EGEA 2015

Conference - Edition 7

June 3rd – 5th 2015
Fiera Milano- Milan – Italy

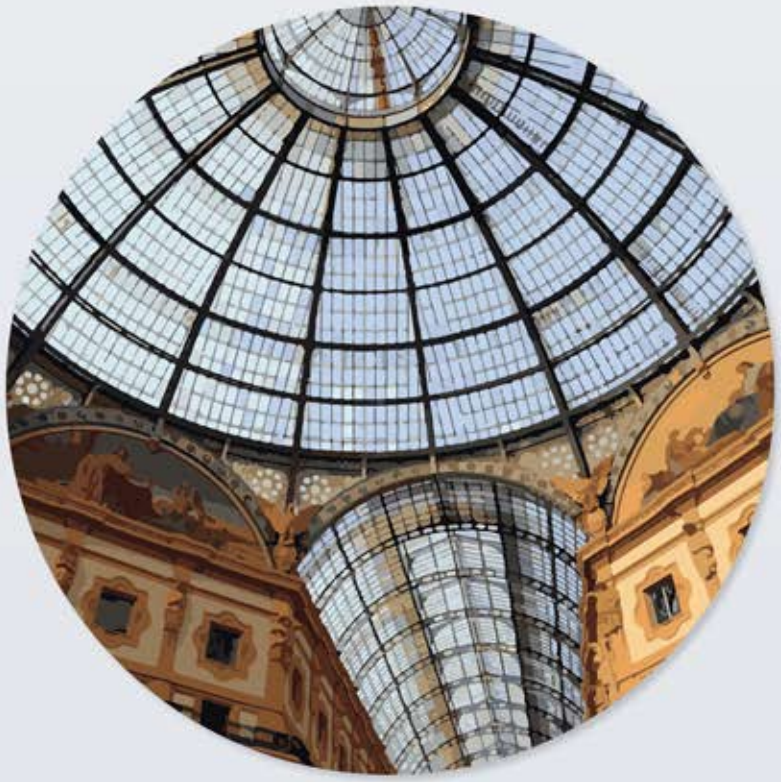
HEALTHY DIET, HEALTHY ENVIRONMENT WITHIN A FRUITFUL ECONOMY: THE ROLE OF FRUIT AND VEGETABLES

Chair: **E. Riboli** - UK

EGEA
CONFERENCE
7th edition

Scientific Committee:

MJ. Amiot-Carlin - FR; **M. Caraher** - UK; **M. Caroli** - IT; **N. Darmon** - FR; **ML. Frelut** - FR; **F. Gomes** - BR; **J. Halford** - UK; **P. James** - UK; **T. Norat** - UK; **R. Nugent** - USA; **S. Panico** - IT; **E. Riboli** - UK; **G. Riccardi** - IT



Scientific Coordinator: **Saïda Barnat** - FR

Organized by les fruits et légumes frais Aprifel

With the support of FranceAgriMer Établissement national des produits de l'agriculture et de la mer

les fruits et légumes frais Interfel

Preface

Vytenis Andriukaitis
European Commissioner for Health and Food Safety

I am honoured to introduce this book of abstracts for EGEA's 7th international symposium promoting a diet rich in fruit and vegetables. I welcome the title of this year's event "healthy diet, healthy environment within a fruitful economy: the role of fruit and vegetables". Indeed healthy diets contribute to making people healthy; and healthy people are the driving force of a healthy economy.

As the EU Health Commissioner, I believe there is a sound economic case for health promotion. This is why I will continue to urge EU countries to invest in disease prevention and health promotion to improve people's health and quality of life. Doing so will help avoid higher societal costs down the line.

Nutrition, as we all know, is an important determinant of health. A balanced diet, with high consumption of fruit and vegetables, helps prevent a number of chronic diseases and improves health outcomes across the board. This is good not only for the individual but for the economy as a whole, as a population in good health makes for an active and productive workforce, and also alleviates the burden on health and social budgets.

So, how is the EU doing in terms of fruit and vegetable consumption? The joint EC/OECD "Health at a Glance: Europe 2014[1]" paints a worrying picture. In the European Union, the proportion of citizens eating vegetables every day ranges from 41% to 95% with an average of 58%. This means that 42% of Europeans eat no vegetables at all during an average day! When it comes to fruit, only 61% of our citizens eat fruit daily, meaning that 39% eat no fruit at all in an average day. Little wonder, then, that the rate of overweight and obesity amongst adults exceeds 50% in no less than 17 EU countries.

The Commission is keen to promote fruit and vegetable consumption, especially amongst the young and fosters exchange of best practices to promote good nutrition in a number of dedicated platforms.

The EU-financed fruit scheme continues to provide school children with fruit and vegetables to help shape healthy eating habits. In addition, a number of interesting projects to promote healthy nutrition are being piloted in several European countries. One, called "My healthy family", encourages children, older people and pregnant women from less wealthy regions in Hungary and Poland to eat more fruit and vegetables.

"We love eating", another family-oriented initiative, encourages conscious eating with a diet that includes colorful fruits and vegetables, and more physical activity for people in seven European cities.

The abstracts in this book are a reflection of the wide range of issues we need to address to promote healthy diets, from advertising to agriculture, and provide a source of inspiration for policy makers and stakeholders.

Vytenis Andriukaitis

[1] Health at a Glance: Europe 2014: http://ec.europa.eu/health/reports/docs/health_glance_2014_en.pdf

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S. Barnat - Egea Scientific Coordinator - Aprifel - FR

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A world tour Fruit & Vegetable policies - *animated by* **M. Caraher** - UK

With: **F. Branca** - WHO, **UR. Charrondiere** - FAO, **P. James** - Representative of EGEA Chairs, **P. Roux** - DG SANTE - EC, **R. Van der Stappen** - DG AGRI - EC

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Epidemiology of food, nutrition, physical activity and cancer - **E. Riboli** - UK

Mis-selling foods: Marketing strategies in the multi-media world and their impact - **J. Halford** - UK

Policy coherence to promote fruit and vegetable intake - **K. Allen** - UK

18:30-20:30 *Welcome cocktail - With the kind contribution of Freshfel Europe*

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New food system approaches to managing and resolving the burden of obesity and chronic diseases - **N. Renshaw** - BE
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The biology of taste and flavor learning - **J. Mennella** - USA

How family influences children's eating behaviour - **S. Issanchou** - FR

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Cognitive development from early childhood to adolescence and impact of old and new media advertising - **ML. Frelut** - FR

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The SFVS: a collaboration between agriculture and health - **I. de la Mata** - DG SANTE - EC

The New Zealand FIS at a glance - **P. Dudley** - NZ

The SFVS: a successful initiative whithin the Common Agricultural Policy - **R. Van der Stappen** - DG AGRI - EC

SFVS on live : One scheme, plenty implementing ways - Short movie on participating Member States
G. Keller - DG AGRI - EC

16:30-17:00 **Conclusions**
E. Riboli - UK

President

Elio Riboli
Director - Imperial College London
UNITED KINGDOM

Marie - Josèphe Amiot-Carlin
Vice Director of the Research
Unit Nutrition INRA / INSERM
FRANCE

Martin Caraher
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City University London
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Jason Halford
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Philip James
Past-President World Obesity Federation
London School of Hygiene
and Tropical Medicine
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Teresa Norat
Epidemiologist - Imperial College London
UNITED KINGDOM

Rachel Nugent
Clinical Associate Professor & Project
Director - University of Washington
USA

Salvatore Panico
Professor - Medicina Clinica e Chirurgia
Federico II University
ITALY

Gabriele Riccardi
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OFFICIAL OPENING

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WELCOME

S. Barnat
Egea Scientific Coordinator - Aprifel - FR

Saida BARNAT, Ph.D in Human Nutrition, is the Scientific Director and Deputy Director of APRIFEL, the French Agency for Research and Information on Fruits and Vegetables. In this capacity, she has developed a broad international network among the scientific community (nutrition, health, and behaviour, food safety...) and facilitated interaction with the fruit and vegetables sector and other key stakeholders, such as consumer associations.

Dr. Barnat is the Vice Chairman of Freshfel's Promotion and Communication Committee. From 2009 until 2012, she served as part of the EU Group of Experts for technical advice on the School Fruit Scheme to help the implementation and the evaluation of the Scheme in the EU Member States.

June 3rd, 2015

A world tour Fruit & Vegetable policies

animated by **M. Caraher** - UK

With:

F. Branca - WHO; **UR. Charrondiere** - FAO; **P. James** - Representative of EGEA Chairs;

P. Roux - DG SANTE - EC; **R. Van der Stappen** - DG AGRI - EC

Questions for all panelists

1. What economic arguments can health authorities make for raised fruit & vegetable (F&V) consumption? Where do health arguments align with job opportunities and the economy?

2. New policy initiatives are increasingly assessed on the basis of their economic and environmental impact. Given the social as well as economic costs of unhealthy eating, nutrition should form an integral part of any policy assessment. How can the public and health authorities help achieve this goal of health related policy making?

3. How can we change the structures that cause food systems to provide such poor and monotonous F&V options?

4. In the coming cooperation on nutrition issues with EFSA, how could the EC and WHO focus on foods, especially on F&V to increase F&V consumption as part of the solution to tackling obesity and other NCDs? What about developing guidelines for self-regulation reflecting a risk-based approach and can we set the process up so that self-regulation, if failing, leads progressively to mandatory measures?

5. We need more/better policies that increase the availability and accessibility of nutrient-rich foods such as F&V. Which policies would be appropriate in your view and what further measures would you take to promote F&V polices in countries/member states?

6. What are the plans to link any increases in F&V production with ecologically sustainable policies?

7. How can we preserve agrobiodiversity, ensure food sovereignty and prevent malnutrition (both excesses and deficiencies) through public policy? How can we connect these objectives to increased F&V consumption?

HEALTHY DIET, HEALTHY ENVIRONMENT WITHIN A FRUITFUL ECONOMY: THE ROLE OF FRUIT AND VEGETABLES

Moderator:

M. Caraher
Professor of Food & Health Policy
City University
London - UK
m.caraher@city.ac.uk

Martin Caraher is Professor of Food and Health Policy at Centre for Food Policy at City University in London. He originally trained as an environmental health officer in Dublin.

He has worked for and acted as a consultant to the UK Dept of Health, the World Bank and the World Health Organisation. He was a member of the original London Food Board which developed the food strategy for London. He was a member of the 2012 Olympic Food Group representing public health interests.

He currently acts as an advisor on food matters to a number of social science research groups across Europe, as well he is an advisor to the European Executive Agency for Health and Consumers (DG SANCO) and the European Commission's Consumers Health And Food Executive Agency (Chafea), Health Unit He is also a member of the International Obesity Task Force (IOTF) scientific committee.

Martin has worked extensively on issues related to food poverty, cooking skills, local sustainable food supplies, the role of markets and co-ops in promoting health, farmers markets, food deserts & food access, retail concentration and globalisation.

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F. Branca
Director - WHO
Nutrition for Health
and Development
Geneva - CH
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Francesco Branca is the Director of the Department of Nutrition for Health and Development in the World Health Organization in Geneva and is currently the acting Executive Secretary of the Standing Committee of Nutrition.

He has been a Senior Scientist at the Italian Food and Nutrition research Institute where he was leading studies on the effects of food and nutrients on human health at the different stages of the life cycle and on the impact of public health nutrition programmes. He has been President of the Federation of the European Nutrition Societies in 2003-2007.

Dr. Branca graduated in Medicine and Surgery and specialized in Diabetology and Metabolic Diseases at the Universita' Cattolica del Sacro Cuore, Roma and obtained a PhD in Nutrition at Aberdeen University.

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UR. Charrondiere
Nutrition Officer
FAO Nutrition Division
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Dr U. Ruth Charrondiere is a nutritionist and has worked on dietary assessment, food composition, biodiversity, breastfeeding, sustainable diets and exposure assessment.

She has worked with WHO, UNICEF and since 2002 with the Food and Agricultural Organization of the United Nations (FAO). She is the coordinator of INFOODS (International Network of Food Data Systems). She is also an expert in Total Diet Studies (TDS) and exposure assessment, and served as member in the EFSA working group on TDS and in the ANS Panel.

She has contributed to capacity and standard development in food composition and TDS through teaching in many international courses, the development of the FAO/INFOODS e-Learning Course on Food Composition Data and the Compilation Tool, and many guidelines and is active in policy fora to improve the nutrient composition of agricultural products. She has also published about 190 scientific articles, book chapters, technical or policy-guidance documents, and databases/ tables/ tools.

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P. James
Past-President World Obesity Federation - London School of Hygiene and Tropical Medicine - UK
Jeanhjames@aol.com

Professor Philip James established the International Obesity Task Force in 1996 and then became President of the World Obesity Federation from 2008 to 2014 and now assumes the role of Past President responsible for global initiatives relating to food and health with particular emphasis on the pandemic of obesity and chronic diseases.

He chaired the first WHO Technical group on diet and the prevention of chronic diseases and malnutrition. He also chaired and wrote the UN Millennium Commission Report on global issues relating to nutrition up to 2020, and produced Blair's plans for the UK Food Standards Agency and those for a new EU Food and Health Authority. His new analyses led to the new 5% goal for sugar.

He now works for WHO tackling the challenge of nutrition related diseases globally but especially in North Africa and the Middle East, with new initiatives involving reformulation of staple foods, the elimination of trans fats, the promotion of vegetable and fruit consumption and the creation of new standards for food availability in all public supported institutions.

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P. Roux
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Philippe Roux is Head of Unit SANTE.C.4 "Health determinants" since 1st July 2013.
He started his career in the French Social sector in 1985. During the same time, he studied social sciences, European law and Public Health. He worked with DGV (Employment and Social Affairs) from 1990 to 1998 in support of the development of the EU initiatives related to drug prevention.

In September 1998, he joined the European Monitoring Centre for Drugs and Drug Addiction where he contributed to the development of the framework and tools for the evaluation of the EU action plans on drugs and was from 2002 deputy Head of Unit in the "Interventions, law and policy" Unit of the Agency.

He joined SANCO Health Determinants Unit in 2005 to work with the Nutrition and Physical Activity team with responsibilities in the coordination of the Diet, Physical Activity and Health European Platform. He was Deputy Head of Unit SANTE.C.4 "Health determinants" from October 2006 to January 2013. He was acting Head of this Unit from January to June 2013.

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R. Van Der Stappen
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Rudy van der Stappen, lawyer specialised in European Law, working for the European Commission since 1989 on agricultural matters.

He is currently the deputy head of the horticultural and specialized crops unit in DG Agriculture (fruit and vegetables, olive oil, wine, bananas and floriculture), dealing with market analysis and monitoring as well as management of policy instruments associated with these sectors (including drafting of required legislation).

Keynote lectures

Epidemiology of food, nutrition, physical activity and cancer
E. Riboli - UK

Mis-selling foods: Marketing strategies in the multi-media world and their impact
J. Halford - UK

Policy coherence to promote fruit and vegetable intake
K. Allen - UK

HEALTHY DIET, HEALTHY ENVIRONMENT WITHIN A FRUITFUL ECONOMY: THE ROLE OF FRUIT AND VEGETABLES

E. Riboli
Director
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Professor Elio Riboli is Director of the School of Public Health at Imperial College London. Prof. Riboli has an M.D. degree (1977, Milan), a Master of Public Health (1980, Milan) and a Master of Science in Epidemiology (1982, Harvard, Boston, USA).

In 1983 he moved to IARC-WHO in Lyon, where he undertook the task of developing new research projects in the area of nutrition, nutritional status and cancer. In 1990 he initiated the European Prospective Investigation into Cancer and Nutrition (EPIC), which eventually included 26 centres in 10 European countries. Questionnaire data on diet and lifestyle have been obtained from about 500,000 study subjects, and blood samples from most of them. He was Head of the Nutrition and Hormones Group of IARC from 2004 to 2005.

In 2006, Elio moved from IARC to Imperial College where he was initially appointed Professor and Chair in Cancer Epidemiology and Prevention and in 2008 the Director of the School of Public Health, a position which he still holds today. Currently Elio is Chair of Interventional Public Health of the Imperial College AHSC and Director of Research in Public Health of the Imperial College NHS Healthcare Trust, providing a direct link between academic research, public health and clinical translation.

Epidemiology of food, nutrition, physical activity and cancer

Over the past two decades a growing body of scientific evidence has accumulated supporting the role in cancer aetiology of factors that for convenience are often labelled as "metabolic", as opposed to "exogenous carcinogens". These include diet composition, anthropometric characteristics, physical activity, "metabolic syndrome" components such as hyperinsulinemia and high blood pressure, and some aspects of sexual maturation and reproductive history (the latter, specifically in relation to some female cancers).

The need to investigate complex lifestyle factors and the growing interest in taking advantage of biomarkers of various metabolic conditions led to the development of very large prospective cohort studies with baseline collection of blood samples and their long term storage for future laboratory analyses to compare biomarkers in subjects who developed cancer and those who didn't during the follow-up period.. This new generation of large scale projects combining personal lifestyle and clinical data with biological samples has provided the research infrastructure required to investigate the role of metabolic factors in cancer causation and prevention and has led to major discoveries.

The role of overweight and obesity in cancer mortality was first suggested by studies conducted in the 1930s within the databases of large USA Health Insurance companies. However, sound epidemiological evidence took time to accumulate and it was not until the first WCRF-AICR Global report on diet, nutrition and cancer (1997) that the role of obesity was judged "probable" by a high level expert panel and eventually upgraded to "convincing" in the 2007 WCRF-AICR report.

EPIC largely contributed to the identification of an increased cancer risk in overweight/obese individuals, particularly in relation with the cancers of the colon and rectum, breast (after menopause), endometrium, ovary, kidney, liver, and non-Hodgkin's lymphoma. Taking all available evidence into account, it is currently estimated that the worldwide cancer burden due to overweight and obesity is in the order of 15-19 percent in high income countries and 10-13 percent medium and low income countries.

Sedentary lifestyle and lack of physical activity have been known for long time to be related to higher risk of developing coronary heart, other vascular diseases and type 2 diabetes. The possible cancer preventative effect of physical activity was first suggested by experimental studies in rodents conducted more than 50 years ago. Some case control studies on colorectal cancer and breast cancer conducted in the 1980s suggested that this could also be the case in humans. However, a number of methodological doubts surrounded these results, due to the scepticism on the scientific validity of retrospective assessment of physical activity levels in cancer patients compared to healthy controls.

Prospective cohort studies have had a key part in providing convincing support to the role of physical activity in reducing cancer risk and conversely the detrimental effect of sedentary

lifestyle. EPIC as well as other large prospective cohort studies have found that the effect of physical activity on cancer risk is seen at different levels of BMI and conversely, increased BMI is a risk factor for subjects at different levels of physical activity.
The mechanisms linking obesity and sedentary lifestyle are now becoming better understood, and include the deregulation of insulin sensitivity, the triggering of inflammation processes and the deregulation of various growth factors.
Overall, obesity and sedentary lifestyle are emerging as major causes of cancer as well as of other diseases worldwide.

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J. Halford
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Professor Jason Halford is a chartered Health Psychologist and currently the Convernor of the Liverpool Obesity Research Network – LORN. He is also the head of the Department of Psychological Sciences. He is a Chair in Biological Psychology and Health Behaviour at the University of Liverpool and former Director of the Human Ingestive Behaviour laboratory. He has Chaired of the UK Association for the Study of Obesity – ASO from 2011. The ASO is Europe's largest and the World's oldest National Obesity Science organisation.

Over the past 10 years his research has focused on drug induced weight gain, the effects of nutrients and fibre on appetite and hormone release, the effects of stress on eating behaviour, and on lean obese differences in the expression of appetite. More recently, his works have focused on the effects of branding and food promotion on children's food preferences and diet. Professor Halford is co-ordinater of the EU Frame work project SATIN and have conducted a number of weight management interventions (nutritional, behavioural and pharmaceutial)

Mis-selling foods: Marketing strategies in the multi-media world and their impact

The child is a key market due to 1) the influence they exert over family spending, 2) their role as a direct market due to their personal spending power, and 3) critical a future market as a lifelong ('cradle to grave') consumer. The brand is central to this and brand building starts in toddler-hood. The brand associates an image or personality with a product or range and generates positive sentiment towards it. Young children have a high recognition of brand logos and by the age of 3 start making brand requests. This not only affects food choice but also the perceived attributes of foods. Brands are built on advertising. Television revolutionised advertising and TV remains the most direct means of accessing children. It is an entry point and a core activity that all other promotional activity is structured around. Advertising to children relies on fun, happiness, enhances popularity, enhanced performance or elevated mood, coolness, taste and flavour and are designed to grab attention through unusual sound effects, movement, fast pacing, fantasy, creative music, catchy jingles, humour and repetition (all of which improve recall). The complexity and interconnectedness of this has proliferated in the digital age. While it is relatively easy for children to distinguish traditional media, online and particular social media based marketing is more difficult to discern. Moreover, a child need not understand the material is promotional to be influenced by it.

Promotional messages are reinforced through the influence of peers and parents, and encountering brands outside the context of the advert (sponsorship and other marketing activities). Celebrity endorsers, licenced and brand equity characters, are not only components of adverts, but operate beyond the advert to reinforce the core brand values, and also independently influence eating behaviour. Advergames immerse the child in the brand, reward interaction through enjoyment and achievement, and through competition and social media engage and recruit peers.

A positive relationship with the brand is built and shared. Preferences are based on innate and learnt factors which adverts reinforce. Branded food is cheap, ubiquitous (and tasty), and in environments in which brands are highly visible (shops, schools, cinemas etc.), children with positive brand beliefs are particularly alert to this imagery. Positive evaluations trigger a behavioural response, purchase or request to purchase. The enjoyment derived through consumption will ensure children remain emotionally vested in the brand.

Representative bodies and lobbyists for industry challenge the science despite an extensive body of rigorous reviewed studies and evidence based reviews. Industry commissioned reports are seldom independently reviewed nor are the supporting data freely available. Parental responsibility is regularly cited. Parents are gate keepers but children are exposed to vast amounts of persuasive marketing which engenders parent-child conflict and unhappiness. We must be careful not to overstate the role of food promotion in childhood obesity, but we should recognise *"Efforts to prevent NCDs (Non-Communicable Diseases) go against the business interests of powerful economic operators. … this is one of the biggest challenges facing health promotion."* Dr Margaret Chan, Director General, WHO, 10.6.13.

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K. Allen
WCRF International
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Dr Kate Allen works as Executive Director (Science and Public Affairs) at World Cancer Research Fund International (wcrf.org), leading and developing the organisation's scientific, policy and conference programmes in the areas of food, nutrition, physical activity and weight management. An important aspect of her role is helping to create collaborative relationships and activities across the WCRF national charities (in Europe, the Americas and Asia) in these areas.

Previously Kate worked at The Institute of Cancer Research, where she set up an award winning Interactive Education Unit developing learning materials for scientists, healthcare professionals, students, patients and the general public. Before that she worked at Medi Cine International, a medical education agency, where she developed educational materials across all media, mainly for specialist physician audiences.

Kate has a PhD in neurology and worked originally as a scientist at the Institute of Neurology and the National Hospital for Neurology and Neurosurgery at Queen Square, London and the Royal College of Surgeons of England.

Policy coherence to promote fruit and vegetable intake

As recorded by the WCRF International NOURISHING database, governments in countries all over the world have taken actions to promote fruit and vegetable intake among their populations. However, in most countries, intake remains inadequate. In this presentation we will show how a more coherent approach to fruit and vegetable promotion policies has the potential to be more effective. It will look at the potential to implement policies across the NOURISHING Framework to promote fruit and vegetable consumption – through labeling and claims; offers in specific settings; using fiscal measures; setting incentives for retailers; harnessing the food supply chain; informing people through public awareness; advice in health care settings; and giving nutrition education.

June 4th, 2015

Plenary Session

Agriculture & Health: a promising wedding

Chair:

K. Brownell
Dean of the the Sanford School of Public Policy
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Kelly Brownell is Dean of the Sanford School of Public Policy at Duke University, where he is also the Robert L. Flowers Professor of Public Policy and Professor of Psychology and Neuroscience.

Prior to joining the faculty at Duke, Brownell was at Yale University where he was the James Rowland Angell Professor of Psychology, professor of epidemiology and public health, and director of the Rudd Center for Food Policy and Obesity. While at Yale he served as chair of the department of psychology and as master of Silliman College.

Brownell has published 15 books and more than 350 scientific articles and chapters. He has served as president of several national organizations, including the Society of Behavioral Medicine, Association for the Advancement of Behavior Therapy and the Division of Health Psychology of the American Psychological Association. He is in the Institute of Medicine and in 2006 was named by Time Magazine as one of the World's 100 Most Influential People.

With:

M. Cecchini - OECD - FR

N. Renshaw - EPHA - BE

P. James - London School of Hygiene and Tropical Medicine - UK

M. Cecchini
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Michele Cecchini is a health economist / policy analyst in the OECD Health Division, where he has been working on the Economics of Prevention project since 2007.
His research interests include priority setting and programme evaluation in the health sector, in particular with regards to the health and economic assessment of policies influencing non-medical determinants of health (e.g. nutrition, physical activity and alcohol consumption).

Michele holds a position of adjunct professor in applied health economics at the School of Public Health of the University of Siena and held a visiting position at the Health Services & Systems Research Centre of the Duke-NUS Graduate Medical School in Singapore. He has also served as a temporary advisor to a number of government and international agencies, including WHO and the EC on a range of diet- and physical-activity related issues.

After obtaining a degree in Medicine and Surgery at the University of Genoa, Michele completed his specialist training in Public Health at the University of Siena. He also obtained a master degree in Health Policy, Planning and Financing from the London School of Economics and the London School of Hygiene and Tropical Medicine.

Remedying the food based costs of chronic diseases

M. Cecchini and F. Sassi

Unhealthy diets, resulting from changes in food supply and eating habits, are responsible for a larger share of mortality and morbidity than any other risk factor. In 2010 alone, more than 11 million deaths worldwide were amenable to chronic diseases associated with low consumption of fruit, vegetables and whole grains and high consumption of salt, fat and added sugars. Beyond being a top health problem, unhealthy diet poses a significant threat to the economic sustainability of healthcare systems. Obese people incur at least 25% higher healthcare expenditures than those of normal-weight individuals. The EC estimates that the economic burden related to unhealthy diet, physical inactivity and obesity represents up to 7% of EU health budgets, without taking into account further costs resulting from lost productivity and premature deaths. The diet of Europeans is not getting better; evidence suggests that the recent economic crisis may have led consumers to further switch to lower-priced (per calorie) and less healthy food.

Based on OECD and WHO analyses, in 2011 the UN assembly endorsed a prevention package which includes policies to tackle unhealthy diet and lack of physical inactivity. All these interventions have a significant public health impact, are highly cost-effective, affordable and feasible to implement. Intersectoral prevention strategies are a key component of this package as they tend to be incredibly efficient and generate larger health gains. Carefully designed policies in the agricultural and education sector have, in particular, the potential to steer people towards healthier dietary behaviours.

A prevention package including health education and promotion, regulation and fiscal measures, and lifestyle counselling by family doctors is a better investment than many treatments currently provided by OECD health care systems. If implemented, it would favour a more balanced diet which in the medium term would prevent, in the European region, more than 40 million life years lived with cancer and 30 million life years lived with cardiovascular diseases. One in every eight European citizens would benefit from an additional year of life expectancy. The impact on health expenditure would be also remarkable, with cumulative savings in healthcare expenditure for over 120 USD per capita. The same strategy would produce effects of comparable magnitude in North America.

In emerging economies, population-wide approaches, that do not rely only on the delivery of costly patient-level care, may play an even larger role with the additional advantage of decreasing the pressure on healthcare systems already under constraint. Price and regulation policies as well as food standard are some of the most efficient 'best buys'. Analyses on Brazil and China show that packages including these interventions would produce a significant health impacts becoming cost saving shortly after their implementation.
A switch to a more healthy diet would not damage the agricultural sector either. OECD calculated that the switch of demand in foodstuff following the implementation of these prevention actions would decrease, on average, the world price of beef and vegetable oils by 1% and of cheese by 1.5%.

N. Renshaw
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Nina Renshaw joined EPHA (European Public Health Alliance) as Secretary-General in November 2014 after eight years at Brussels-based environmental group Transport & Environment. At T&E she was Deputy Director and successfully campaigned on a variety of issues including safer lorry design, sustainable transport investment, road pricing and traffic noise. She was a delegate to the World Health Organization (WHO) and the United Nations Economic Commission for Europe (UNECE) on traffic noise and represented the Green10 environmental groups on the European Commission's advisory group on red tape reduction.

After graduating in International Business in the UK, she started her career in logistics in Austria. She gained an MA in European Policy and Politics from Humboldt University in Berlin and Bath University where she specialised in civil society and policy-making.

New food system approaches to managing and resolving the burden of obesity and chronic diseases

Our future *Food Policy* must be one that protects & improves our health.
UN Special Rapporteur on the right to food, Olivier de Schutter speaks of a need to better link agriculture, food & health – "at the moment these are completely disconnected policies." And "We need to focus on wellbeing, not just agricultural production."

Currently public health is an afterthought to the EU agri policy:
There is only 1 explicit public health measure in the CAP – which is only 0.25% of spending – the School Fruit Scheme.
And even that is up for a 'subsidiarity review', which shows that the dogma of "Better Regulation" is not about policy quality, efficiency or necessity – because the SFS is a success:

- The SFS gets fruit & veg to over 8 million children in the EU.
- Studies show it leads to more f&v eaten at home with families as well.
- It is particularly essential considering very many children regularly have days where they don't get any of their '5 a day'.
- Two-thirds of EU Member States do not manage to reach the absolute minimum of 400g (capita/day) of fruit and vegetable consumption recommended by the World Health Organisation (WHO).
- OECD and WHO analysis show that consumption of fruit and vegetables is falling since the economic crisis, as households tend to replace healthy food by cheaper processed and calorie-dense foodstuffs (HFSS). Healthy diets are already for many people in Europe – unaffordable? – luxury.
- 25 MS have taken up the SFS: Certainly a majority of these did not have national schemes in place before and esp in CEE – so EU level programme surely makes a difference.

So what more can Food Policy do for our health? Secure a supply of nutritious, healthy food.
Very obvious symptoms of a policy which currently does not deliver on this:

- Half of us in Europe are overweight. The UK's Chief Medical Officer says overweight has become "normalised".
- There are 22 million overweight children in the EU - 5.1 million obese.
- This is happening incredibly rapidly. 1 in 4 kids was overweight in 2008, now it's already 1 in 3, with numbers rising by around 1.2 million children overweight and 300,000 obese each year.
- Epidemic-proportions of diet-related NCDs (CVDs, cancers, T2 diabetes) – it must be said that these are in large part preventable conditions, leading to premature deaths.
- CVDs cause 52% of premature deaths in Europe at estimated costs to the EU economy of almost Euro 200bn/yr.

Obviously these figures bely suffering, but it's also essential to put into the context as posing a severe (avoidable) barrier to economic growth – a healthy and productive workforce.

It is not an overstatement to say that the future affordability, sustainability and even survival of our national health systems as we know them depends on better action against obesity and chronic diseases.

But the good news is that the vast majority are preventable. - Up to 4/5 cases of NCDs such as CVDs and T2D could be avoided by healthier diets.
Because of this EPHA calls for an analysis of 'health-harmful subisides', including those in the CAP on animal fats, sugar and alcohol. We need to have the discussion how these are affecting our health and our economies. Are subsidies really needed? Are they targeting the right policy objectives? Can these be well justified to the public and taxpayers?

Some countries are already taking fiscal action or enacting bans – on transfats, soft drinks, minimum unit prices for alcohol. National fiscal measures - Having to take away with one hand to prevent harm from products that are subsidised by the EU clearly needs rationalisation – especially as consumers are caught in between. If we really mean it with "Better Regulation" – let's look at the effects of subsidies on our health.

We need to take an open minded approach into how this situation can be improved. Not just from the CAP but joined up food & health policies at EU level, including labelling, marketing and advertising, backed up by national policies and measures. Taking up the challenge for health will benefit society and economy as a whole – especially – and this has been entirely overlooked to date - the future sustainability of our health services.

The next generation of food - agri - rural dvp policy must be firmly put in this context: must deliver, not undermine, sustainable health systems, a healthy and productive workforce and sustainable economies.

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Professor Philip James established the International Obesity Task Force in 1996 and then became President of the World Obesity Federation from 2008 to 2014 and now assumes the role of Past President responsible for global initiatives relating to food and health with particular emphasis on the pandemic of obesity and chronic diseases.

He chaired the first WHO Technical group on diet and the prevention of chronic diseases and malnutrition. He also chaired and wrote the UN Millennium Commission Report on global issues relating to nutrition up to 2020, and produced Blair's plans for the UK Food Standards Agency and those for a new EU Food and Health Authority. His new analyses led to the new 5% goal for sugar.

He now works for WHO tackling the challenge of nutrition related diseases globally but especially in North Africa and the Middle East, with new initiatives involving reformulation of staple foods, the elimination of trans fats, the promotion of vegetable and fruit consumption and the creation of new standards for food availability in all public supported institutions.

Transforming the food chain to combat inequity and environmental degradation

Most societies started with subsistence agriculture until the agrarian revolution allowed the greater long-term storage of foods, particularly cereal crops. This then sustained the evolution of towns and cities but to this day the availability of fruits and vegetables to major cities is highly constrained by transport and storage problems. Furthermore the economic and agricultural thinking imposed on the poorer countries of the world since the 1950s was based, for the first 4 decades, on the UK World War II experience of the need to consider national food production as an issue of national security together with a focus on providing enough animal protein and energy from any source to deal with the original UK

concern to combat stunting in children and to avoid children's underweight and meet the energy needs of adult workers. The collapse of the Soviet Union and the global acceptance of the free market philosophies of the Reagan/Thatcher era led to a collapse in agricultural support and an acceleration in today's cheaper nutritionally poor junk food culture. Individualistic not community led policies and right wing political thinking accepted any societal process amplifying economic opportunity. Huge market forces in affluent countries manipulated food prices so that the poorer came to rely on cheaper nutritionally inadequate food; inequity is now linked to obesity and poor diets. In lower income countries subsistence farming is decried and international investment focuses on cash crops to feed the affluent world. Global warming is accelerated by unsustainable fossil fuel fed agriculture and ever-greater ruminant meat consumption.

Free market forces dominate economic orthodoxy but inequity and climate change topped the agenda at the 2015 Davos World Economic Forum. Even the IMF, renowned for savaging the well-being of poorer countries by "structural adjustment", recognizes the validity of Picketty's economic analyses of escalating capitalist inequity and the huge economic costs of inequity; climate change issues now dominate the UN if not global agenda. Health as well as climate change analyses reveal the importance of limiting meat consumption economically and changing agricultural policies with a dramatic consequent reduction in cereal growing. So a new agenda is emerging for agricultural change but where inequity is not yet locked into the remedial framework.

We need to be more radical than Picketty and recognize the conjoint interactive political/business manipulation of national policies to preserve the wealthy. Progressive change tackling the current corrupt political power bases requires changes in institutions and policies to make pre-tax income distribution far less unequal with "living wages" for all and changes in corporate governance and trade union laws. We also have to impose carbon taxes and the environmental costs into food production with progressively higher taxes on international food commodity trade. Water conservation will become crucial as climate change threatens the current capacity to grow fruit &vegetables as well as sustainable grassland. So scientists and radical economic planners now need to engage politically.

June 4th, 2015

Parallel Sessions

✓ **Nutrition & Health**

Advertising

Sustainable Agriculture

Nutrition & chronic diseases: What is new?

Chair:

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Dr. Teresa Norat is an epidemiologist working as Principal Research Fellow in the Department of Epidemiology and Biostatistics at Imperial College London since 2007.

She is coordinating the World Cancer Research Fund Continuous Update Project at Imperial College.

She worked from 1998 to 2006 in the Unit of Nutrition at the International Agency for Research on Cancer, Lyon where she collaborated in the large European Prospective Investigation into Nutrition and Cancer (EPIC).

Her research focuses on the role of nutrition, lifestyle, metabolic factors and genetic factors in the aetiology of chronic diseases, in particular cancer in EPIC.

With:

E. Kampman - Wageningen University - NL

S. Panico - University of Naples Federico II - IT

G. Riccardi - University of Naples Federico II - IT

E. Jirillo - University of Bari - IT

E. Kampman
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Ellen Kampman is a nutritional epidemiologist and professor in Diet and Cancer at Wageningen University and Research Centre in the Netherlands.

Her research focuses on the role of lifestyle in cancer prevention and prognosis. She is project leader of many national and international research projects. Her multi-disciplinary research group conducts observational epidemiological studies and intervention studies among healthy individuals and cancer survivors.

One of the ongoing observational studies is The GeoLynch study (http://www.geolynch-studie.nl/geolynchstudy_eng), a prospective cohort study among Lynch Syndrome carriers. Another ongoing study is the COLON study, a prospective study among 1,000 colorectal cancer patients (http://www.colon-studie.nl/colonstudy_eng).

She published more than 100 papers in peer-reviewed international journals and is senior editor of the AACR journal Cancer Epidemiology Biomarkers and Prevention. Prof. Kampman studied Nutrition and Health at Wageningen University. During her PhD study in Cancer Epidemiology, she was a visiting fellow at the Harvard School of Public Health in Boston. With support from the Dutch Cancer Society, she received postdoctoral training in Molecular Biology at the Fred Hutchinson Cancer Research Centre in Seattle.

Nutrition and Cancer - An apple a day keeps the doctor away?

Dietary factors play an important role in the prevention of several types of cancer. Based on the systematic literature review (SLR) of the WCRF/AICR Second expert report, it is estimated that about one third of all frequently occurring cancers could be avoided by healthy food habits and an increase in physical activity. Based on convincing and probable evidence from this SLR, WCRF/AICR formulated dietary guidelines for cancer prevention on an individual as well as on a public health level. Adherence to these guidelines are inversely associated with cancer risk in several prospective cohort studies.

One of the recommendations for cancer prevention involves eating more vegetables and fruits as part of a healthy diet to prevent various types of cancer. As dietary intervention studies in healthy individuals with cancer as the endpoint are considerably complex and expensive , this recommendation is mainly based on observational epidemiological studies and animal experimental studies. Large prospective cohort studies, however, show at best weak associations between the intake of vegetables and fruits and the risk of various cancers. The results of these studies may be biased by residual confounding, but the observed weak associations may also be due to the use of food frequency questionnaires to estimate habitual dietary intake. Studies using biomarkers of vegetables and fruit intake as assessed in blood samples show stronger associations. Also, consumption of vegetables and fruits may be most beneficial in childhood, a period in life which is not covered by most cohort studies.

Whether a higher consumption of plant foods may also be associated with a favorable cancer prognosis is unknown, and is currently evaluated in various prospective cohort studies among individuals diagnosed with cancer.

Up until now, the specific phytochemicals or specific types of vegetables and fruits responsible for the apparent benefits are, however, not identified. Results from intervention trials with specific phytonutrient alone do not explain the observed health benefits of diets rich in fruits and vegetables. Recommendations therefore suggest to consume a variety of vegetables and fruits.

Implementation of the cancer prevention guidelines appears to be challenging. Only a very small fraction of the population does consume the recommended servings of vegetables and fruits daily. In some European countries, only 5 to 10% of the general population adheres to this guideline.

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Salvatore Panico is Professor of Internal Medicine at the School of Medicine Federico II University. Prof. Panico is board certified in Medicine (Naples, 1975), in Nephrology (Naples, 1978), Master of Science Epidemiology University of London (1980) and in Cardiology (Naples, 1983).

He was director of the National Research Council Unit "CVD in Mediterranean women" between 1990-96.
Since 2007 he is Research Professor of Social and Preventive Medicine at the State University of New York in Buffalo, USA.

Prof. Panico has been the coordinator of the Ministry of Health Committee on cardiovascular risk in Italy (Center for Disease Control) and since 1999 is the Director of the Clinical Epidemiology and Predictive Medicine Unit at the Dipartimento di Medicina Clinica e Chirurgia (Naples Medical School "Federico II University").

Vegetables and fruit keep preserving cardiovascular health

Scientific literature consistently confirms that prevention and cure of cardiovascular disease is promoted by protective life styles, characterized by the adoption of a healthy dietary pattern, non-sedentary habits, body weight control, together with quitting smoking. Dietary habits have shown important changes in populations in the last years due mostly to socio economic changes and partly to increase in awareness of healthy lifestyle. Some differential trends are detectable if the evaluation is made taking into account social status (education and income): lower-classes are experiencing the worst dietary pattern if compared with middle-high classes; this is true also in Mediterranean countries where the classical diet has been largely substituted by low-cost unhealthy food in less economically privileged individuals. In spite of this the current information on the role of dietary patterns in influencing cardiovascular disease frequency and risk indicate that those individuals who have kept their adherence to the Mediterranean eating habits still experience a protection from cardiovascular disease, and more generally for chronic diseases.

Therefore, in line with the historical evidence on the protective role of the Mediterranean diet, recent observational and experimental investigations indicate that a pattern inspired to the use of those traditional foods still have a protective role. This finding is consistent with the observation that in non Mediterranean countries some patterns, including a number of foods which are part of a protective pattern in Mediterranean populations also have a protective role. Consistently food of vegetable origin appear as the protective part of those dietary patterns. Similar findings are detectable in studies on individuals who have already experienced a major cardiovascular event, where current patterns based on food items that include products of vegetable origin are able to improve prognosis. The potential for prevention and cure by a dietary pattern characterized by the frequent use of vegetables and fruits remain strong over decades and may be considered among the long-lasting evidence in the field of the nutritional literature on chronic diseases and particularly cardiovascular.

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Gabriele Riccardi is Professor of Endocrinology and Metabolic Diseases.
He is Chairman of the Master Course in Human Nutrition at the Federico II University of Naples (Italy), Head of the Diabetes, Nutrition and Metabolism Unit of the University Hospital, and Past President of the Italian Diabetes Society.

Prof. Riccardi is International Fellow of the American Heart Association and member of the Joint Committee of the European Society of Cardiology and the European Atherosclerosis Society for the Guidelines on Management of Dyslipidaemias.

He is member of the Scientific Advisory Board of the Italian Nutrition Foundation, the Barilla Center for Food and Nutrition and the Functional Food Science Center of the Lund University (Sweden). From 2002 to 2007 he was Editor-in-Chief of the journal Nutrition, Metabolism and Cardiovascular Diseases (Elsevier).

Dietary intake of fiber, fruit and vegetables for preventing diabetes and its complications

G. Riccardi, M. Vitale and C. Vetrani

Epidemiological studies indicate that the habitual consumption of two-three servings/day of vegetables and two servings/day of fruit are associated with a reduced risk of T2DM. Any further increase in the consumption of these foods does not seem to have additional benefits. Among the possible mechanisms underlying this association, the beneficial impact of fruit and vegetables on body weight control is certainly relevant in view of the direct relationship between the degree of overweight and the risk to develop type 2 diabetes. In addition, fruit and vegetables represent an important source of dietary fiber that acts at the level of the small intestine by slowing the transit time, thus hampering the post-prandial blood glucose rise. A good control of blood glucose fluctuations throughout the day plays an important role in the prevention of type 2 diabetes and of its long-term complications.

Moreover, dietary fiber is not digested in the small intestine while is metabolized by the gut saprophytic bacteria with production of short chain fatty acids. These metabolites inhibit glucose production by the liver, further contributing to a better regulation of blood glucose levels. Furthermore, they reduce hepatic cholesterol synthesis and are active on triglyceride metabolism, particularly during the postprandial period; this improvement of the overall lipoprotein profile is relevant for the prevention of long-term diabetic complications. Dietary fiber has a beneficial effect also on impaired insulin sensitivity, an important pathogenic factor for the development of type 2 diabetes, and on elevated blood pressure, that influences the risk of diabetic complications at the level of the heart, the kidney and the eyes. Actually, a 10g/day increment of total dietary fiber intake is associated with a 14% decrease in risk of all cardiac events and a 27% decrease in risk of cardiac death. Polyphenols are a very large and complex family of compounds belonging to different classes of chemical structures but with the antioxidant phenolic group as a common element. Polyphenols are present in virtually all plant foods, particularly in fruit and vegetables. A recent study on a representative cohort of adults with diabetes enrolled in USA has clearly demonstrated that consuming more flavonoid-rich fruits and vegetables (dark, leafy greens, citrus fruit, apples and berries) is associated with lower degrees of inflammation, better glycemic control, and reduced odds of diabetic retinopathy.

In conclusion, a regular intake of fruit and vegetables contributes to the prevention of type 2 diabetes and can help to reduce the risk of diabetic complications. The available evidence fully supports dietary recommendations for prevention and treatment of diabetes that give strong emphasis to fruit and vegetables intake.

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Doctor Emilio Jirillo is Professor of Immunology at Bari University since 1986.

He was Scientific Director of the National Institute of Gastroenterology in Castellana (Italy) (from 1986 to 2009).

His key research interests are microbial immunity, mucosal immunology, neuroimmunology, and immunonutrition.

He is author of 316 papers listed in PUBMED and several books and chapter of books. Editorship: Chief Editor of: Endocrine Metabolic Immune Disorders-Drug Targets; Clinical Immunology Endocrine Metabolic Drugs.

Healthy Aging

Nowadays, despite the progressive decline of many bodily functions with aging longevity is increasing. However, elderly is associated to a number of pathologies, the so called age-related diseases, which ultimately lead to frailty. Particularly, inappropriate dietary habits are the major cause of metabolic disease, cardiovascular disease, neurodegeneration and cancer in elderly. On these grounds, a few studies have documented that Mediterranean type diet is associated to healthy ageing also in virtue of a reduced cardiovascular risk. In this framework, polyphenols contained in fruits and vegetables represent major ingredients of the Mediterranean diet, also exerting antioxidant and anti-inflammatory effects. Over recent years, our group has intensively investigated the immunomodulating properties of polyphenols extracted from red wine or fermented grape marc (FGM).

In vitro studies have demonstrated the ability of red wine polyphenols to induce release of nitric oxide from human monocytes and inhibit the activation of the NFK-B pathway, thus leading to a decreased release of proinflammatory cytokines. FGM, when admistered to colitis mice, could reduce clinical manifestations and secretion of TNF-alpha and IL-1 beta. FGM in vitro were able to activate human peripheral TREG cells with increased release of IL-10, an anti-inflammatory cytokine. In vivo administration of Leucoselect, a product enriched in polyphenols from red grape, to frail elderly patients significantly increased the release of Th1 cytokines, such as IFN-gamma and IL-2, thus suggesting a recovery of the otherwise depressed adaptive immunity in these subjects. In conclusion, the bulk of data presented suggest that assumption of dietary polyphenols retards senescence or attenuates the condition of low grade inflammation in elderly, the so-called “inflammageing”.

June 4th, 2015

Parallel Sessions

Nutrition & Health

✓ **Advertising**

Sustainable Agriculture

Zoom on advertising policies

Chair:

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Margherita Caroli is a paediatrician and a nutritionist with a PhD in Paediatric Nutrition. She has been working at the Paediatric department in D Camberlingo Hospital since 1980 until 1998 when she was nominated Head of the Nutrition Unit at the Department of Prevention ASL Brindisi up to now. She has been the scientific coordinator of several projects at regional, national and European level in the field of promotion of health and prevention of obesity and chronic diseases mostly in children.

She is also member of numerous national committees and task forces at national and European level. She is also frequently temporary advisor for WHO in the field of paediatric nutrition related to obesity. She has been Board Member of the European Childhood Obesity Group, of the Italian Society of Obesity, of the EASO Task Force on Childhood Obesity and of the Italian Society of Paediatric Nutrition. She was also President of the ECOG.

She has been an invited speaker in more than 120 scientific meetings, conferences and workshop. She has written numerous papers in national and international journals, and she is also a reviewer for several international scientific journals. She has collaborated to several scientific books and she edited three books in childhood obesity and nutritional education.

With:

M. Mwatsama - UK Health Forum - UK

S. Bodenbach - EC - DG SANTE

J. Jewell - WHO

M. Canavari - University of Bologna - IT

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Modi Mwatsama is a Registered Nutritionist and Director for Global Health at the UK Health Forum where she leads on non-communicable diseases (NCDs) and global health policy.
She has expertise in public health policy development, advocacy and implementation at local, national and international levels.

Modi previously worked as a Senior Researcher in global health at UCL and Food and Health Programme Manager at Heart of Mersey – a cardiovascular disease prevention programme in England. Modi is an expert advisor on a number of government committees including global health, sugar reduction, food based dietary guidelines and the 5 a day campaign. She is a member of the NCD Advisory Group of the UK Faculty of Public Health and is completing a part-time Doctorate in Public Health on food policy at LSHTM.

She has a broad interest in public health policy research, and for her doctorate has looked how major donors in global health prioritise issues and view NCDs, and how the UK's salt reduction and nutrition labelling policies evolved over time.

What has been achieved so far at international level?

This presentation will:

- Provide an overview of the global policies and recommendations on food advertising including the different measures and tools for effective action;
- Review international examples of the progress made and challenges faced by governments, the food industry and other stakeholders;
- Consider the merits of voluntary versus mandatory action;
- Make recommendations for policy makers and advocates on the successful implementation of food advertising measures.

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EU policies on labelling

Stephanie Bodenbach joined the European Commission in 2006, where she is dealing as a policy officer with nutrition labelling and related nutrition issues as well as with the implementation of the White Paper on a Strategy for Europe on Nutrition, Overweight and Obesity related Health Issues focussing specifically on reformulation. Previously, she held positions as researcher and scientific coordinator in the coordination office of the Public Health Association of Saxony and as technical and scientific consultant in the European sales branch of a Japanese pharmaceutical and fine chemicals company.

Stephanie Bodenbach holds Master degrees in Nutritional Science from Bonn University and Public Health from the University of North Carolina at Chapel Hill.

J. Jewell
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Jo Jewell is currently working as a Technical Officer for Nutrition within the Division of Noncommunicable Diseases and the Lifecourse at the WHO Regional Office for Europe.

His previous experience includes roles as Policy and Public Affairs Manager at World Cancer Research Fund International, based in London, and as Policy Coordinator at the European Public Health Alliance in Brussels. He has a background in European politics and has a Masters in Health Policy, Planning, and Financing.

His experience and publications mainly relate to food and nutrition policy, including a focus on effective policy design and the role of European and global recommendations. Recent work has examined the use of price policies to promote healthier diets, nutrient profile models for restricting food marketing to children, front of pack nutrition labelling and school food policies.

Social marketing to promote F&V consumption as part of an healthy diet

The short presentation will draw on experience from across the European region of best practice approaches to promoting fruit and vegetable consumption, notably among school children. It will start with a brief overview of the latest data on fruit and vegetable consumption in Europe, and its relevance in terms of health outcomes. It will then address ways in which social marketing policies and interventions can be designed to be more effective by:

- Understanding how knowledge of the existing preferences and barriers to fruit and vegetable consumption can help target the policies/intervention more effectively;
- Adopting a sophisticated theory of behaviour change that moves beyond information alone to also incorporate repeated exposure and accessibility;
- Ensuring that the policy/intervention is supported by wider environmental changes and complementary measures;
- Learning continuously from monitoring and evaluation, including setting realistic objectives for future actions.

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Maurizio Canavari is an associate Professor of Agricultural Economics and Appraisal since October 1, 2005. Previously (1998-2005) he served as Assistant Professor.

He holds the doctoral degree in "Appraisal and Land Economics" (University of Padua, 1997), Laurea Degree in Agricultural Science, Economics and Technology Program (University of Bologna, 1990). In 2014 he got the habilitation as Full Professor in Agricultural Economics and Appraisal.

He lectures on agri-food marketing, strategic marketing management in agribusiness and marketing research. Current research interests concern topics in agri-food marketing and economics of quality in the agri-food chains, such as trust and quality assurance and certification in food networks, marketing and consumer behaviour related to quality food products, such as organic, functional and unique specialty food.

F&V marketing: no lie, no sale?

M. Canavari, R. Wongprawmas, R.H. Hawkins-Mofokeng

It has been known that communication and information provision can have an impact on consumers' knowledge, attitudes and their purchasing decision-making, which includes food choices as well as dietary habits. Consequently, communication and marketing have been used in both appropriate and inappropriate ways. For instance, marketing strategies have been used by several governments to promote healthy lifestyle, or fruits and vegetables (F&V) consumption campaigns. On the other hand, some actors might use marketing as a tool to mis-lead consumers in an attempt to increase their market share and profits. Hence, the role and potential impacts of communication, particularly marketing related to food products, have gained considerable attention from policy makers, industries and stakeholders ever since. Eating fruits and vegetables (F&V) on regular basis is important for our health. However, several studies in Europe reported that European consumers ate F&V lower than the suggested daily dietary intake. One of the possible ways to cope with this issue is, to employ different types of communications to get through these consumers. In an attempt to present the situation of marketing usage in promotion campaigns of healthy-claimed products and to define the possible prospect that could be used for F&V consumption. Therefore, this study aimed to review examples of certain approaches that the industry used in promoting their products and selected scientific research literature regarding effects of marketing on consumer usage of food products. Several scientific and industry case studies confirm that marketing activities, especially advertisement, Internet website, and the latest, application and advergames do influence consumers' purchasing decisions and consumption habits. Ultimately, possible marketing strategies for promoting healthy products, particularly F&V, would be presented in order to foster healthy-life styles to consumers.

This presentation will:

- Discuss about communication, marketing and effects of information on consumers;
- Review industry's approach on information, communication and examples from industry cases;
- Review government's approach and government campaigns to improve F&V consumption in Europe;
- Recommend possible marketing strategies to promote F&V consumption.

June 4th, 2015

Parallel Sessions

Nutrition & Health

Advertising

✓ **Sustainable Agriculture**

Sustainability of F&V production

Chair:

MJ. Amiot-Carlin
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Marie Josèphe Amiot-Carlin is a senior scientist at Inra, vice director of the Research Unit Nutrition (INRA France).

Her key research interests are nutrition, plant micronutrients, bioavailability, prevention of cardiometabolic factors, food security and sustainability.
She currently works on five programmes funded by the French Research Agency (POLIVD3, OCAD, JASSUR, MEDINA, BIONUTRINET).

She is also a member of various councils (Agropolis, TERSYS research federation, Scientific Interest Group on Fruits, ACTIA, CSU CTIFL/FranceAgriMer/MAAP), editorial boards (NUTRAFOODS, IFAVA) and societies (French Society of Nutrition, Phytochemical Society of Europe).

She is involved in teaching and expertise as well (for ANSES, Louis Bonduelle Foundation...).

With:

MJ. Amiot-Carlin - INRA - FR

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Agro-ecology & sustainable food systems for good nutrition & health

Based on epidemiological studies, plant-based diets are recommended to prevent against the incidence of chronic diseases. Compared to diets rich in meat and dairy products, plant-based diets are more sustainable, because natural resources are less required and environment is less impacted.

Considering food consumption, dietary repertoires are simplified and there is a loss of traditional food culture in the current dominant "agro-industrial" food system. These diets are associated with nutrient deficiencies and excess energy consumption, leading to the triple burden linked to the coexistence of undernourishment, nutrient deficiencies and obesity. On the global level, this dietary pattern shift leads to an increased accessibility of inexpensive agricultural supplies and an erosion of agro-biodiversity.

In has been hypothesized that both diversity and quality of agricultural resources are essential for healthy dietary patterns. The combination of different plants (maize-beans-squash) has been shown to fit with both nutritional requirements and eco-agriculture. The compliance with the 5 a day recommendation of fruit and vegetables improves the overall dietary pattern and promotes health. Introducing diversity of fruit and vegetables (green vegetables, nuts raw and cooked…) is very effective on the global nutritional quality of diet to better fulfil nutrient recommendations. Fruit and vegetables are rich sources of vitamins, minerals and fibre. Some plant species have specific nutrient profiles. Green leafy vegetables are rich in folates, provitaminic A carotenoids, vitamin K. Citrus fruits are good sources in vitamin C; legumes in proteins; nuts in polyunsaturated fatty acids. Besides essential micronutrients such as vitamins and minerals, plants are also rich in bioactive substances: polyphenols, sulphur compounds, non-provitaminic A carotenoids (lycopene and lutein). Some of these phytochemicals are specific of plant foods. It is the case of limonene of Citrus fruits, isoflavones of beans, allicin of garlic and onions. All these non-nutritive substances have beneficial effects on health and many of them were shown to display antioxidant activities. The contents in different phytochemicals vary greatly within a species and according to the agro-environmental conditions (temperature, light, fertilisation…). Phytochemicals are plant secondary metabolites that play many ecological roles. The biosynthesis of phenolics is increased under environmental stress providing biotic protection of crops, enhancing shelf life of plant-derived products, while contributing to their nutritional qualities and human health benefits. The contents in antioxidants, notably polyphenols were reported higher in organic-cultivated crops that in conventional ones. However, yields are globally less in organic than conventional crops.

The increase of productivity of organic or "friendly-environmental" cultivated crops remains a challenge for the future, in the context of climate change, and the decreasing availability of water.

Quantitative indicators of both dietary and biological diversity can be combined with adequate intakes of nutrients in respect with the quality of environment and the positive impact on the socio-economical system. It is necessary to have a better knowledge of micronutrient composition and its variation, health benefits (on glycaemic control, oxidative stress…) of cultivated and wild plants. Research on the properties of neglected and underutilized species and local varieties merits higher priority in agro-ecology and food systems.

Food security and access to adequate levels of intake remains questionable for the future, considering the increase and aging of population. Re-examining food systems based on locally-available foods, food variety and traditional food cultures adapted to our modern lifestyle, environment preservation, minimizing losses and waste and preserving a "win-win" relation between consumers and producers could be considered as retro-innovative strategies to sustain agro-ecology-food systems. The co-existence of different food systems is certainly an answer for good nutrition and health in the future.

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Rachel A. Nugent, Ph.D. is the DCPN Principal Investigator and *DCP3* Series Editor for the following volumes: Cardio-metabolic and Respiratory Disease; Environmental Health and Injury Prevention; AIDS, STIs, TB and Malaria; and Disease Control Priorities.
Rachel is also a Clinical Associate Professor in the Department of Global Health at the University of Washington and Director of the Disease Control Priorities Network. She joined the UW in April 2011. She was formerly Deputy Director of Global Health at the Center for Global Development, Director of Health and Economics at the Population Reference Bureau, Program Director of Health and Economics Programs at the Fogarty International Center of NIH, and senior economist at the Food and Agriculture Organization of the United Nations.

From 1991-1997, she was associate professor and department chair (1993-97) in economics at Pacific Lutheran University. She has advised the World Health Organization, the U.S. Government, and non-profit organizations on the economics and policy environment of NCDs. She was a member of the Institute of Medicine Committee on the Cardiovascular Disease Epidemic in Developing Countries, the World Economic Forum Global Agenda Council on Chronic Diseases and Well-Being, and a contributor to the Disease Control Priorities Project in Developing Countries, published in 2006. Her recent research includes tracking donor funding on NCDs and the linkages between agriculture and NCDs. She received her M.Phil. and Ph.D. degrees in economics from the George Washington University in Washington, DC, USA.

Incentivizing investments for F&V in a healthy food system

A healthy and sustainable food system has many demands. To people concerned about food security, a healthy food system is one that eliminates hunger. To people worried about the power of "Big Food," a healthy food system aggressively regulates and monitors the frequency and types of products that reach consumers, especially children. To people interested in the long-term viability of natural resources, a healthy food system doesn't degrade or use excess amounts of water, land or air. To agricultural producers, a healthy food system fairly rewards their efforts, and provides them with clear market signals for production and investment decisions. To public health advocates, a healthy food system creates conditions for proper nutrition and low disease risks. Finally, consumers want affordable, diverse, and widely accessible food, and many also want to know that the food they eat is responsibly and sustainably produced.

Clearly, there is no single definition of a healthy food system. However, achieving a healthy population requires access to sufficient and diverse fruits and vegetables and other nutritious consumables.

This paper will describe the investments needed to create a food system that provides adequate F&V in a variety of different contexts. It provides examples of agriculture and food system investments that support the production of F&V to achieve national nutrition and health requirements, and describes effective policies that incentivize healthy food production.

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Dr U. Ruth Charrondiere is a nutritionist and has worked on dietary assessment, food composition, biodiversity, breastfeeding, sustainable diets and exposure assessment.

She has worked with WHO, UNICEF and since 2002 with the Food and Agricultural Organization of the United Nations (FAO). She is the coordinator of INFOODS (International Network of Food Data Systems). She is also an expert in Total Diet Studies (TDS) and exposure assessment, and served as member in the EFSA working group on TDS and in the ANS Panel.

She has contributed to capacity and standard development in food composition and TDS through teaching in many international courses, the development of the FAO/INFOODS e-Learning Course on Food Composition Data and the Compilation Tool, and many guidelines and is active in policy fora to improve the nutrient composition of agricultural products. She has also published about 190 scientific articles, book chapters, technical or policy-guidance documents, and databases/ tables/ tools.

Biodiversity and nutrition

Biodiversity (i.e. food identified at the taxonomic level below the species level, and neglected/ underutilized or wild species) represents a promising solution to address the multiple burdens of malnutrition by providing dietary energy, macro- and micronutrients and other beneficial bioactive constituents. Data show that intraspecific differences in nutrient contents are often as important as between species, with 1000-fold differences and more, representing the difference between nutrient deficiencies and adequacy. For example, one banana can provide 1 or 200 percent of the RDI for vitamin A.

FAO and partners promote a multi-sectorial approach to prevent and treat all forms of malnutrition. The pillars employed are based on the assumptions that diversified diets that can provide all the nutrients and non-nutrients needed to sustain healthy lives; that the food supply (agriculture and food processing) and the demand for healthy foods need to be improved simultaneously; that policies and programmes in many different sectors need to become truly nutrition sensitive; and that biodiversity has an important role to play. Over the past years, FAO, INFOODS and partners have begun building the evidence basis to demonstrate the benefits of biodiversity for nutrition and health, and have published databases, guidelines, indicators and tools to explore and benefit from biodiversity.
In order to assist countries to better consider and use biodiversity for nutrition, the Commission on Genetic Resources for Food and Agriculture (CGRFA) has endorsed in 2015 the Voluntary Guidelines for Mainstreaming Biodiversity into Policies, Programmes and National and Regional Plans of Action on Nutrition.
They give examples in the areas of planning, research, implementation, and awareness-raising on how to mainstream biodiversity into relevant sectors. Their implementation will hopefully improve the nutritional and health status of the world's population while assisting in reaching nutrient requirements through foods and conserving biodiversity for future generations.

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Dr, HDR, Marc Tchamitchian is laboratory head for the Écodéveloppement research unit at the French National Institute for Agricultural Research (INRA).

He first worked on greenhouse climate control, using optimal control methods applied to greenhouse crop and climate models. Later on he also applied Artificial Intelligence methods to this same greenhouse control problem and contributed to the setup of an expert system. He contributed to the application of these methods to the control of fertigation in greenhouses during a one year stay as an invited scientist at the University of Thessaly, Greece.

In 2004, he changed position within INRA and started working on sustainable cropping systems, including organic farming, on the identification of the biological processes on which they rely and on the use of this knowledge in participatory design approaches. His focus is more specifically on pest management, whether soil-borne or aerial, both in the case of protected vegetable production. He is also interested on the methods that allow merging and validating knowledge originating from different sources (stakeholders and scientists).

Fruit and vegetable for a sustainable production

In the second half of the twentieth century, the agricultural production of the occidental world has rapidly increased, thanks to an integrated R&D scheme based mainly on three pillars, genetic improvement, adequate if not excessive nutrient supply, pest and disease control, the two last pillars being achieved by an important input of chemicals. These improvements reached their goal, producing food for an ever increasing world population.

However, by the end of this twentieth century, this high productive agriculture has been pointed out as a source of pollution, of negative environmental effects (loss of biodiversity...) and as contributing to the decrease of some finite resources (water, phosphorus...). New paradigms of ecological agriculture have emerged, based on the reintroduction of ecological processes within agricultural systems, to replace some if not all of the inputs coming from chemistry. Organic agriculture is one such paradigm which started even earlier. Nowadays, agroecology, ecological intensification, ecofunctional agriculture and others are proposed as new models to design a sustainable agriculture.

In this presentation, we will first review what these new agricultural models imply in terms of farming systems and cropping techniques for fruits and vegetable. The three pillars of the progress achieved as of today will be questioned. Organic matter and green manure will replace soluble fertilizers, which implies that nutrient supply will depend on the soil microbial activity, at rates that are also temperature dependent. Balancing crop needs with a more fluctuating supply will be more difficult and also implies to redesign the crop rotations. Pest and disease control will rely on natural regulations, on the activity of beneficial organisms (insects, micro-organisms), and pest population can be expected to maintain themselves at non null levels, with possible consequences the properties of the production. Such drastic modifications in the farming systems question the current genetic improvement scheme, or at least of the current indicators on which new varieties are evaluated.

In a second part, we will review the quality of fruits and vegetables coming from ecological production systems. However, because ecological production systems are not easily identifiable, we will consider organic systems as a prototype of sustainable agriculture. This second part will therefore review the existing literature describing the link between fruits and vegetables produced according to ecological principles and their quality.
We finally conclude on the remaining weak points and the possible routes for research and development to alleviate them.

June 4th, 2015

Parallel Sessions

Co organized with DG-JRC

✓ **Nutrition & Health**

Advertising

Sustainable Agriculture

Food safety and nutrition towards 2050: opportunities and challenges

Chair:

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Anne-Katrin Bock is a Policy Analyst at the headquarters of the Joint Research Centre (JRC), the European Commission's in-house science service. A biologist by training and holding a PhD in microbiology, she joined the JRC and its Institute for Prospective Technological Studies, Seville, Spain, in 2000, carrying out techno-economic analyses of emerging biotechnological developments and applications in agriculture and health.

She moved to the JRC headquarters in 2009, and since 2012 contributes to building up foresight capacity at the JRC in Brussels. She is responsible for the recent JRC foresight study "Tomorrow's healthy society - research priorities for foods and diets".

With:

S. Caldeira - EC - JRC

F. Ulberth - EC - JRC

H. Daniel - Technical University of Munich - DE

HCJ. Godfray - Oxford University - UK

E. Anklam - EC - JRC - IRMM

D. Jacobs - FoodDrinkEurope - BE

P. Roux - EC - DG SANTE

P. Verhelst - Boerenbond - BE

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Food safety and nutrition towards 2050 - opportunities and challenges

Safe and nutritious food is a prerequisite for healthy diets. Their role for health and disease prevention is widely recognised. The EU policy and legislative framework which covers all stages of the EU food supply chain "from farm to fork", targets as a central objective the provision of safe, nutritious, high quality and affordable food to Europe's citizens. The standards and requirements implemented within this framework aim at ensuring a high level of food safety and nutritional food quality for consumers within a European and an increasingly global market.

Today's food system is challenged by a number of social, economic and environmental changes on European as well as on global level, which could potentially put the European food safety/nutrition framework under significant stress. Among these are environmental factors such as climate change and resource depletion, global population growth with increased demand for high energy diets, further globalisation of the food chain or, on the contrary, trade disruptions, or the future global and European economic developments.

Against this background, the Joint Research Centre (JRC), the European Commission's in-house science service, is carrying out a Foresight study to provide insights into possible future challenges and critical changes for food safety and nutrition in the EU and to identify resulting research questions and policy needs to help shaping a resilient legal framework governing food safety and healthy diets. The study was initiated on request of the European Commission's Directurate. General for Health and Food Safety.

A major element of this foresight approach is the development of different scenarios with a time horizon of 2050 that challenge the food system in terms of food safety and nutrition. Related JRC foresight studies on research priorities for healthy diets (https://ec.europa.eu/jrc/en/news/new-foresight-report-research-priorities-food-diet?search), and food security (report forthcoming) provide relevant input. Furthermore, this foresight study builds on the results of a scoping study carried out in 2013 (http://ec.europa.eu/food/food/docs/final_report_scoping_study_en.pdf).

What future developments are possible and what would they mean for food safety and nutrition in the EU? Are there related knowledge gaps that we need to fill? What policy measures could prepare us for the possible challenges ahead of us? What could we do to avoid certain developments from happening? What opportunities might emerge? These are the questions the scenarios will be used to answer. Sandra Caldeira and Franz Ulberth (JRC) will present the scenarios. Experts will comment on the scenario implications for food safety, nutrition and EU food policies from their different academic perspectives. A panel discussion with additional stakeholders representing, food industry, farmers and policy-makers will highlight other relevant aspects for the food system.

EU Food production and consumption in 2050 - Alternative scenarios

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Sandra Caldeira is Project Manager at the European Commission (DG Joint Research Centre) where she works with an enthusiastic team on Nutrition and Public Health.

Their research portfolio is focused on policy support to public health and covers present and future nutrition-related issues and their impact to the health of the European citizens, from childhood obesity to active and healthy ageing.

Sandra holds degrees in Microbiology and Biotechnology as well as a PhD in Biomedical Sciences. She worked as a postdoctoral researcher in the University of Lisbon (PT) and at Cambridge University (UK) and Stanford University (US). Prior to joining the European Commission (in 2010) she held positions as an invited professor of Genetics at the University of Lisbon and as a Scientific Editor at the European Molecular Biology Organisation (EMBO) in Heidelberg.

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Franz Ulberth is Head of the Standards for Food Bioscience Unit (until Dec 2012 known as Food Safety and Quality Unit) at the European Commission's Joint Research Centre – Institute for Reference Materials and Measurements (JRC-IRMM).

Franz graduated (PhD) in "Food Science and Biotechnology" from the University of Natural Resources and Applied Life Sciences (BOKU) in Vienna, Austria. After graduation he joined the Department of Food Science and Technology at the same university. Triggered by participation in research projects funded by the EC's Measurement & Testing Programme, his research interest soon included quality of analytical data and developing tools such as validated methods and reference materials for ensuring quality in the laboratory.

He joined JRC-IRMM in 2002 as a programme co-ordinator for food and environmental reference materials at the IRMM. In 2007 Franz was nominated Head of the Standards for Food Bioscience Unit at the JRC-IRMM. He represents the Joint Research Centre in relevant Technical Committees of standards developing organisations such as the European Committee for Standardization, International Organization for Standardization, AOAC International and the Codex Alimentarius.

Scenario implications - different perspectives

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Hannelore Daniel holds currently the position of a full Professor of Physiology of Nutrition and is a director of the Research Center For Nutrition and Food Sciences at the Technical University of Munich, Germany. Her main research interests are the molecular structure, function and physiology of nutrient transport processes in cell membranes and metabolic control mechanisms in mammalian cells in response to alterations in nutrient supply assessed at the transcriptome, proteome and metabolite levels.

She is also member and board-member of various scientific societies : elected in 2004 as a member of the National Academy of Sciences (Leopoldina), Germany ; reviewer and advisor for national and international funding agencies and the EU commission and since 2011 chair of the scientific advisory board of the EU Joint Programing Initiative "a healthy diet for a healthy life".

Hannelore Daniel has published around 270 original scientific papers, some 20 reviews, text-books on Physiology and Biochemistry of Human Nutrition and Molecular Nutrition and has provided some 300 oral presentations as invited speaker to various science communities, NGO´s and public bodies.

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Charles Godfray is a population biologist with broad interests in science and the interplay of science and policy. His research involves experimental and theoretical studies in population and community ecology, epidemiology and evolutionary biology. He is particularly interested in food security and chaired the Lead Expert Group of the UK Government Office of Science's Foresight project on the Future of Food and Farming.

Currently he chairs the Science Advisory Council of the UK's Department for Environment, Food & Rural Affairs. He is a Fellow of the UK Royal Society, and is Hope Professor (based in the Zoology Department) at Oxford University where he directs the Oxford Martin Programme on the Future of Food.

Moderator:

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Participants:

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Our future food - Panel discussion

Elke Anklam is a chemist by education with specialisation in food, organic and radiation chemistry. After having obtained her PhD from the University Hamburg, Germany, she worked in various European Research Institutions and was a teaching Professor at the Applied University of Fulda, Germany.

Since 1991 she has been working in the European Commission's Joint Research Centre (JRC-EC); from 2006-2012 as Director of the JRC-Institute for Health and Consumer Protection (JRC-IHCP) in Ispra, Italy and since January 2013 as Director of the JRC-Institute for Reference Materials and Measurements (JRC-IRMM) in Geel, Belgium.

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Hannelore Daniel holds currently the position of a full Professor of Physiology of Nutrition and is a director of the Research Center For Nutrition and Food Sciences at the Technical University of Munich, Germany. Her main research interests are the molecular structure, function and physiology of nutrient transport processes in cell membranes and metabolic control mechanisms in mammalian cells in response to alterations in nutrient supply assessed at the transcriptome, proteome and metabolite levels.

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Hannelore Daniel has published around 270 original scientific papers, some 20 reviews, text-books on Physiology and Biochemistry of Human Nutrition and Molecular Nutrition and has provided some 300 oral presentations as invited speaker to various science communities, NGO´s and public bodies.

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At FoodDrinkEurope since March 2010, Dirk Jacobs is Deputy Director General and Director in charge of Consumer Information, Diet and Health issues.

As Deputy Director General, he supports the Director General in the general management and external representation of the organisation. Furthermore, he manages and co-ordinates the European food and drink industry's positions in the areas of consumer information and diet, nutrition and health.

Mr Jacobs is a Dutch national and has a BSc and MSc in International Business Administration at Maastricht University, studied international economics in Milan, Italy, and has a post-graduate MBA in European (Business) Studies.

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HEALTHY DIET, HEALTHY ENVIRONMENT WITHIN A FRUITFUL ECONOMY: THE ROLE OF FRUIT AND VEGETABLES

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Philippe Roux is Head of Unit SANCO.C.4 "Health determinants" since 1st July 2013.
He started his career in the French Social sector in 1985. During the same time, he studied social sciences, European law and Public Health. He worked with DG V (Employment and Social Affairs) from 1990 to 1998 in support of the development of the EU initiatives related to drug prevention.

In September 1998, he joined the European Monitoring Centre for Drugs and Drug Addiction where he contributed to the development of the framework and tools for the evaluation of the EU action plans on drugs and was from 2002 deputy Head of Unit in the "Interventions, law and policy" Unit of the Agency.

He joined SANCO Health Determinants Unit in 2005 to work with the Nutrition and Physical Activity team with responsibilities in the coordination of the Diet, Physical Activity and Health European Platform. He was Deputy Head of Unit SANCO.C.4 "Health determinants" from October 2006 to January 2013. He was acting Head of this Unit from January to June 2013.

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Active for 7 years at Boerenbond, the Belgian Farmers' Union, as representative at COPA-COGECA, the European Farmers' Organization and WFO, the World Farmers' Organization.

Involved in the debate on the reform and future of the CAP, international trade issues and, food chain initiatives at Belgian and European level - on a code of conduct for fair trading practices, quality assurances schemes and valorization of extra legal quality, sustainable development, interprofessional agreements - development of agricultural entrepreneurship in the South.

Before research and teaching assistant at Ghent University, Faculty of Bioscience Engineering, Department of Agricultural Economics.

Master degree in Commercial Engineering, KULeuven, Faculty of Economics and Business.

June 4th, 2015

Parallel Sessions

Nutrition & Health

✓ **Advertising**

Sustainable Agriculture

Tools to implement policies on advertising

Chair:

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Fabio Gomes currently works as a Public Health Nutrition Officer of the Ministry of Health of Brazil at the Food, Nutrition and Cancer Unit of the National Cancer Institute of Brazil developing multi-component and multi-setting health promotion strategies, mobilising regulatory measures to reduce the demand for unhealthy products, and protecting food and nutrition public policies from conflicting interests.

He has worked as advisor of the United Nations Development Programme for the Brazilian Ministry of Health, supporting the development of strategies to implement nationwide actions for Surveillance of Risk Factors for Non-Communicable Diseases (NCDs) in Schools. As World Public Health Nutrition Association (WPHNA) External Affairs Secretary he took care of WPHNA relations with other bodies, political declarations and conferences organisation.

He graduated in nutrition at the Rio de Janeiro State University in Brazil. He obtained a MSc. in Population Studies and Social Research in 2007 and a PhD in Collective Health at the Institute of Social Medicine of the Rio de Janeiro State University in 2013.

With:

P. Binard - Freshfel - BE

S. Levie - Food Cabinet - NL

K. Brownell - Duke University - USA

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Philippe Binard is currently the General Delegate of Freshfel Europe, the European Fresh Produce Association.

Philippe Binard has a legal background from the University of Leuven (1984), and he joined CIMO (European Fruit and Vegetables Importers Association) in 1987, after several trainings in both the public and private sector. He became General Delegate of that organisation in 1992.

In 2001, he was appointed General Delegate of Freshfel Europe, the new association launched as the single platform for the European fresh produce sector. Besides his responsibilities within Freshfel Europe, he is also in charge of other trade associations, namely ECBTA (European Banana Trade Association), WAPA (World Apple and Pear Association) and SHAFFE (Southern Hemisphere Association of Fresh Fruit Exporters). He was also the Secretary General of ECSLA (European Cold Storage and Logistics Association) from 1989 to 2002.

What about fruit and vegetables labelling?

Fruit and vegetables are a special food category, not only because of its nutritional assets, its wide diversity of varieties, tastes and textures, but also because it is often sold loose to consumers. This certainly does not facilitate the labelling of fruit and vegetables and the communication of its assets to consumers. Advertising is a world of contrasts and of an unlevelled playing field where a lot of factors come into play: budgets, tools, media, audience… In this world, fruit and vegetables often are in a weak position compared to its competitors of the agri-food industry given scarcity of budget, fragmentation of the sector, diversity of products, unbranding,...

In regard to the labelling, fruit and vegetables are subject to horizontal legislations on the indications that have to be provided by law. Several regulations apply, resulting from legislation on marketing standards, on food information to consumers, or on food safety and food additives legislations as well as any other relevant laws such as the one on nutrition and health claims. All these regulations taken together provide information which sometimes can even be considered as excessive and not relevant or fail to be effectively understood by consumers or even reaching them. Positive or crucial information might be lost somewhere in a load of other less relevant information. The presentation will highlight two labelling case studies with an (negative) impact on fresh fruit and vegetables:

- "*Where is the fruit?*": Freshfel Europe commissioned some years ago a research to establish the actual fruit content of a variety of FMCG food products that contain an image/picture or a word/reference to fruit on the outer packaging or the label. In the new wave of health-conscious consumers, the image of fruit and vegetables is indeed identified by consumers as one of the most valuable towards achieving healthy eating habits (Special Eurobarometer of 2006 on Health and Food). The research's findings confirmed the perception that competing industries take the benefit of the attractive image of fresh produce for its own benefit, while the sector experience difficulties to build on them. Findings are alarming in regard to misused and stressed that despite depicting fruit on their labels or packaging, 1 in 5 products contained no fruit at all, and 50% of the sampled products had less than 10% of fruit.

- Nutrition and health claims: The European Union finalised recently a new legislation to provide to business operators a legal framework to formulate nutritional or health claims. Given the properties of fresh produce, the sector could have legitimate expectations to take the most of this legislation. However, after a few months of practices, it now appears clear that the winners are unlikely to be the fragmented and much diversified fruit and vegetables categories, while the agri-food industry is likely to maximize the benefits. Costs, complexity of dossier, diversity of products, lack of research are among the main reasons behind this.

Year on year, the Freshfel Annual Consumption Monitor notes the on-going decline across Europe of the fresh produce consumption. The equivalent of one piece of fruit or vegetables was lost per person per day since the turn of the century and today 2/3 of the EU Member States are well below the minimum of 400 g/person/day recommended. None of the

aspects affecting the communication, the promotion, the image, the packaging, or the labelling of the produce should be neglected so that produce should be well protected and would take the full benefit of its diverse and powerful assets to move consumers from their awareness on the need to consume fruit and vegetables and convert this knowledge into action. This is a true public-private joint responsibility.

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Samuel was born in Oxford and raised in Amsterdam. He studied political sciences at the UvA (Amsterdam University) and wrote a thesis on food policy.

Samuel has a great passion for food and social systems and he's found a way to combine these to passions in his professinal life. Samuel founded the Dutch Youth Food Movement and is co-founder of the Food Film Festival. He also owns two companies. One is a campaigning and consultancy bureau in Amsterdam named Food Cabinet focussing on food and change. The other is an artisan sausage production, Brandt & Levie. Samuel won prizes as best Food Trendwatcher and best Social Entrepeneur. Tha campaigns Samuel comes up with are focussing on healthy and sustainable food.

How to effectively advertise healthy foods?

In a world where billions are being spent to market unhealthy food and at the time governments are spending billions to prevent obesity and dietary diseases it seems crazy that healthy food is hardly being promoted.

As a joke we came up with the Big Bang Broccoli campaign to show the world that vegetables can be just as sexy as a can of coke. The campaign rocketed and from that moment on we where planning a follow up. In this talk I will talk about what a social campaign looks like and how we can use this as an advertising strategy for fruits and veg. Also will we show are latest campaign for a very Dutch and healthy product.

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Kelly Brownell is Dean of the Sanford School of Public Policy at Duke University, where he is also the Robert L. Flowers Professor of Public Policy and Professor of Psychology and Neuroscience.

Prior to joining the faculty at Duke, Brownell was at Yale University where he was the James Rowland Angell Professor of Psychology, professor of epidemiology and public health, and director of the Rudd Center for Food Policy and Obesity. While at Yale he served as chair of the department of psychology and as master of Silliman College.

Brownell has published 15 books and more than 350 scientific articles and chapters. He has served as president of several national organizations, including the Society of Behavioral Medicine, Association for the Advancement of Behavior Therapy and the Division of Health Psychology of the American Psychological Association. He is in the Institute of Medicine and in 2006 was named by Time Magazine as one of the World's 100 Most Influential People.

How price control and other related policies can increase fruit and vegetable intake

Economic incentives have long been a part of public health approaches to improving contributors to health. Taxes on substances such as tobacco and alcohol have powerful influences on sales and consumption, and hence on health, and incentives for individuals

to adopt behaviors such as conserving electricity or installing solar panels can have positive environmental effects.

Governments are heavily involved with financial policies that affect diet and health, but not always in beneficial ways. Agriculture subsidies and trade policies, for example, favor some crops over others and ripple through the food supply affecting not only prices but also which foods are foods produced (e.g., there are incentives to produce highly processed foods). It is finally the case that such policies are being considered with improved population nutrition as one of the goals.

Changing food prices could be used to decrease consumption of foods contributing to ill health or to increase consumption of foods that protect health. An ideal policy would do both. This is the impetus for considering taxes on foods such as sugar-sweetened beverages (SSBs). Economists have done elasticity studies and have estimated that a tax that increases the price of SSBs by 20% would decrease population consumption by 15-20%. This is the basis for the most common proposal, which is to create an excise tax of 1 penny ($0.01) per ounce on beverages with added sugar.

Some proposals have been made to subsidize foods such as fruits and vegetables. If the subsidies were sufficient to decrease price in an appreciable way, consumption should increase. This would produce health benefits, particularly if less healthy foods were consumed less as a consequence. Using the revenue from taxes on less healthy foods to subsidize the costs of more healthy foods would be one means to support such a program.

No matter how finely crafted, proposals do not become policy without the support of political leaders and the populations who elect them. Learning ways to frame these policies to generate maximum support, and to produce strategic research that will be valuable in policy discussions will be essential.

June 4th, 2015

Parallel Sessions

Nutrition & Health

Advertising

✓ **Sustainable Agriculture**

Health as an ethical and sustainability issue

Chair:

P. James
Past-President World Obesity Federation - London School of Hygiene and Tropical Medicine - UK
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Professor Philip James established the International Obesity Task Force in 1996 and then became President of the World Obesity Federation from 2008 to 2014 and now assumes the role of Past President responsible for global initiatives relating to food and health with particular emphasis on the pandemic of obesity and chronic diseases.

He chaired the first WHO Technical group on diet and the prevention of chronic diseases and malnutrition. He also chaired and wrote the UN Millennium Commission Report on global issues relating to nutrition up to 2020, and produced Blair's plans for the UK Food Standards Agency and those for a new EU Food and Health Authority. His new analyses led to the new 5% goal for sugar.

He now works for WHO tackling the challenge of nutrition related diseases globally but especially in North Africa and the Middle East, with new initiatives involving reformulation of staple foods, the elimination of trans fats, the promotion of vegetable and fruit consumption and the creation of new standards for food availability in all public supported institutions.

With:

W. Verbeke - Ghent University - BE

N. Darmon - INRA - FR

E. Ziglio - University of Innsbruck - AU

A. Segrè - Agro-Food Center of Bologna - IT

W. Verbeke
Professor of Agro-Food Marketing and Consumer Behaviour
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Dr. Wim Verbeke is Professor of Agro-Food Marketing and Consumer Behaviour. He is affiliated with the department of Agricultural Economics of Ghent University in Belgium.

Wim's research interests comprise citizen and consumer attitudes, perceptions and acceptance of agricultural and food production technologies and products. Specific interests are on the impact of information, food labelling and the role of personal characteristics on food-related attitudes, beliefs, perceptions, choices and consumption decisions. His research focuses on products, product categories or concepts like functional, organic or sustainable foods.

His research team is a partner in several Seventh Framework research projects funded by the European Union. He has co-authored more than 250 peer-reviewed papers published in leading international journals in the disciplines of agricultural economics and policy, marketing, communication, social sciences, agricultural sciences, food science and technology, and nutrition and dietetics.

Opportunities for plant-based diets as a sustainable and healthy food choice

W. Verbeke, E.J. Van Loo and C. Hoefkens

There is a growing interest in healthy and sustainable food consumption behaviour, but little is known about the match or mismatch between these two concepts as perceived by food consumers. A related question is whether and to what extent the perception of plant-based diets matches with these two concepts. The objectives of this study are therefore to quantify consumers' perceptions of a sustainable diet, a healthy diet and a plant-based diet, to investigate the (dis)similarities between these three concepts as perceived by consumers, and to assess the role of motives and barriers in driving healthy, sustainable and plant-based food choice.

Cross-sectional data were collected through a web-based consumer survey involving a total sample of 2,783 consumers from Belgium, Germany, The Netherlands, and United Kingdom. Data were collected in June 2014. Samples were representative for age, gender and region in each of the study countries. The questionnaire measured participants' perceived meaning of sustainability, their attitudes, perceived barriers and benefits of eating plant-based foods, as well as their perceptions of healthy, sustainable and plant-based diets.

In each of the study countries, participants indicated that about 51-53% of their total diet was plant-based, i.e. composed of fruits, vegetables, plant-based meat substitutes, nuts, seeds, legumes, soy- or plant-based alternatives to dairy. Attitudes towards plant-based diets were strongly favourable. The image profiles of 'a healthy diet', 'a sustainable diet' and 'a plant-based diet' were highly comparable, suggesting a strong match between these concepts as perceived by consumers. Each of the three concepts was most strongly associated with the attributes 'nutritious' and 'natural', whereas they were the least associated with 'traditional' and 'low price'. Based on the study participants' involvement with health and sustainability, four distinct consumer segments were identified. The profile of the segments suggests that involvement with sustainability implies a fairly equivalent degree (either low, moderate, or high) of involvement with health. This holds for more than 75% of the study sample. Meanwhile, health involvement does not necessarily imply an equivalent degree of involvement with sustainability as was seen among one of the identified segments. The segments differ significantly in their attitude towards plant-based diets and self-reported consumption of plant-based foods. The share of plant-based foods ranged from more than 60% in the diet of consumers with a high health and sustainability involvement, to less than 40% in the diet of consumers who were low involved with both concepts.

The study concludes that there is a close match between the meaning and image of a healthy, a sustainable and a plant-based diet. Strong involvement with health and sustainability associates with a more positive attitude towards and higher self-reported consumption of plant-based foods. Public policy or private marketing strategies that trigger health and sustainability involvement are therefore likely to foster the share of plant-based foods in consumers' diets.

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Nicole Darmon is a nutritionist, epidemiologist and senior researcher at INRA (the French National Research Institute for Agricultural Research), within MRU Nutrition and Obesity, in Marseilles (south of France). Known as an expert in the field of social inequalities in nutrition, she studies the multiple constraints influencing foods choices, be they related to individual preferences, or to physical or economic access to healthy food.

She develops both interventional research and theoretical methods (diet modeling, food nutrient profiling) to translate the recommendations (nutritional, toxicological, environmental ...) into realistic, healthy and more sustainable food choices.

Sustainable diet: a matter of food choices

Sustainable diets are culturally acceptable, nutritionally adequate, economically affordable and they have a low environmental impact. Many studies on diet sustainability rely on modeling approaches, but those studies are often based on arbitrary decisions with respect to the dietary changes that can be considered reasonable or "realistic" to people. Given that cultural acceptability is a crucial dimension of diet sustainability, studies based on diets consumed by people in everyday life may help identifying the main levers for reducing diet's environmental impact and adopt the most sustainable food choices.

Studies on self-selected diets reveal a wide inter-individual variability of the environmental impact of diets. For instance, in France, the mean diet-related greenhouse gas emissions (GHGE) was estimated at 4170 g CO2eq per day and per adult but, beyond this average, strong positive correlations were found between total ingested quantities (and between total energy intake) and diet-related GHGE. Therefore, the first lever to reduce our diet's environmental impact is surely to buy less, waste less, and eat just what we need-not more, which is fully consistent with public health messages to fight overweight and obesity.

Then, the different dimensions of diet sustainability may not be fully compatible. For instance, the fact that it is more difficult to eat healthily on a low budget reveals a fundamental contradiction between nutritional adequacy and diet affordability. The compatibility between nutritional adequacy and environmental friendliness is not straightforward either. For instance, among existing individual diets of adults in France, those with the lowest carbon impact were found to be the least adequate ones regarding nutrition. Thus, the nutrition dimension should not be forgotten when designing or promoting sustainable diets, because nutritional adequacy does not automatically follow affordability, social acceptability and environmental friendliness.

Finally, sustainable diets probably need not to be as extreme as it is too often proposed. Diet modeling approaches are very powerful but they can lead to flawed conclusions when social acceptability is not correctly taken into account in the models used. Likewise, meat reduction strategies have been explored in many studies because meat (ruminant meat in particular) is the food category with the highest environmental impact per kg. However, the benefits (on both health and the environment) of reducing meat strongly depend on what it is substituted for, which is too often not considered.

Rather than "designing" new diets, identifying the most sustainable diets among existing ones may help avoid too important deviations from social norms. In France, for instance, a reduction in diet GHGE by 20% while maintaining high nutritional quality seems realistic since it was observed at no extra-cost for approximately 20% of adults. This was achieved by reducing both the energy intake and the energy density, but without dramatically altering existing food patterns. The energy share of plant-based products was increased and that of meat, mixed dishes and alcoholic drinks was reduced, but the magnitude of the differences was quite small. Therefore, there is no need to avoid entire food categories to achieve diet sustainability and the long-standing advice of favouring food variety is still valid in this context.

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Dr. Erio Ziglio is currently Guest Lecturer at the Management Centre Innsbruck, Austria. Dr Ziglio has been involved with the World Health Organization, European Office since the early 1990s. At the WHO he was responsible for the Health Promotion Programme and in 2003 he was appointed as Head of the European Office for Investment for Health and Development till his retirement on 1 October 2014.

In addition to his over 20 years of work with the WHO, he has 15 years of professional experience in the academic world both in Europe and North America. He worked for the European Commission for three years as a public health consultant in the late 1980s.

Dr Ziglio has lectured internationally and published widely on the subjects of health promotion, health policy and planning and health and development. He held an Honorary Professorship at the University of York, and was an Honorary Research Fellow at the University of Edinburgh, where he received his PhD in 1985. For several years he was a member of the international teaching staff at the Public Health School, Yale University. Since 2013, Dr. Ziglio has been a Professorial Fellow to the Royal Society for Public Health, London, UK.

Promoting population health and tackling health inequalities

At the time of writing, the direct impacts of the present European-wide economic and social crisis are becoming more and more apparent. Due to economic difficulties more and more European are pushed or trapped in poverty and long-term unemployment. The impact of the current economic crisis on health could potentially erode existing and hard won population health gains, with the most vulnerable groups in our societies at the highest risk.

In this economic context, health and social systems face prospects of decreased government expenditure in health; decreased development aid for health; service delivery hindered by lack of resources; increased population health needs and pressure on social protection mechanisms. Furthermore, people's copying with hardship and new social and economic vulnerability show impact on people's behaviour including purchasing of food and eating patterns. The purchasing and consumption of fresh vegetable and healthy food is one of the challenges for individuals and families.

In the above-describer context it is clearer than ever that promoting health and reducing health inequities must be pursued within a strategy that addresses both health and development issues. This is the rationale of the new European Health Policy put forward by the European Office of the WHO known as *Health 2020*.

Dr Ziglio will outline the rationale of Health 2020. He will then give an overview of the main scientific studies that informed Health 2020. Finally he will present some of the continuing challenges and new opportunities linked to strategies for the promotion of population health and the reduction of health inequities with specific reference to the focus of the workshop.

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Andrea Segrè is currently President of the Agro-Food Center, Bologna and President of the Edmund Mach Foundation, San Michele all'Adige.

In 1991 he became Researcher in Economics and Agricultural Politics at the University of Bologna, in 1998 he was nominated Associate Professor of Agricultural Economics and in 2000 Professor in International and Comparative Agricultural and Food Policy and Agricultural Development. Is served as Dean of the Faculty of Agricultural Sciences at the Alma Mater Studiorum, University of Bologna. between 2005-2012.

He has dealt for a long time with the transition processes of the economic-agricultural systems in the countries of the ex real socialism, developing many missions on the field on

behalf of various International Organizations (European Commission, World Bank, FAO, OSCE, Italian Ministry of Foreign Affairs) and publishing different volumes and scientific articles.

Food waste reduction: an ethical or financial issue?

Despite the growing attention from the academic world, civil society and policy makers, the debate on food waste (FW) is affected by a lack of a consensus over its definition and scope boundaries, the conditions that lead to their creation and the (lack of) quantification along the food supply chain. Moreover, as policies and policy proposals are emerging, there is a greater need for quantification and analysis of policy options.

The definitional debate is influenced by the perspective to which they are developed, targeting amongst others food security, resource efficiency and/or nutritional quality aspects of food production and consumption. Also, changes over time can be found as well as geographic differences. Major definitions have been developed by FAO that emphasizes a difference between food loss and food waste. Food loss refers to the decrease in edible food mass available for human consumption throughout the different stages of the food chain (production, post-harvest, processing, and distribution) while food waste refers to edible food which is discarded, usually at retail and consumer level (FAO, 2011). Food loss, they argue, is mainly caused by logistical and infrastructural limitations, while food waste is largely related to behavioral factors (FAO, 2011).

BIO Intelligence Service (2010) developed the first attempt to identify a definition at the European level: "Food waste is composed of raw or cooked food materials and includes food loss before, during or after meal preparation in the household, as well as food discarded in the process of manufacturing, distribution, retail and food service activities. It comprises materials such as vegetable peelings, meat trimmings, and spoiled or excess ingredients or prepared food as well as bones, carcasses and organs."
More recently, two additional definitions have been drafted from the EC (2014) and EU FP7 Project FUSIONS (2014). The newly proposed revision of the EC Waste Directive in the Communication "Towards a circular economy: a zero waste programme for Europe" by DG Environment states that "food waste" means food (including inedible parts) lost from the food supply chain, not including food diverted to material uses such as bio-based products, animal feed, or sent for redistribution (2014). The EU FP7 Project FUSIONS (2014) has executed an extensive comparison of definitions and has developed a definitional framework for food waste as where it is referred to as "any food, and inedible parts of food, removed from the food supply chain to be recovered or disposed (including composted, crops ploughed in/not harvested, anaerobic digestion, bio-energy production, co-generation, incineration, disposal to sewer, landfill or discarded to sea)".

In the United States the Environmental Protection Agency (EPA) defines food waste as "uneaten food and food preparation waste from residences and commercial establishments such as grocery stores, restaurants, bars, and company cafeterias" (EPA, 1997). For the California Department of Resources Recycling and Recovery (CalRecycle), the definition of food waste is equal to what can be called food scraps. Therefore, by food waste they mean any discarded food, including overproduction, unsold food (i.e. remains such as onion skins or carrot tips), as well as any leftovers (CalRecycle, 2009). This last definition specifically includes the edible food that is refused since it is not used by the final consumer (avoidable waste from eaten food), and the inedible scraps (unavoidable waste from eaten food).

Overall FW has a number of interrelated implications for food and nutrition security, economic development and environmental impacts since they represent a waste of different natural resources. What exacerbates the concern, is the fact that nearly a third of the food produced for human consumption is estimated to be wasted globally, estimated by FAO (2011a). This raises the question of what causes food waste throughout the food supply chain and what policy measures should be undertaken for their prevention and reduction.

June 4th, 2015

Plenary Session

Reports from the parallel sessions of the day

Sessions 2 & 5: Nutrition & Health **T. Norat** & **AK. Bock**

Sessions 3 & 6: Advertising **M. Caroli** & **F. Gomes**

Sessions 4 & 7: Sustainable Agriculture **MJ. Amiot-Carlin** & **P. James**

F&V consumption: a multisectoral systemic approach

Chair:

E. Riboli
Director
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Professor Elio Riboli is Director of the School of Public Health at Imperial College London. Prof. Riboli has an M.D. degree (1977, Milan), a Master of Public Health (1980, Milan) and a Master of Science in Epidemiology (1982, Harvard, Boston, USA).

In 1983 he moved to IARC-WHO in Lyon, where he undertook the task of developing new research projects in the area of nutrition, nutritional status and cancer. In 1990 he initiated the European Prospective Investigation into Cancer and Nutrition (EPIC), which eventually included 26 centres in 10 European countries. Questionnaire data on diet and lifestyle have been obtained from about 500,000 study subjects, and blood samples from most of them. He was Head of the Nutrition and Hormones Group of IARC from 2004 to 2005.

In 2006, Elio moved from IARC to Imperial College where he was initially appointed Professor and Chair in Cancer Epidemiology and Prevention and in 2008 the Director of the School of Public Health, a position which he still holds today. Currently Elio is Chair of Interventional Public Health of the Imperial College AHSC and Director of Research in Public Health of the Imperial College NHS Healthcare Trust, providing a direct link between academic research, public health and clinical translation.

With:

F. Branca - WHO

F. Gomes - INCA - BR

F. Branca
Director - WHO
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Policy coherence to achieve healthy diets - a call from the 2nd International Conference on Nutrition

Francesco Branca is the Director of the Department of Nutrition for Health and Development in the World Health Organization in Geneva and is currently the acting Executive Secretary of the Standing Committee of Nutrition.

He has been a Senior Scientist at the Italian Food and Nutrition research Institute where he was leading studies on the effects of food and nutrients on human health at the different stages of the life cycle and on the impact of public health nutrition programmes. He has been President of the Federation of the European Nutrition Societies in 2003-2007.

Dr. Branca graduated in Medicine and Surgery and specialized in Diabetology and Metabolic Diseases at the Università Cattolica del Sacro Cuore, Roma and obtained a PhD in Nutrition at Aberdeen University.

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F. Gomes
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Fabio Gomes currently works as a Public Health Nutrition Officer of the Ministry of Health of Brazil at the Food, Nutrition and Cancer Unit of the National Cancer Institute of Brazil developing multi-component and multi-setting health promotion strategies, mobilising regulatory measures to reduce the demand for unhealthy products, and protecting food and nutrition public policies from conflicting interests.

He has worked as advisor of the United Nations Development Programme for the Brazilian Ministry of Health, supporting the development of strategies to implement nationwide actions for Surveillance of Risk Factors for Non-Communicable Diseases (NCDs) in Schools. As World Public Health Nutrition Association (WPHNA) External Affairs Secretary he took care of WPHNA relations with other bodies, political declarations and conferences organisation.

He graduated in nutrition at the Rio de Janeiro State University in Brazil. He obtained a MSc. in Population Studies and Social Research in 2007 and a PhD in Collective Health at the Institute of Social Medicine of the Rio de Janeiro State University in 2013.

Building and strengthening fruit and vegetable-friendly food systems

Big Food corporations manufacturing ultra-processed products are dedicated to increasing the presence of their products in populations' diet. The displacement of local foods, meals and ways of eating by these companies' products and associated eating practices might impact on populations' nutrition and health, but also on the related structural determinants such as countries' agro-food-biodiversity, food sovereignty and equity.

The extent of the domination by Big Food multi- or transnational corporations also relates to how friendly is the food system to healthy foods such as fresh or minimally processed fruits, vegetables and pulses. The levels of domination of food systems by Big Food will be characterised by the volume of sales and share of ultra-processed products in population's diet, the agro-food-biodiversity of the country, and the extent of mono/oligopolisation of system (food growing, processing, supplying, promotion, placing). Three levels of domination will be contrasted:

1) Highly dominated ones: with very impoverished agro-food-biodiversity; monotonous, unhealthy; highly mono/oligopolistic system.

2) Least dominated by Big Food: with wealthy agro-food-biodiversity; predominantly healthy traditional diet; predominantly self-sufficient (e.g. local production and supply); highly decentralised/local/shared system.

3) Mildly dominated by Big Food: with a quite well preserved agro-food-biodiversity; potentially self-sufficient; still with some space for local/shared/decentralised food growing, processing, supplying, promotion, and placing.

The production, availability, affordability of and demand for fresh or minimally processed fruits, vegetables and pulses are in function of the level of domination of food systems by Big Food transnational corporations manufacturing ultra-processed products. The demand is unbalanced in favour of ultra-processed products by means of marketing tactics such as product placement, promotion and pricing. The extent and time trend of this unbalanced competition between fruits, vegetables and pulses and ultra-processed products relates to upstream determinants such as food system's history, public policies reaction to markets, culinary traditions, and geographical limitations. When this unbalanced competition reaches production the consequences tend to be increasingly irreversible in many aspects.

Ultra-processed products are essentially assemblages of flours, fats, oils, sugars, salts and cosmetics, which are extracted from very small selection of grown foods. Therefore as the food systems get dominated by these products, in order to fulfil ultra-processed products manufacturers needs for ingredients, increasingly less crops are dedicated to fruits, vegetables and pulses production, and monotonisation of diets reaches the agriculture and impoverishes agro-biodiversity as well.

Legislative and economic measures are required to mediate this process favouring a diversified production of fruits, vegetables and pulses, and increasing the demand for these fresh or minimally processed foods and its associated healthy eating practices. In addition, these measures shall also be designed to effectively decrease the demand for ultra-processed products. Otherwise those policies leveraging fruits, vegetables and pulses, will not resist unrestricted pressures from ultra-processed products' markets to take over food systems.

June 5th, 2015

Plenary Session

Nutrition in childhood: short and long term health

Chair:

M. Caroli
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Margherita Caroli is a paediatrician and a nutritionist with a PhD in Paediatric Nutrition. She has been working at the Paediatric department in D Camberlingo Hospital since 1980 until 1998 when she was nominated Head of the Nutrition Unit at the Department of Prevention ASL Brindisi up to now. She has been the scientific coordinator of several projects at regional, national and European level in the field of promotion of health and prevention of obesity and chronic diseases mostly in children.

She is also member of numerous national committees and task forces at national and European level. She is also frequently temporary advisor for WHO in the field of paediatric nutrition related to obesity. She has been Board Member of the European Childhood Obesity Group, of the Italian Society of Obesity, of the EASO Task Force on Childhood Obesity and of the Italian Society of Paediatric Nutrition. She was also President of the ECOG.

She has been an invited speaker in more than 120 scientific meetings, conferences and workshop. She has written numerous papers in national and international journals, and she is also a reviewer for several international scientific journals. She has collaborated to several scientific books and she edited three books in childhood obesity and nutritional education.

With:

J. Mennella - Monell Chemical Center - USA

S. Issanchou - INRA - FR

U. Simeoni - Centre Hospitalier Universitaire Vaudois - CH

M. Caroli - ASL Brindisi - IT

J. Mennella
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Dr. Julie A. Mennella obtained a Ph.D. from the Department of Behavioral Sciences at The University of Chicago in Chicago, IL. She subsequently did postdoctoral work on the transfer of volatiles from maternal diet to human milk at the Monell Chemical Senses Center in Philadelphia, PA.

She joined the faculty there in 1990 where she is now a Member. Her major research interests include sensitive periods in human flavor learning during breastfeeding and formula feeding and the role of genetics and culture on taste sensitivity and preferences.

In addition to her research, she founded and then directed a program at Monell Center from 1991-2007 that encouraged under-represented minority high school and undergraduate students to pursue careers in science and medicine.

Dr. Mennella is the recipient of grants from the National Institute of Deafness and Other Communication Disorders and the Eunice Kennedy Shriver National Institute of Child Health and Human Development and is the author or co-author of numerous research papers.

The biology of taste and flavor learning

Health initiatives address childhood obesity in part by encouraging good nutrition early in life. In this talk, I will highlight the basic science that revealed children live in different sensory worlds than adults. That is, children naturally prefer higher levels of sweet and salty tastes and reject lower levels of bitter tastes than do adults. Thus, their basic biology does not predispose them to favor the recommended low-sugar, low-sodium, vegetable-rich diets and makes them especially vulnerable to our current food environment of foods high in salt and refined sugars. If this is the bad news, the good news is that sensory experiences, beginning early in life, can shape preferences. Mothers eating diets rich in healthy foods can get children off to a good start since flavors are transmitted from the maternal diet to amniotic fluid and mother's milk, and experience with such flavors leads to great acceptance of those foods. In contrast, infants fed formula learn to prefer its unique flavor profile and may have more difficulty initially accepting flavors of fruits and vegetables not found in formula. Once weaned, regardless of early feeding mode, infants can learn through repeated exposure and dietary variety. In summary, the convergence of findings from basic taste research reveal that early life experiences with healthy tastes and flavors may go a long way toward promoting healthy eating and growth, which could have a significant impact in addressing the many chronic illnesses associated with poor food choice.

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Dr Sylvie Issanchou is senior scientist at INRA (Institut National de la Recherche Agronomique). She has a background in food science and sensory evaluation.

Within the research unit CSGA (Centre des Sciences du Goût et de l'Alimentation), she leads a research group working on the Development and dynamics of food preferences and eating behaviour.

She is author of about 80 scientific papers in international refereed journals, 17 book chapters and over 150 communications in international or national meetings.

She has been the coordinator of a European project on the 'Determining factors and critical periods in food habit formation and breaking in early childhood: a multidisciplinary approach funded by the European Community's Seventh Framework Program.

How family influences children's eating behaviour

Parents may influence children's eating behaviour in many ways. It starts before birth as flavour compounds from the foods eaten by the mother can be transmitted to the amniotic

fluid, are perceived by the foetus and this leads to a better acceptance of these flavours up to several months after birth. Breastfeeding may also impact acceptance of new foods. Firstly, flavour compounds from the foods eaten by the mother can be transmitted to her milk and may favour later acceptance of these flavours. Secondly, the daily flavour variation in breast-milk compared to the stability of the flavour in formula milks could explain why breastfed infants more readily accept new foods than formula-fed infants. Breastfeeding was also found associated with positive effects on later eating patterns. The pattern of complementary feeding seems also important since providing foods with different flavours from day to day increased the acceptance of new foods. Delayed introduction to lumpy foods was associated with more food refusals and a lower consumption of a number of fruits and vegetables in childhood. Parental practices used by parents when their child dislikes a food are also important. Indeed, repeated exposure is an effective means of increasing acceptance of a dislike food in infancy and is also effective to increase acceptance of new foods in children.

The effectiveness of repeated exposure during early childhood is less conclusive for previously known and not liked vegetables. For bitter vegetables pairing them with a liked ingredient could be a good strategy to increase the liking of their flavour in particular for children with a high sensitivity to bitterness. Studies on the use of rewards to encourage children to eat some foods gave mixed results. However, a review of these studies concluded that rewards have broadly positive effects on intake, but negative effects on liking if the target food is already liked. Moreover, results suggest that non-food tangible rewards, or praise can be highly effective in encouraging children to taste new or less liked foods. It has also been shown that a positive affective context reinforces the positive effect of exposure on preference. Moreover, parents could play a modelling role, especially if they display a real enthusiasm when eating the target food they want to be eaten by their child. On the contrary, the more the mothers used permissive strategies, the less their child likes vegetables.

Parental practices influence also how much is eaten. Thus, 5-year-old children ate a greater amount when they were offered larger portions. When young children were focused on the amount of food remaining on their plate and received rewards for eating, they showed lower caloric compensation than children who were focused on their internal cues of fullness. Moreover, the maternal use of food to regulate preschool children's emotions was associated with a higher intake of sweet foods in the absence of hunger when children were upset.

Finally, it is noticeable that the use of these practices differs according to the family's social background and, in particular, with the mothers' education level.

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Umberto Simeoni is Professor of Paediatrics at Faculté de Biologie et de Médecine, University of Lausanne and Director of the Division of Pediatrics and of the DOHaD Research Unit at CHUV University Hospital in Lausanne Switzerland.

He graduated at Louis Pasteur University, Strasbourg, France, where he later worked in the position of Professor of Paediatrics and Director of Neonatal and Pediatric Intensive Care Units at Strasbourg University Hospital, up to 2001. He then became Professor of Pediatrics and Director of the Department of Neonatology at Aix-Marseille University and AP-HM University Hospital in Marseille, France up to 2014.

His research is oriented towards the developmental origins of adult diseases, perinatal nephrology, perinatal bioethics, as a member of the UMR-S 1076 INSERM research unit. He authored and co-authored more than 150 referenced articles, several books on neonatology, and more than 250 invited lectures. Past-President of the French Society for Neonatal Research, he is currently Past-President of the French Society for Perinatal Medicine and President of the European Association of Perinatal Medicine.

Nutrition and epigenetics in the perinatal environment

The time period of development that extends from pre-conception to early infancy is the period of life during which epigenetic DNA imprinting activity is the most active. Epigenetic changes have long lasting effects on genes expression and are related to, and often induced by the environment in which early development takes place. Furthermore they may induce a particular risk for developing specific chronic disease at adulthood, known as non-communicable diseases (including cardio-vascular diseases such as stroke or coronary heart disease, metabolic diseases such as overweight, obesity and diabetes, diseases of the reproductive system such as male infertility, prostate, testicle or breast cancer. Epigenetics are now recognized as the molecular basis for the Developmental Origins of Health and Disease (DOHaD) concept, also known as foetal or developmental programming, or the theory of Barker. The period of vulnerability covering early development has also been referred to as the 1000 days period (i.e. from conception to the second anniversary).
Epidemiological and experimental studies in animals have shown that all biological and physiological systems undergo naturally the process of developmental programming, including the immune system, fertility, cellular senescence and longevity, and even behavioural functions.

Pathological pre- and perinatal conditions, such as preterm birth, intrauterine growth restriction, intra-uterine exposure to maternal overweight or diabetes, altered early nutrition and early exposure to contaminants such as dioxins, PCBs, bisphenol A have been shown to induce epidemic-like long term effects, that affect various systems, with relatively similar mechanisms.

Neonatal and infantile nutrition plays an important role in long term consequences of adverse perinatal conditions, either as the principal or as a second hit. This is true for adverse conditions due to economical and sanitary factors encountered in developing countries, but also for pre- and perinatal diseases and complications of pregnancy that are key issues in rich countries.

Work in rat models in our laboratory and in others shows that early postnatal nutrition influences renal function and blood pressure at adulthood. Contrary to what is observed in humans, nephrogenesis is still on-going in the neonatal rat, up to 7-9 days of life. This confers to such animal model a moderate similarity with situations of postnatal on-going nephrogenesis in human preterm infants. We observed that postnatal, transient overfeeding during lactation in normal rat pups induced elevated blood pressure and increased glomerular sclerosis at adulthood. Moreover, this was accentuated, together with proteinuria and a decreased glomerular filtration rate when overfeeding was superimposed to foetal growth restriction. Such physiological changes are accompanied by marked changes in the kidney transcriptome, in which the transcription of around 20% of the whole genome has been altered, possibly via epigenetic mechanisms. This means that excess nutrient intakes during the neonatal period, even when they originate in breast milk, may induce long term hypertension, and decreased renal function, in particular when associated with previous growth restriction.

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Margherita Caroli is a paediatrician and a nutritionist with a PhD in Paediatric Nutrition. She has been working at the Paediatric department in D Camberlingo Hospital since 1980 until 1998 when she was nominated Head of the Nutrition Unit at the Department of Prevention ASL Brindisi up to now. She has been the scientific coordinator of several projects at regional, national and European level in the field of promotion of health and prevention of obesity and chronic diseases mostly in children.

She is also member of numerous national committees and task forces at national and European level. She is also frequently temporary advisor for WHO in the field of paediatric nutrition related to obesity. She has been Board Member of the European Childhood Obesity Group, of the Italian Society of Obesity, of the EASO Task Force on Childhood Obesity and of the Italian Society of Paediatric Nutrition. She was also President of the ECOG.

She has been an invited speaker in more than 120 scientific meetings, conferences and workshop. She has written numerous papers in national and international journals, and she is also a reviewer for several international scientific journals. She has collaborated to several scientific books and she edited three books in childhood obesity and nutritional education.

Nutritional education to children: a realistic tool or a dream?

Education is a mandatory contribution to individual development that starts during infancy and childhood. Steps follow each other in a determined order leading to a more complex and better adaptation to society and interactions. These steps have to follow the child neurological and cognitive development pace.
The same is true for nutrition. Nutritional education is part of the early and ongoing child cares but may be bad or good according to several points of views. Food variety, amount of food eaten, meal times and rhythm are all strongly influenced by education. As a consequence, distinct problems may arise.
Current education patterns tend to evolve so that differences increase between traditional education and young parents' action. The loss of traditional family structure, greater distances between grandparents and parents, divorces, all contribute to weaken the weight of references. Advertising, community life as in schools or kindergarten may introduce other sources of confusion.
Nutritional education which is first performed by the parents can be amended provided it starts from existing lifestyle and relies on valuable arguments. Whenever it is in contradiction with family's habits (or loss habit) it is likely to be rejected.

June 5th, 2015

Plenary Session

Advertising vs. adversity: a moving border?

Chair:

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Dr Marie-Laure Frelut is a pediatrician and child obesity specialist in the Endocrinology department at Bicêtre University Hospital (Université Paris Sud, AP-HP).

She was a founding member and past president of the European Childhood Obesity Group (ECOG).

She has worked as a national and international expert in the field of child and adolescent nutrition for the French government and national research agency (INSERM), with the AFERO (French association for the Research and Studies on Obesity) and WHO.

She is also a permanent expert at the European Medicines Agency (EMEA).

She currently is a member of the Nutrition Committee of the French Pediatric Society, of the European Committee for the teaching of obesity (SCOPE), of the European Association for the Study of Obesity (EASO) and of the AFERO.

With:

ML. Frelut - Hôpital Bicêtre - FR

S. Storcksdieck - EC - JRC

J. Halford - University of Liverpool - UK

A. Garde - University of Liverpool - UK

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Cognitive development from early childhood to adolescence and impact of old and new media advertising

Child cognitive development is a continuum process with a predictable sequence yet having a unique course for every child. Each stage of cognitive development is influenced by the previous ones as well as by the environment. Obviously children are more influenced by the closer environment, such as parents, family and, last but not least, every way of communication, including the media, if present in their everyday life.
Helping children to reach the highest level possible of their cognitive development is essential not only for children and their families, but also for the society as a whole.
Several theories deal with the way cognitive development progresses in children and which are the most important factors in its shaping.
Piaget's theory as well as human ecology one, passing through Erikson's, attachment 's and others, state that children slowly acquire those cognitive abilities allowing them to fully understand and properly react to the events of life. Normally the full cognitive development is reached around 18 years of age or at the end of adolescence.
For at least the last 40 years, media have become important factors in shaping children behaviour, preferences, and long-lasting beliefs. For many years television has been the most powerful media influencing children's life.

For about 10 years the huge explosion of new media, such as Internet and cellular phones, has revolutionized children's life, opening new roads both for their communication with peers, and for getting information from a bunch of subjects, often with the hidden aim of selling items or convincing them to perform specific behaviours.

Children start to use computer and similar items already at very young age and specific laptop are available even for one year old children. Many apps and TV programs are claimed as "educational" so that parents perceive their use as positive for their children. On the contrary, several studies show that 1 or 2 year old children using these items present a delay in their language development. Actually, at this age every minute spent playing at computer or any other similar equipment is a minute stolen to the real human interaction between parents and very young children, that it is considered the best way for children to develop knowledge, abilities and positive behaviours.
Time spent using these devices increases with age, sometimes starting even at one year of age and reaching the highest rate during adolescence.
In Italy 10% of children get their first mobile before 6 years of age, 17.6% get it at 6-7 years, while 34.9% around 8-9 years of age, and 23.3% at 10-11 years of age. This means that only around 15% of children at 11 years of age do not own a mobile. Around 13% of children use their mobile to surf in the Net, 16.5% to watch TV programs, 56% to play videogames. 56% of children own a computer with an internet connection. As many parents are not so "virtual" educated as their sons and daughters, this means that children are probably left alone in front of a huge amount of information.
Children can watch food advertisings both in television programs and through the Internet and apps available on cellular phones and their derivate (Ipad, tablet, etc) .
At what age children are able to distinguish advertisings from programs? Several researches performed during the last 20 years have tried to assess this issue and their results are very interesting.
Young, in 1997, stated that in UK children were able to distinguish them already at the age of 2; Furnham, in 2000, declared that in Germany two third of 6 year old children distinguished advs from programs; data from Tufte in Denmark in 1999 were similar to the previous researcher as most of the children of 7 years of age made a distinction between the two, and last Foxin in the 1996 in USA verified that the ability to discriminate between programs and advertising was present in several children of 10-12 years of age.
However the ability to distinguish between advertising and programmes doesn't mean that children are able to understand the proper aim of advertisings.
As a matter of fact, the advertising structure is adapted according the audience's age and cognitive level.
In other words, when advertisings are addressed to children the language is built specifically for them, whereas when the age range is higher and advertisings are addressed to adolescents the language used is totally different from the previous one and is taylor made, as a high fashion dress on adolescents' desires.
In general, in TV and other media advertisings, human and cartoons characters eat snacks

and drink soft drinks and soda. Both in programmes as well as in advertisings eating is often considered a social activity or a reward to a stressing situation. At the same time high referral to foods and drinks and their use by obese subjects are rarely shown. As a consequence, the use of food in programs and advertisings leads to a misconception of healthy nutrition, stimulation of excess food intake and an over-representation of junk food both in children as in adolescents.
The values present in advertisings are those familiar to children, such as family and friendship, and when the advertising is addressed to adolescents friendship is still the most highlighted value, but also love with peers becomes important.

The setting is also adapted to those children and adolescents who spend their lives mostly at home (more present in advertisings for children), school, as well as open spaces or cafeterias. All the advertisings have a "happy ending", short stories of success obtained thanks to the effects of the advertised food, so becoming the main factor to reach happiness, friendship, fun, beauty, fitness, and so on.
Very few children and adolescents have a such cognitive development to fully understand the real aims of those well constructed advertisings and to resist the desire of feeling irresistible, strong and charming thanks to a little aid such as a taste food…
Last, but not least, all the food advertisings could contribute to favour a slowed cognitive development, especially in less privileged children and adolescents.
To sum up, considering old and new media there is a very little difference in advertisings' structure but a higher risk of excess of view. As a matter of fact, during the last years children used to stay home and watch television, food's advertising included, nowadays they are persecuted by a higher number of food advertisings present in "mobile media" available, such as cellular phones and Internet.

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In May 2013, Stefan Storcksdieck joined the Nutrition team within the Public Health Policy Support Unit of the JRC as Scientific Project Officer.

Stefan holds an MSc equivalent (Dipl. oec. troph.) in Nutrition and Household Economics from Justus-Liebig-University Giessen, Germany, and a PhD in Human Nutrition from ETH Zurich, Switzerland. Before joining the JRC, he was employed for five years at the European Food Information Council (EUFIC) in Brussels, first as Nutrition Communications Manager and then as Nutrition & Health Projects Manager.

At the JRC, Stefan is focussing on school food policies across Europe, coordinating the JRC input to the EU project PATHWAY-27, and supporting other projects of the Nutrition group.

Shaping the school environment to promote healthy diet and lifestyle habits

S. Storcksdieck genannt Bonsmann, Tsz Ning Mak, T. Mouratidou, J. Wollgast, S. Caldeira

Adopting healthy lifestyle behaviours early on is seen as crucial for optimal long-term health. Schools are an ideal setting for intervention in that they represent a protected environment where children, their families and school staff including caterers can be reached with key messages about healthy diets and lifestyles. School food policies can help set the scene, but what kind of guidance do European countries actually propose?
To answer this question, the JRC has identified and described the national school food policies in the EU28 plus Norway and Switzerland and brought together experts to discuss school food policy contents, best practices and the potential to explore the policies and the school setting further.

The mapping revealed that all 30 countries considered have a school food policy in place; half of them being voluntary and the other half mandatory. Standards and guidelines provided commonly offer food-based instructions, but they also consider the dining environment, vending services, catering practices, and staff training among others. Regarding fruit and vegetables, almost all policies define what and how much to provide for lunch and/or other mealtimes. Variations mainly relate to the types of meals targeted (e.g. lunch,

breakfast, snack, dinner); whether standards/recommendations are nutrient- and/or food-based; and if vending machines and the wider food environment (kiosks near schools, packed lunches from home, etc.) are considered. Additionally, the mapping revealed that restrictions on food marketing in schools vary in scope and detail. Individual country factsheets produced by the JRC provide further detail on national school food policies in Europe.

Crucial success factors for effective school food policy implementation were the building of partnerships, local engagement (focus on head teachers), and increasing the availability of healthier options. At the same time, further work is needed on ways to communicate better between all stakeholders, improve the image of school food, and target resources effectively. Knowledge gaps include the influence of diet on school attainment and the role of portion sizes for energy intake and weight management.

Moving forward, we plan to tackle these gaps, by for example producing policy briefs and stimulating policy dialogue on concrete health-promoting school-based interventions that address the issues identified above. This work will support European policymakers in their efforts to further improve the school environment and thus promote healthy behaviours in children and beyond, in line with the EU Action Plan on Childhood Obesity 2014-2020.

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Professor Jason Halford is a chartered Health Psychologist and currently the Convernor of the Liverpool Obesity Research Network – LORN. He is also the head of the Department of Psychological Sciences. He is a Chair in Biological Psychology and Health Behaviour at the University of Liverpool and former Director of the Human Ingestive Behaviour laboratory. He has Chaired of the UK Association for the Study of Obesity – ASO from 2011. The ASO is Europe's largest and the World's oldest National Obesity Science organisation.

Over the past 10 years his research has focused on drug induced weight gain, the effects of nutrients and fibre on appetite and hormone release, the effects of stress on eating behaviour, and on lean obese differences in the expression of appetite. More recently, his works have focused on the effects of branding and food promotion on children's food preferences and diet. Professor Halford is co-ordinater of the EU Frame work project SATIN and have conducted a number of weight management interventions (nutritional, behavioural and pharmaceutial).

Food advertising to children: effect of self-regulation vs legislation

In 2007 the UK broadcast regulator Ofcom enacted legislative control over the marketing of unhealthy foods to children. This banned High Fat Salt Sugar (HFSS) food advertisements on dedicated children's channels and restricted the broadcast of such commercials around programmes of appeal to 4-15 year olds on any channel. These restrictions have been cited as an example to follow for countries currently relying on self-regulatory pledges from industry as their primary strategy to limit food marketing influence on children. Indeed industry data suggest a significant fall in advertising spend on televisions adverts for food. However, analysis (mid-implementation) of 150,000 adverts in 2008 demonstrated that on channels popular with children there was a disproportionate amount of unhealthy food advertisements. Importantly this was the same whether we examined children's peak or non-peak viewing periods. Variation was seen across channel types with some particular worrying examples in sports and music dedicated TV (and one children's channel Cartoon Network).

In 2010 the regulation was fully implemented, and held as a gold standard, and so our analysis was repeated. With regard to the total number of food adverts, this was low in children's channels (down 4.3% from 2008) but higher in sports, family and music channels. In all of these there were more food adverts shown during children's peak viewing time (SKY SPORTS, ITV, Channel 4, SKY1, 4 MUSIC, SMASH HITS, MTV). This represented a rise from 2008 of 3.0% on music channels and 4.3% on sports channels. Across the three channels types nearly 60% of adverts during children's peak viewing time were still for unhealthy foods, a pattern also seen on children's channels (even though they showed far

fewer food adverts per se). Adverts for unhealthy foods during children's peak viewing (as a % of total) were 84% on sport, 64% on music 55% on family channels.

The proportion of healthy food adverts children saw remained low (6-16% of total) on those channels. From 2008 there was little change in the proportion of adverts shown classed as health or unhealthy. There was marginal growth miscellaneous category in which bands rather foods were advertised (which avoids the regulatory nutritional profiling mechanism. Overall in 2010, fast food items were the most frequently (15.2%, up 3.3% from 2008) and sugar-sweetened beverages were the third most frequently advertised food product increasing (up from 4.6% in 2008 to 7.4%) of all food commercials.

These analyses demonstrate children remain exposed food adverts during peak viewing on channels popular with them and most of these are still for unhealthy foods. Whilst legislation is viewed as superior to self-regulation, in and of its self, it actually has little to no substantive overall effect if 1) the total child audience not is used as a criterion and 2) brand advertising can get around nutritional profiling models. Falls in advertising spend merely reflect reduced advertising costs in a proliferating media environment. Irrespective of the form of control (self-regulation vs legislation) without robust independent monitoring the impact of any system may be very limited.

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Amandine Garde is Professor of Law at the University of Liverpool. She previously lectured at King's College London where she obtained her PhD, at the Faculty of Law in Cambridge where she was also a Fellow of Selwyn College, at the University of Exeter and at the University of Durham.

Her research interests lie in the fields of EU Internal Market, Consumer, Advertising, Food and Public Health Law. In particular, she has developed an expertise on the legal aspects of obesity prevention and other risk factors for non-communicable diseases such as tobacco and excessive alcohol consumption.

As one of the few legal experts on the prevention of non-communicable diseases, she has been invited to take part in a broad range of policy initiatives. Most notably, her work has attracted the attention of the World Health Organization, for whom she has co-authored reports on food marketing to children and has provided a series of training sessions on the role of legal instruments in the prevention of non-communicable diseases.

She currently is a member of the Ad Hoc Working Group on Science and Evidence to the WHO Commission on Ending Childhood Obesity. She has also been involved in projects for – among others – the Directorate General of the European Commission for Health and Consumers, the UK Government, the Scottish Government, the Swedish Institute for European Policy Studies, as well as the National Institute for Health Education and Promotion (INPES) and the National Institute for Health and Medical Research (INSERM) in France.

Food marketing regulation: Time to seize the bull by the horns

In May 2010, at the Sixty-third World Health Assembly, the WHO Member States endorsed a set of recommendations on the marketing of foods and non-alcoholic beverages to children (resolution WHA63.14). The Recommendations were developed in response to a request made by Member States in May 2007 (resolution WHA60.23), in light of evidence establishing that food marketing influences children's food preferences, purchase requests and consumption patterns. Since then the evidence has further accumulated and childhood overweight and obesity have continued to grow.

The case is therefore stronger than ever to ensure that the Recommendations are effectively implemented by Member States. However, implementation of the Recommendations has been slow and incomplete. This paper will present an overview of the measures a few Member States have adopted to limit children's exposure to unhealthy food marketing, before discussing how the effectiveness of these measures could be improved if Member States adopted a more robust evidence-based, rights-based approach and if they were more mindful of health inequalities.

June 5th, 2015

Plenary Session

Co organized with DG-AGRI

European School Fruit & Vegetable Scheme - SFVS
& The New Zealand School Fruit In School at a glance - FIS

Chair:

M. Tarabella
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Marc Tarabella is a Belgian politician, Mayor of Anthisnes and Member of the European Parliament for the French Community of Belgium with the Parti Socialiste, part of the Socialist Group and sits on the European Parliament's Committee on Agriculture and Rural Development. He his rapporteur on the proposal for a regulation of the European Parliament and of the Council amending Regulation (EU) No 1308/2013 and Regulation (EU) No 1306/2013 as regards the aid scheme for the supply of fruit and vegetables, bananas and milk in the educational establishments

He is a substitute for the Committee on the Internal Market and Consumer Protection and for the Committee on Women's Rights and Gender Equality. He is also a vice-chair of the Delegation for relations with the countries of Southeast Asia and the Association of Southeast Asian Nations (ASEAN).

With:

I. de la Mata - EC - DG SANTE

P. Dudley - United Fresh New Zealand Incorporated - NZ

R. Van der Stappen - EC - DG AGRI

G. Keller - EC - DG AGRI

I. de la Mata
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Isabel de la Mata is the Principal Advisor with special interest on health in the European Commission since March 2008. Before this, she worked as Counsellor for Health and Consumer at the Permanent Representation of Spain to the EU, as Deputy Director General for Health Planning at the Spanish Ministry of Health, as Advisor to the Viceminister of Health and several other posts at the Ministry of Health of Spain and the Regional Departments in the Basque Country and in Madrid.

She has worked with WHO, including as member of the Standing Commission of the Regional Committee, Pan American Health Organisation, Inter-American Development Bank and the Spanish Agency for International Cooperation.

Dr de la Mata graduated in Medicine and Surgery at the University of Basque Country in 1983 and holds post-graduate degrees from the University of Leuven and Paris VI in Public Health, Hospital Administration and Statistics. She is specialist in Preventive Medicine and Public Health.

The School Fruit and Vegetables Scheme, a collaboration between agriculture and health

Current challenges
The EU is facing high levels of prevalence of overweight and obesity in children. Overweight and obesity have major personal, social and economic burdens.
A healthy lifestyle in children (a balance diet and adequate levels of physical activity) plays an important role in addressing these diseases.
Consumption of fruits and vegetables in children falls below WHO recommendations, although these are essential components of a healthy diet.

EU action on nutrition
- The 2007 Strategy for Europe on Nutrition, Overweight and Obesity-related Health Issues promotes a balanced diet and active lifestyles.
- On 24 February 2014 the High Level Group on Nutrition and Physical Activity agreed an Action Plan on Childhood Obesity that aims to cap childhood obesity by 2020 by, for example, promoting healthy eating among children.

Increasing fruit and vegetables intake is one of the objectives of both the Strategy and the Action Plan.
- The EU School Fruit Scheme providing fruit and vegetables (and supporting educational measures) to school children is an EU-wide voluntary scheme, aiming to healthy eating behaviour changes in young people.

As the prevalence of obesity in Europe has been rising in many countries, and rising fastest in low socioeconomic population groups, the EU has taken action for addressing health inequalities related to nutrition:
- The European Parliament has been funding four pilot projects for promoting healthy diets, physical activity and increasing consumption of fresh fruit and vegetables among children, pregnant women and older people, especially in poorer regions of the Member States and in low socio-economic groups.
- The "Obesity and inequities" joint WHO/EC publication issued in 2014 is a policy guidance text that supports European policy-makers to improve the design, implementation and evaluation of interventions and public health policies to reduce inequities in overweight and obesity.

Conclusion
Overweight and obesity are determined by multiple factors, some of them falling outside of the remit of health sector. Cross-sectorial cooperation is essential to achieve healthier lives for all the European Union's children.

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Paula Dudley has more than 20 years experience managing New Zealand's 5+ A Day programme and over a decade managing the New Zealand Fruit in Schools programme.

Paula studied nursing prior to taking the role for United Fresh New Zealand Incorporated, during this time she has studied Business with a Major in Communications.

The New Zealand FIS at a glance

This presentation summarises the findings of an independent evaluation of the New Zealand Fruit in Schools (FIS) programme undertaken in late 2014.

The primary purpose of the evaluation was to understand and document the benefits of Fruit in Schools, in particular any wider health promotion impacts, with a particular focus on nutrition and healthy eating.

The evaluation drew on a range of information sources including findings from an online survey of principals of FIS schools (n=378) with a response rate of 81%; 16 key informant interviews and previous Fruit in Schools evaluations.

According to principals, feeding hungry children is the number one benefit of FIS. 85% of principals surveyed reported their school had fewer hungry children as a result of Fruit in Schools. 80% reported reduced stigma as a result of Fruit in Schools, and said that children were more willing to ask for food if they were hungry.

Both principals and Health Promoting Schools facilitators agreed that FIS was providing direct health benefits for children in low decile schools due to increased consumption of fresh produce, and wider dietary changes triggered by Fruit in Schools. 72% of principals agreed or strongly agreed that 'if Fruit in Schools was ended, academic outcomes would suffer' and 91% said 'the overall health of children would decline' if Fruit in Schools was ended.

FIS extends beyond health and academic outcomes to positively influence the wider nutrition and physical activity environment in schools, cultural wellbeing by supporting Mâori values and practices such as manaakitanga, environmental and social wellbeing and community and health sector engagement.

Participants reported FIS was successful because:
- It is meeting a genuine need and making a real difference
- It is very well managed, and easy for schools to participate
- The fruit and vegetables provided are varied and of high quality
- It has been consistent and reliable over many years

Based on the findings of the current evaluation, we conclude that FIS is an effective food and nutrition programme with wide ranging benefits. It is highly valued by schools and well aligned with international evidence on how to improve nutrition and reduce obesity in children.

Research carried out by Quigley & Watts (Jude Ball and Carolyn Watts).

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Rudy van der Stappen, lawyer specialised in European Law, working for the European Commission since 1989 on agricultural matters.

He is currently the deputy head of the horticultural and specialized crops unit in DG Agriculture (fruit and vegetables, olive oil, wine, bananas and floriculture), dealing with market analysis and monitoring as well as management of policy instruments associated with these sectors (including drafting of required legislation).

The European School Fruit & Vegetable Scheme (SFVS): a successful initiative within the Common Agricultural Policy

Implemented since 2009, the School Fruit and Vegetables Scheme's main objectives are to increase the low consumption of fruit and vegetables among children, to help shaping their eating habits at the age were they are formed and to reinforce the link between the farming community and children. It is a voluntary Scheme with Member States' obligatory co-financing of the EU aid used.

The Scheme is based on two "pillars":

- the supply of fruit and vegetables to school children. Mainly fresh fruit and vegetables are distributed to pupils during the morning break at average twice per week. Although Member States are free to choose the age group of children targeted, the majority focus on children in primary school (6-to-10 years old);
- the accompanying measures. These are educational measures such as tasting sessions, farm visits and others, aiming at encouraging children to consume more fruit and vegetables through attractive activities. These measures make children connecting closely to agriculture and increase their awareness about where products come from, seasonality, local production and more.

The Scheme has become more performing year after year, both in terms of participation and uptake of the EU aid earmarked for it.
The number of Member States participating has increased from twenty-one in the first year to the current twenty-five, out of twenty-eight members of the European Union. At the same time the number of children and schools benefiting from the Scheme has almost doubled from 4.7 million to 8.6 million and from 32300 to 61400 respectively.
The successful implementation of the Scheme is also confirmed by the increasing uptake of the available yearly budget of EUR 90 million. From 33% used in the kick-off year it has increased to 78% in 2012/2013 school year.

The CAP 2020 reform has brought important changes to the Scheme aimed at consolidating and possibly further strengthening it. As of the current 2014/2015 school year the budget available has been increased from 90 to € 150 million of EU funds. At the same time, the EU co-financing rates pass from 50% to 75% and from 75% to 90% (for less developed regions).

Although it is too early to assess the impacts of these changes on the performance of the Scheme, they are expected to have a positive impact on a number of aspects, such as the number of participants, the quantities distributed and/or the distribution frequency.
The Scheme has proved to be almost unanimously well accepted by children and civil society. The European Commission is constantly working to improve it and to overcome obstacles to its effective implementation, in close cooperation with the Member States and the stakeholders.

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SFVS on live: One scheme, plenty implementing ways - Short movie on participating Member States

Giuliana Keller is market officer at DG Agriculture and Rural Development.

Since 2009 she is in charge of the School Fruit and Vegetables Scheme and deals both with legislation and implementation.

In 2012-2014 she was responsible for the scientific Group of experts on the School Fruit and Vegetables Scheme appointed by the European Commission in order to assist with the implementation, monitoring and evaluation of the Scheme.

P 1

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Blood concentrations of carotenoids and retinol and lung cancer risk: an update of the WCRF-AICR systematic review of published prospective studies

Background: Carotenoids and retinol are considered biomarkers of fruits and vegetables intake and are of much interest because of their anti-inflammatory and anti-oxidant properties; however, there is inconsistent evidence regarding their protective effects against lung cancer.
Objective: We conducted a meta-analysis of prospective studies of blood concentrations of carotenoids and retinol and lung cancer risk.
Design: We identified relevant prospective studies published up to 31 September 2014 by searching the PubMed database. We calculated summary estimates of lung cancer risk for the highest compared with lowest carotenoid and retinol concentrations and dose–response meta-analyses using random effects models. We used fractional polynomial model to assess potential nonlinear relationships. Seventeen prospective studies (18 publications) were included in the meta-analysis.
Results: Blood concentrations of α-carotene, β-carotene, total carotenoids and retinol were significantly inversely associated with lung cancer risk or mortality. The summary RR were 0.66 (95% CI: 0.55-0.80) per 5 μg/100 mL of α-carotene (studies (n) =5), 0.84 (95% CI: 0.76- 0.94) per 20 μg/100 mL of β-carotene (n=9), 0.66 (95% CI: 0.54-0.81) per 100 μg/100 mL of total carotenoids (n=4), and 0.81 (95% CI: 0.73-0.90) per 70 μg/100 mL of retinol (n=8). The inverse associations for the highest compared with the lowest concentrations were statistically significant for β-carotene, lycopene, total carotenoids and retinol. There were not enough data to conduct stratified analyses by smoking.
Conclusions: Higher blood concentrations of several carotenoids and retinol are associated with reduced lung cancer risk. Further studies in never and former smokers are needed to clarify if the inverse associations are confounded by smoking.

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P 2

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Predictors of fruit and vegetables consumption among Kuwaiti adults

Introduction: High fruit and vegetables intake (600g/day) has been associated with a reduction of total disease burden including ischemic heart disease, stroke, and cancer by 1.8%[1]. The highest prevalence of obesity and non-communicable diseases (cardiovascular disease and diabetes mellitus) was reported in Gulf countries[2] where fruit and vegetables consumption was lower than recommended national/international daily intakes[3]. In 2003, the WHO and FAO launched a worldwide initiative to promote higher fruit and vegetables consumption[1]. The current novel analyses describe fruit and vegetables intake among Kuwaiti adults, determining predictors of high and low fruit and vegetables consumption that may assist in developing future Kuwaiti health promotion directives.
Method: These analyses used data collected from the nationally representative cross-sectional Kuwait Nutrition Surveillance System, 2010-12. Demographic, anthropometric and lifestyle data were collected from 7046 Kuwaiti adults (mean age 39 +12 years). Consumption frequency of 7 food items was collected using a questionnaire based on the CDC Behavioral Risk Factor Surveillance System. Total daily fruit and vegetables consumption was calculated from summing the number of times food items were consumed. Multiple regression analyses were conducted, predicting characteristics of high and low fruit and vegetables consumers using unadjusted and full adjusted models.
Results: Mean fruit and vegetables intake among Kuwaiti adults was 3.9 servings/day; only 34% met the WHO 2003 daily fruit and vegetables recommendations. Fruit and vegetables intake was significantly higher by 1.5, 2.3 and 2 servings/week respectively among men, who were physically active and non-smokers in comparison to women, who were physically inactive and smokers. There was a significant positive association between age and fruit and vegetables intake after adjustment for confounders.
Conclusion: Current findings suggest that intervention campaigns to increase fruit and vegetables consumption in Kuwait should primarily target: women; smokers; young; and the physically inactive.

References:
[1] Lock, K., Pomerleau, J., Causer, et al. (2005). *Bull World Health Organ*, 83(2), 100-108.
[2] Ng, S. W., Zaghloul, S., Ali, H. I., et al. (2011). *Obesity Rev*, *12*(1), 1-13.
[3] Zaghloul, S., Waslien, C., Al Somaie, M., et al., (2012). *EMHJ*, 18(5), 461-467.

P 3

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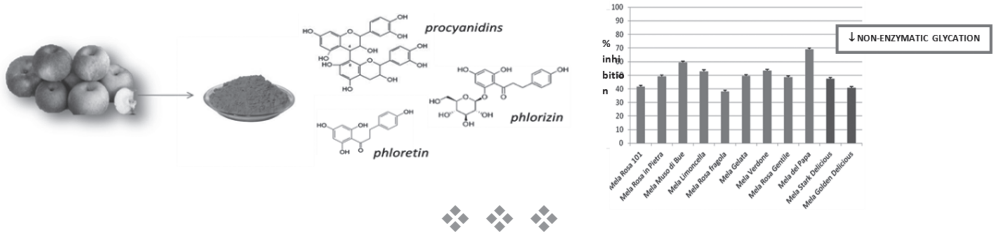
Nutritional and functional qualities of varieties of apples included in the regional repertory of Marche

Objectives: Aim of the study was to characterize the nutritional and functional properties of apple varieties included in the Regional Repertory of Biodiversity of Marche managed by ASSAM (Agency for Food Service Industry in the Marche) targeted to protect genetic resources at risk of erosion.
Methodology: The content of major nutrients and the polyphenolic profiles have been studies in nine local apple varieties included in the Regional Repertory of Marche (*mela Gelata, mela Rosa Gentile, mela Rosa Fragola, mela Limoncella, mela Muso di Bue, mela del Papa, mela Verdone, mela Rosa 101, mela Rosa in Pietra).* To investigate the nutraceutical proprieties of apples the compositional analysis has been associated to the study of their antioxidant properties and ability to inhibit the non-enzymatic glycation of proteins. The interest in this topic is supported by previous studies that reported that both oxidation and non-enzymatic glycation of biological molecules play a key role in the development of many chronic degenerative diseases. Therefore, the evaluation of the antioxidant properties and the ability to inhibit non-enzymatic glycation is a useful parameter for investigating the functional properties of food
Results: The results showed that the apples included in the Regional Repertory are characterized by a high content of polyphenolic compounds. These compositional characteristics reflect in high antioxidant properties and a remarkable ability to inhibit the non-enzymatic glycation of proteins.
Conclusions: The results demonstrate that these apple varieties, in addition to the excellent taste, have a high nutritional and functional qualities and therefore their consumption may have positive consequences for the environment, for the maintenance of biodiversity and health



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Increasing fruits and vegetables intakes to reach nutritional adequacy does not necessarily increase the exposure to food contaminants: a modeling approach in the French women population

Context and objectives: Existing dietary guidelines do not explicitly or quantitatively take into account food safety considerations. The aim of the present study was to assess whether a nutritionally adequate diet would be compatible with food safety recommendations.
Methodology: By crossing dietary data from the French national survey INCA2 and toxicological data from the total diet study EAT2, we estimated for women the mean intakes of 205 representative food items and mean exposures to 45 contaminants including pesticides, heavy metals, mycotoxins, non-dioxin like PCBs and dioxin-like compounds (DLCs). Non-linear optimization was used to design two modeled diets as close as possible to the observed diet and respecting i) the French Recommended Dietary Allowances (FRDA)(NUT model) or ii) the FRDA and the Toxicity Reference Values (TRV) while not exceeding the observed exposures (NUTOX model).
Results: In the NUT model, the main dietary changes were increases of fruits and vegetables (F&V) quantities (Table 1). Exposures exceeding the observed levels, while remaining below the TRV, were noticed for non-dioxin like PCBs and DLCs (because of fish increase), cadmium (mainly because of vegetables increase), and few pesticides (mainly because of fruits, vegetables, hot drinks and starches increases). In the NUTOX model, F&V still increased although in slightly lower amounts than in the NUT model.
Conclusion: Our results show that improving nutritional quality might increase the exposure to toxicants, while remaining in safe ranges. However, making specific choices would allow reaching nutritional adequacy without increasing the contaminant content of the diet.

Table 1: Quantities of F&V (g/d) and exposures to some contaminants (% TRV) in observed and optimized diets

	Fruit and vegetables	Non-dioxin like PCBs	DLCs	Cadmium	Chlorpyrifos-ethyl
Observed	437	26	25	23	8
NUT	668	52	36	33	13
NUTOX	635	26	20	23	8

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"Together for health… always": the challenge of 5 servings a day of fruit and vegetables also in the nursing homes

Introduction: The WHO Ministerial Conference on nutrition and non-communicable diseases (Vienna, July 2013) and other WHO documents stress the importance of promoting healthy eating and encouraging physical activity in all age groups (life-course approach), with particular attention to vulnerable groups. This project develops both areas, but here we will refer exclusively to the nutrition component.

Objectives: Improvement of the quality of life in nursing homes by promoting the Mediterranean diet, with particular attention to the increase of fiber consumption as recommended by RDAs, and by promoting physical activity.

Methodology:

- identification of process and outcome indicators (FV consumption, number of enemas, improved staff knowledge of healthy lifestyle) and their monitoring and verification
- creation of a dining room committee
- operator training
- intervention on the tender, menus and acquisition of new equipment (e.g. offer shakes as snacks, revision of the recipe book: replace potatoes with whole grains in soups, new dishes based on legumes...)
- proposal of protocols for diabetic guests
- activation of a new laboratory "Vegetable Garden" in collaboration with the Agricultural Institute
- occupational kitchen (proposal)

Results:

The evaluation at the end of the project demonstrated:

- FV increased consumption (+ 74%)
- adoption of a menu enriched with plant foods (legumes and cereals seed grains)
- shakes used as snacks
- reduction of enemas (- 30%)
- overall improvement of the operators' knowledge (e.g.+38% correct answers on 5 servings of FV)
- establishment of the dining room committee

Conclusions: The Mediterranean diet, including 5 servings of FV per day, can be promoted even in nursing homes. It is essential, however, to have the active involvement of all actors: health care professionals, the guests relatives, institutions and local administrations, and the continuing support of the partnership created for the sustainability of the project.

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Socioeconomic determinants of fruit and vegetable intake at a time of economic crisis: results from the MOLI-SANI study

Objective: Adherence to the traditional Mediterranean diet is dramatically declining over the last decades. Previous evidence has suggested a likely role of the economic crisis in the shifting from this healthful dietary pattern that is closely linked to lower risk of major chronic disease and mortality. The aim of the present study was to assess the role of socioeconomic factors in determining the intake of fruits and vegetables before and after the economic crisis started (2007).

Methods: Analyses were conducted on 22,578 subjects recruited, between 2005 and 2010, within the MOLI-SANI study; this is a prospective cohort study on general population from the Molise region, a Southern Italian area with typical Mediterranean dietary habits. Household income and educational level were used as major socioeconomic indicators. High fruit and vegetable intake was considered when it was above the calculated sex-specific medians of consumption.

Results: During the five years of recruitment, mean consumption of both fruits and vegetables (gr/day) significantly decreased over time. In 2007-2010, household income was associated with higher intake of fruits (multivariable model including age, sex, household income, education, site of residence, energy intake, diabetes, hypertension, and body mass index), whereas no relationship was found in the years before the economic crisis began (2005-2006); conversely, in the latter period, major determinants of high fruit intake were age and sex only. Regarding vegetable intake, age was a major determinant too, but no significant role of socioeconomic indicators nor of their impact on consumption changed over time.

Conclusion: Fruit and vegetable consumption declined over the years 2005-2010 in a general population with typical Mediterranean dietary habits. In 2007-2010, income became a major determinant of high fruit intake, most likely due to the economic downturn.

Table 1. Fruit and vegetable consumption from 2005 to 2010 in the MOLI-SANI population

	Recruitment years						
	2005 (n=3025)	2006 (n=4464)	2007 (n=5799)	2008 (n=5826)	2009 (n=3113)	2010 (n=351)	P value*
Fruit intake (gr/day)	361 (198)	385 (223)	365 (206)	331 (173)	346 (174)	320 (146)	<.0001
Vegetable intake (gr/day)	172 (80)	172 (77)	159 (68)	166 (67)	160 (58)	153 (48)	<.0001

* Means and p value obtained from the multivariable model adjusted for age, sex, household income, education, site of residence, energy intake, diabetes, hypertension, and body mass index.

Table 2. High fruit and vegetable intake according to socioeconomic indicators by recruitment periods

		High fruit intake			High vegetable intake	
	N, %	2005-2006 (4117/7489)	2007-2010 (7045/15089)	N, %	2005-2006 (3945/7489)	2007-2010 (7066/15089)
Age						
35-43	1343 (17.9)	-1-	-1-	2446 (16.2)	-1-	-1-
44-53	2025 (27.0)	1.55 (1.33-1.80)	1.22 (1.10-1.35)	4573 (30.3)	1.32 (1.14-1.54)	1.16 (1.05-1.29)
54-59	1244 (16.6)	2.22 (1.86-2.64)	1.65 (1.46-1.86)	2631 (17.4)	1.35 (1.13-1.61)	1.29 (1.14-1.45)
60-70	1732 (23.1)	2.82 (2.37-3.35)	2.09 (1.85-2.36)	3517 (23.3)	1.47 (1.23-1.74)	1.17 (1.04-1.32)
>70	1145 (15.3)	2.78 (2.28-3.38)	1.91 (1.66-2.21)	1922 (12.7)	0.95 (0.78-1.15)	0.82 (0.70-0.94)
		P for difference = 0.0040			*P for difference = 0.11*	
Sex						
Women	4053 (54.1)	-1-	-1-	7932 (52.6)	-1-	-1-
Men	3436 (45.9)	0.58 (0.52-0.65)	0.71 (0.66-0.77)	7157 (47.4)	0.65 (0.58-0.72)	0.65 (0.60-0.70)
		P for difference = 0.031			*P for difference = 0.83*	
Education						
Low	3560 (47.5)	-1-	-1-	8233 (54.6)	-1-	-1-
Medium	2836 (37.9)	1.05 (0.93-1.18)	1.00 (0.93-1.09)	5032 (33.3)	1.02 (0.91-1.15)	1.04 (0.96-1.13)
High	1093 (14.6)	1.13 (0.96-1.34)	1.00 (0.89-1.13)	1824 (12.1)	1.20 (1.02-1.42)	1.12 (1.00-1.27)
		P for difference = 0.11			*P for difference = 0.25*	
Income (Euros/year)						
<10,000	412 (5.5)	-1-	-1-	878 (5.8)	-1-	-1-
10,000-25,000	2092 (27.9)	1.04 (0.83-1.31)	1.01 (0.87-1.17)	4788 (31.7)	1.05 (0.84-1.33)	1.19 (1.02-1.39)
25,000-40,000	1779 (23.8)	0.96 (0.76-1.22)	1.06 (0.90-1.25)	2882 (19.1)	1.04 (0.82-1.33)	1.25 (1.05-1.47)
40,000-60,000	893 (11.9)	0.90 (0.69-1.18)	1.14 (0.93-1.39)	926 (6.1)	0.99 (0.76-1.29)	1.02 (0.83-1.26)
>60,000	494 (6.6)	0.77 (0.57-1.04)	1.45 (1.13-1.87)	435 (2.9)	1.05 (0.78-1.42)	1.07 (0.83 -1.37)
Non- respondents	1819 (24.3)	1.13 (0.90-1.43)	1.07 (0.92-1.24)	5180 (34.3)	1.20 (0.95-1.52)	0.99 (0.84-1.15)
		P for difference = 0.0003			*P for difference = 0.49*	

*Odds ratios obtained from the multivariable model including age, sex, household income, site of residence, energy intake, diabetes, hypertension, and body mass index.

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Could food taste shop be an useful tool to improve children's eating habits?

Introduction. Food neophobia is a frequent obstacle to children's eating habits improvement and to food variety intake widening. Taste shops could be an useful tool in order to overcome this problem and to emotionally and socially positively influence children's acceptance and liking for specific foods' groups.

The aim of this study is to assess the quality experience of children attending 4 different food taste shops at school.

Materials and methods. Seven hundred 9 years old children participated to 4 food taste shops (fruit, vegetables, milk and yogurt, and bread). The children were asked to use their 5 senses in order to describe each food, to write down their comments on the form, and, at the end of tasting, to state their level of appreciation by crossing the "smiling faces" shown on the form. At the end of the taste shops children were required to write down a free report on their feelings about the taste experience. Children's parents filled a questionnaire used to assess the child's and family's food frequency intakes. Preliminary results on 233 children are presented.. Descriptive statistics only are shown here as the final results will be presented at the meeting.

Results. Parents reported that 11% of children had fruit less than 1-2 times/month, 20% 2-4 times/week and 69% at least once a day; 44% of children had vegetables less than 1-2 times/month, 30% 2-4/week, and 26% at least once a day. Overall, after tasting, fruits were appreciated by 69%, and vegetables by 64% of participants. The most common comments were: "I learned to taste a new food before saying that I don't like it"; "I discovered a new taste and I like it"

Conclusions. Food taste shops are an useful and cheap tool to improve the preference of school children for fruit and vegetables.

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P 8

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Phytochemical screening of Citrus limettarisso, Citrus limon (L.)burm and two varieties Citrus paradisi

Introduction: The main citrus grown for fruit production in Morocco are orange, tangerine, clementine, lemon and grapefruit. Several scientific studies based on established experimental data have shown significant antioxidant properties. Our study focused on the valorization of the main secondary metabolites species Citrus limettarisso, Citrus limon (L.) burm and two varieties Citrus paradisi and their biological effect.

Objective: A qualitative phytochemical screening was performed on the fresh fruit extracts from Citrus limettarisso, Citrus limon (L.) burm and two varieties Citrus paradisi (yellow and blood) to highlight the existence some chemical groups recognized to have beneficial health effects.

Materials and methods: Samples, including whole fruit of each species were dried and crushed.

Tannins, sterols, polyterpenes, flavonoids, alkaloids and reducing sugars were assayed by colorimetry. Saponins were identified by calculating the index of moss.

Results and Discussion: Tannins, alkaloids, sterols, terpenes, reducing sugars and the free flavonoids were presentin all the four species.

O-glycosides of flavonoids are present at Citrus limon (L.) burm and Citrus paradisi yellow, where as C-glycosides aglycones were in Citrus limettarisso level and Citrus paradise blood.

The existence of these secondary metabolites in their four samples contributes to therapeutic properties including antioxidant ones.

Conclusion: The phytochemical screening performed on the extracts from Citrus limon (L.) burm,Citrus limettarisso, Citrus paradisi yellow and Citrus paradisi blood has proven the content in different chemical groups that contribute to the biological activity of Citrus fruit.

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The accompanying measures of School Fruit and Vegetable Scheme (SFVS): satisfaction and effectiveness - The case history of Emilia Romagna, Toscana and Umbria

Introduction Alimos is a cooperative company associating several Italian agribusiness stakeholders. It acts in favor of social development implementing food educational projects for adults and children. Since 2009 it has been implementing SFVS accompanying measures (AM) in Italy.

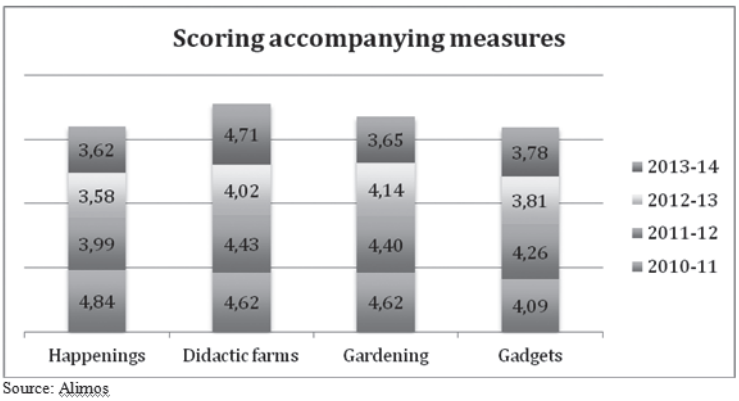
Objectives: The goal of this market study was to understand user's level of satisfaction with regard to the AM implemented by Alimos between 2010 and 2014: happenings (with consumption of fruit and vegetables); visits to didactic farms; gardening; gadgets. "A scuola di frutta", an "experimental" AM, consisting in a workshop addressed to children and parents together, was also developed during the school year 2012-2013.

Methodology: Teachers were asked to score each AM, according to a scale of satisfaction from 1 (minimum) to 5 (maximum). Then, the national data on pupils' weight and eating habits (*Okkio alla Salute* – Italian Ministry of Heath), was used to highlight possible correlations between the activities carried out with pupils and the effects on their eating habits. Only the activities performed during four years and in the same territory were taken into account. A specific survey collected information about "a scuola di frutta".

Results: All the AM obtained high scores (fig.1). The most appreciated were those requiring the direct involvement of pupils outside of the school context (didactic farms). "A scuola di frutta" showed the value of jointed practical activities: children and adults appreciated "to share" the preparation of their own food.

Conclusions: According to the Italian Ministery of Health, since 2008-2010 "healthy eating habits", as the mid-morning snack at school, have increased while obesity has showed a downward trend. This could be the indicator of a correlation between SFVS and children's behaviour at school. Habits at home, instead, are struggling to change. Further studies are needed to precise the effects of families' involvement in SFVS.

Figure 1



Source: Alimos

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Dietary habits of Italian children in 2014: the results of the surveillance system "OKkio alla SALUTE"

Objective: sIn Italy, a national school-based nutritional surveillance system called OKkio alla SALUTE, was established in 2007. The system, financed by the Italian Ministry of Health and coordinated by the National Institute of Health in collaboration with the Italian regions, aims

to evaluate the nutritional status and behaviours (nutrition, physical activity, sedentariness) of children aged 8-9 years. This abstract reports the main findings on dietary habits from the fourth round of data collection (2014) and assesses their relationship with the characteristics of the children.

Methodology: Cluster sampling in all Italian regions was used to select the third primary classes for participation. Information was collected using questionnaires addressed to children and parents and the children were weighed and measured by trained local health staff using standardized equipment.

Results: In 2014, more than 47,000 children were measured: 20.9% [IC95% 20.4-21.4] were overweight, 9.8% [IC95% 9.5-10.2] obese and 2.2% [IC95% 2.1-2.4] were severely obese. Data on dietary habits show that 8% of the children did not have breakfast, 25% did not consume fruit and vegetables daily and 41% consumed more than one sugar-sweetened beverage daily. These habits were more frequent in Southern Regions, in boys and in children with overweight/obese parents. A strong negative association was found between these habits and parents' educational level. The children whose parents are not Italian consumed more fruit and/or vegetables and more sugar-sweetened beverages. The prevalence of overweight and obesity is higher among children who didn't have breakfast.

Conclusion: In Italy, unhealthy nutritional habits are widely diffused among children. These data demonstrate important differences according to region of residence and family and children characteristics that should be considered when programming interventions of health promotion.

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P 11

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Cognitive decline, dietary factors, gut-brain interactions

Rationale: Due to populations aging, cognitive decline is a major public health challenge, as it is strongly age-dependent. Epidemiological evidence supports the hypothesis that modifiable lifestyle-related factors, like diet, are associated with cognitive decline.

Methods: We reviewed major epidemiological studies regarding diet and cognitive decline. We followed three main hypotheses regarding the mechanisms underlying the effects of diet on cognition: oxidative stress, inflammation, and cardiovascular health. Evidence on single nutrients, food groups, and diet patterns is reviewed. It is hypothesized also a direct link between gut health and the brain and specific evidence is reviewed.

Results: Single nutrients, such as vitamins and fatty acids, have been studied extensively, but strong scientific evidence of an association is lacking for these compounds. On the other hand, some food groups, like fruit and vegetables, have repeatedly shown to be beneficial for the brain, as shown by reduced rates of cognitive decline. Specific dietary patterns rich in plant-based food, like the Mediterranean diet, have also been repeatedly found associated to reduce cognitive decline. The intestinal microbiome is likely to at least partly mediate the observed associations.

Conclusions: Research on single nutrients has been inconclusive. More promising appears to be an approach based on food groups and dietary patterns. Fruits and vegetables consumption and adherence to a Mediterranean diet appear to be beneficial in terms of reduced cognitive decline in the population.

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May mere repeated exposure increase fruit and vegetable intake?

Repeated tasting a new or disliked food is considered a crucial passage in modifying children food preferences. This strategy is called mere and repeated exposure and it is debated if simply providing children with fruit and vegetable (FV) portions, without additional interventions, may increase FV intake.

In the context of a trial aimed to evaluate the effectiveness of the Food Dudes Healthy Eating Program, a group of primary school children (N=186, aged 6-10 years) in Lombardy (Italy) received FV portions for 24 consecutive days before the mid-morning snack time. The aim of the present work was to evaluate the FV intake at the beginning (8 days) and the end (4 days) of the FV exposure period.

Children of the 1st and 2nd classes were daily provided with 50 g of F and 50 g of V, while children of the 3rd and 4th classes with portions of 100 g of F and 100 g of V. The foods, provided in a fixed order, every day just prior to the mid-morning snack time, were: Apple/fennel; pear/radish; grapes/broccoli; satsuma/carrot. FV were provided to children in 2 plastic cups and each child (except those with a known allergy), were daily provided with 1 cup of F and 1 of V at the beginning of the mid-morning snack time.

Data were collected during the first 8 days, and the last 4 days, weighing before and after consumption.

Consistently with other FD trial where control group children did not benefit from mere repeated exposure, results of our trial show that children intake at the end of the exposure period was statistically significant lower compared to the first 8 days. Some implications for future programs aimed at increasing FV intake in primary school children are discussed.

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Reaping what you sow: what happens to the produce harvested from edible gardens in New Zealand schools?

Objectives: To explore the distribution and application of edible garden produce in New Zealand primary and secondary schools.

Methodology: A structured, self-administered questionnaire was mailed to a randomly selected sample of 764 New Zealand schools. The questionnaire included questions on how harvested crops were distributed, who they were harvested by, cooking lessons or recipes using produce from the edible garden and whether the produce was linked to healthy eating messages.

Results: Of the schools that responded (64% response rate), 88% of primary and secondary schools which reported having a current edible garden also reported providing cooking lessons or recipes using produce from the garden. 90% of primary schools and 85% of secondary schools linked the edible garden to messages promoting an increase in fruit and vegetable consumption.

Conclusions: New Zealand schools are utilising crops harvested from edible gardens to integrate the produce within cooking lessons, recipes, and meals. Schools were communicating positive healthy eating messages as well as demonstrating the practical aspects of preparing and cooking fresh produce.

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Some medicinal plants, used in the actual context of scientific knowledge, for food supplements development

The utilization of medicinal plants has been one of the most important aspects from ancient times, because of theirs beneficial effects on human health. This studies bring in the foreground the necessity of the natural food supplements made from selected plants and organically grown and biochemical characterized in that type of compounds that have the role of improve human health. The modern techniques for the investigation of the health, promoted by scientists and supported by studies, sustain the development of food supplements. For that purpose was selected medicinal plant material to be analyzed biochemically and enzymatic after that being chosen the best extraction methods for use in developing dietary supplements. The plant material studied was represented by: - Seabuckhtorn (*Hyppophae rhammnoides*); - Blackcurant (*Ribes nigrum*); -Aloe (*Aloe arborescens*); -Parsley (*Petroselinum crispum*).
The interest enzymes were dosed in selected plant material: -amylases (U/g/min), -lipases (U/g/min), -proteases (U/g/min), in specific pH and temperature conditions.
Cakes remaining after extraction will be pyrolyzed and turned into charcoal to be used as a support for fixing interest extracts. The enzyme dosages were used starting from raw plant material, extracts and for the finished product.

No	Dosed enzymes U/g/min	Plant Material			
		Seabuckthorn -fresh fruits	Aloe vera fresh-leaves	Parsley fresh-leaves	Blackcurant fresh -fruits
1	Amylases	250	35.0	0.31	344
2	Lipases	600.0	370.0	395.0	80
3	Proteases	0.62	1.4	2.5	0.29

The enzymes results obtained from fresh selected plant material

Acknowledgement: This paper is supported by the Sectorial Operational Programme Human Resources Development (SOP HRD), financed from the European Social Fund and by the Romanian Government under the project number POSDRU/159/1.5/S/134378."

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Does food consumption in Italy go towards food ethics? Some results from the REGALIM study

Background and aim: Recent research suggests that one of the most effective ways to increase sustainability of food consumption in western countries is to reduce the amount of meat in the diet, and promote the consumption of more plant-based foods. This study was aimed to explore the differences in consumption of fruit, vegetables and meat food groups, and attitudes towards a sustainable agricultural system, across four main geographical areas in Italy.
Methods: A representative random sample of n=3004 18+ years old individuals was selected across the 20 Italian regions. Data were collected through a self-administered questionnaire including three sections: a) measuring attitudes towards sustainable food production and consumption, according to the Theory of Planned Behavior model variables; b) assessing the human values according to Schwartz (1992) theory of the ten basic personal values; c) assessing food habits through the frequency of consumption of main food groups.
Results: A positive attitude towards sustainable food production was generally observed (78%) without significant cross-area differences, except for a reduced proportion of neutral attitude in South and Islands. In the North-East a higher proportion of subjects consumed green leafy vegetables one or more times per day, and a lower proportion consumed meat (beef and poultry) on daily or weekly basis, in favor of a less frequent meat consumption. In South and Islands, less subjects consumed both green leafy and fruiting vegetables on daily basis, and more on weekly basis; daily meat (beef and pork) consumption increased, and occasional meat consumption decreased. In general, for all geographical areas, the most important values were represented by benevolence and universalism, concerning for the welfare and interest in others.
Conclusion: Universalism was more strongly correlated with favourable attitudes towards a sustainable agricultural system, and with sustainable eating behaviors like reduced meat consumption. Some geographical differences also emerged.

Acknowledgement: This work was supported by a grant from the Italian Ministry of Agricultural, Food and Forestry Policies project REGALIM "Monitoring of dietary habits of each Italian region: characterization of territory and social structure for a responsible food consumption to safeguard of the culture and traditions"

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Effect of formulation and heat processing on carotenoids/tocopherol bioaccessibility from a traditional Tunisian dish

Objectives: In order to promote traditional Mediterranean foods, the valorization of the nutritional qualities is an important issue for the agro-food system chain value. In this context, our study focused on fat soluble micronutrient (FSM) behavior, during a traditional Tunisian cooking process and the first steps of digestion. Impact of formulation and heat processing on carotenoids and vitamin E contents were investigated.

Methodology: A simplified method of the original recipe named *Mloukhyia* consisting in mixing three main ingredients (*Corchorus olitorius* used as dried green leafy vegetable, tomato paste and olive oil) and submitted to a cooking treatment (150 min) with added water. Hydrothermal history and viscosity were monitored along with the changes of FSM content and the first steps of digestion called bioaccessibility (i.e the transfer of FSM into micelles using an *in vitro* digestion model).

Results: β-carotene and lycopene contents decreased during processing compared with lutein, an oxygenated carotenoid. Moreover lycopene totally diffused into the oil phase of the complex food matrix, whereas 70% of β-carotene and only 10% of lutein were transferred. The type of carotenoid strongly influences the carotenoid bioaccessibility (Fig. 1). The micellarization was the highest for lutein and increased with heating time. α-Tocopherol was poorly micellarized because totality of this compound remained in oil. It is assumed that domestic cooking method can increase carotene bioavailability from tomato and green leafy vegetable mainly by diffusion into the oil phase of the complex emulsion food system.

Conclusion: The highest micellarization of lutein under *in vitro* digestion and the higher transfer of carotenes into oil could predict a high carotenoid bioavailability *in vivo* of FSM of Mloukhyia dish. These data bring new scientific knowledge on the bioaccessibility of nutrients in order to optimize the nutritional quality of traditional recipes.

Acknowledgement: This work was carried out with the financial support of BIOVERSITY and ANR (Agence Nationale de la Recherche, ANR-12-TMED-0004).

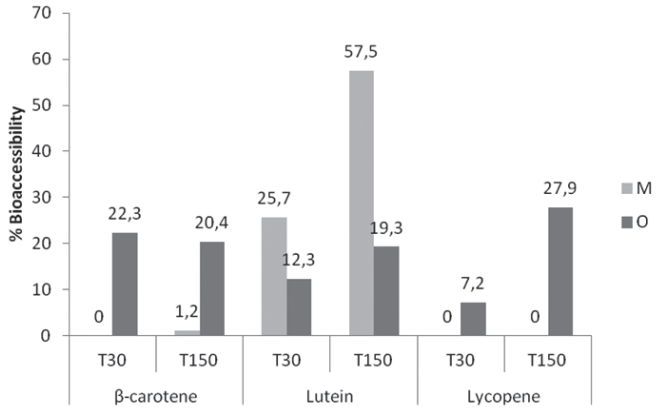

Figure 1. Distribution of carotenoids after in vitro digestion in micellar phase (M: % micellarization) and in oil phase (O: % recovery in oil) for two times T30 and T150 min.

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A short-term trend of abdominal obesity in adolescents through two samples from the city of Rome: the HELENA and ALIADO studies

Abdominal obesity in adolescents has been identified as a risk factor for occurrence of cardiovascular and metabolic diseases.

Objectives: To monitor abdominal obesity in Roman adolescents through a five year-period.

Methodology: A total of 410 adolescents aged 14.5-17.9 years, living in the city of Rome, were selected from two cross-sectional studies conducted during 2006-2007 (HELENA Study) (n=198) and 2011-2012 (ALIADO Study) (n=212), respectively. Anthropometric measurements such as weight, height, waist circumference (WC) were performed in both surveys using the same methodology and trained staff. Overweight and obesity were defined by the IOTF references, abdominal obesity as a waist-to-height ratio (WHtR) greater than 0.5. Smoking data was collected by questionnaire and socio-economic status was assessed using the education level of both parents.

Results: The overall proportion of adolescents with overweight and abdominal obesity decreased significantly ($p<0.05$) from 24.2% and 16.2% in 2006-2007 respectively, to 12.3% and 9.0% in 2011-2012. Girls showed a significant decrease in the mean WC ($p<0.05$) and WHtR ($p<0.001$) whereas boys did not show significant changes in the means between the two surveys. There were more smokers among adolescents in 2006-2007 than in 2011-2012, whereas no difference was found on parental education level.

Conclusion: According to these results, there may be a trend towards lower abdominal obesity, WC and WHtR in female adolescents from the city of Rome. In boys, despite a trend towards lower proportion of abdominal obesity, the mean WC and WHtR leveled- off.

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Effect of apple polyphenol extracts on glycoxidation of intestinal Caco-2 cells

Objectives: Oxidative stress is recognized as one of the primary processes underlying the initiation and progression of inflammation and tissue injury in inflammatory bowel disease. Therefore under physiological conditions, the balance between reactive oxygen species (ROS) generation and ROS scavenging is tightly controlled in intestinal cells. Elevated plasma glucose levels and advanced glycation end products (AGEs), formed during hyperglycemia, generate free radicals resulting in decline of antioxidant defense mechanisms and can cause inflammation and cell damage. Apple fruit has been reported to have high antioxidant effectiveness that is potentially linked to its richness in polyphenolic molecules. The aim of the study was to investigate the role of apple extracts on glyoxidation using intestinal Caco-2 cells.

Methodology: Apple extracts were obtained from freeze dried apples (*Golden* and *Del Papa*) and cell glycoxidation was induced by incubating Caco-2 cells with 25mM glucose.

Results: The results showed that the incubation of Caco2 cells with apple extract reduced the increase of formation of intracellular ROS, lipid peroxidation markers and AGEs formation induced by high glucose treatment. The protective effect was dependent on the concentration of polyphenolic compounds in apple extracts.

Conclusion: The intestine is highly vulnerable to glycoxidative damage due to its constant exposure to aerobic metabolism, high glucose concentration or oxidants and advanced glycation end products from ingested nutrients. A diet rich in apple antioxidants might prevent or delay the progression of intestinal diseases characterized by oxidative stress and inflammation, especially because they reach higher concentrations in the gut than in other tissues.

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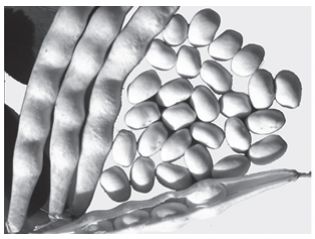
Biodiversity in Marche: nutritional quality of typical legumes and cereals

Objectives: Marche Region, as part of development policies, promotion and protection of agro-ecosystems and production of quality, approved June 3, 2003 the Regional Law No. 12 "Protection of animal and plant genetic resources of the Marche". The law protects the genetic resources that are no longer grown or reared within the region and that now are preserved by experimental institutes, botanical gardens, gene banks, universities and research centers also of other regions or countries, for which there is an economic, scientific, environmental, landscaping or cultural interest. ASSAM (Agency for Food Service Industry in the Marche) is involved in the implementation of programs for the protection of biodiversity for agriculture and manages two instruments: the Regional repertory and the Network of Regional Conservation and Safety. Aim of the study was to investigate the nutritional qualities of legumes and cereals included in the Regional Directory.
Methodology: The content of major nutrients (carbohydrates, fats and protein and fiber), carotenoids and phenolics, were determined in the following products: Chickling (Serra dei Conti), Beans (Monachello, Solfino occhio di capra, Americano); Roveia (Appignano), Cece " Querchia" (Appignano), Fava di Fratte Rosa and Corn (Treia Pollenza Roccacontrada type red and yellow)
Results: The analysis of macronutrients confirmed that legumes and cereals included in the study represent a good source of protein and complex carbohydrates and dietary fiber. The study has also included the evaluation of the levels of phytonutrients such as polyphenols and carotenoids and their antioxidant properties. The results showed a variability in the levels of phytonutrients in the different varieties of legumes and cereals included in the study and have shown that most of them represent a good source of phytonutrients.
Conclusions: The results demonstrate that the typical food of Marche, besides being a very important cultural heritage, have a high nutritional quality, and therefore their consumption may have positive consequences for the environment, for the maintenance of biodiversity and health.


Fagiolo occhio di capra


Fagiolo americano


Fagiolo Monachello

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Impact of glycemic parameters on breast cancer survival

The presence of a causal link between glucose metabolism and breast cancer (BC) is highlighted by the epidemiological findings of a close relationship with type 2 diabetes (T2D), which translates into a 1.2 risk ratio for breast carcinogenesis. In addition, cancer patients with pre-existing T2D experience higher mortality than those without.
Currently, our Centers are actively involved in the recruitment of ambulatory patients with primary or relapsing/recurrent BC, who are prospectively followed under the appropriate Institutional ethics approval, as part of a Clinical Database and Biobank project. Presently, a total of 1171 cancer patients provided informed consent to participate in the project, of which 263 (22.5%) were diagnosed with BC. In this setting, we hypothesized that an association between higher levels of fasting glucose/insulin and shorter relapse free (RFS) or overall (OS) survival times might exist in BC, independently of an overt T2D. Retrospective evaluation of fasting glucose, insulin, glycated hemoglobin in primary BC demonstrated that BC patients have impaired glycemic parameters (all $p<0.001$) compared to healthy women. Moreover, glycated hemoglobin ($p=0.033$) was an independent predictor of disease outcome at multivariate analysis. These results were confirmed in Cox proportional hazards analyses, demonstrating the prognostic value of glycated hemoglobin (HR for RFS=2.5, CI=1.3–4.7; HR for OS=4.8, CI=1.4–15). Furthermore, an impaired HOMA index significantly predicted disease outcome (HR for RFS=3.5, CI=1.9–6.6; HR for OS=5.4, CI=1.3–22).
These results suggest that glucose metabolism contributes to survival outcomes in BC patients. This finding might be of relevance, especially in light of the positive impact of life style interventions in relation to BC risk. However, while the current evidence suggests that a significant proportion of BC cases could be prevented by lifestyle interventions, further studies are still needed to assess whether they may significantly reduce the risk of BC recurrence and mortality.

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The effect of fruit preferences in fruit intake after an intervention-control program

Background and objectives: Preferences determine food intake, and may be relevant to the results of interventions to promote fruit consumption. The aim was to study the effect of baseline consumption and preferences of different fruit types on the total and specific fruit consumption in children submitted to an intervention program.
Methodology: An intervention-control program was carried out as part of the ProGreens project among Portuguese schoolchildren (6th graders; n = 690; 51.2% boys; intervention group: 45.1%). Data were collected at baseline (May 2009) and follow-up (May 2010).
Fruit intake was assessed using 24h-recall. Fruits contributing less than 5% of total intake were combined ("other"). Preferences were assessed using a five-item scale, recoded into "Like very much" vs. other answers (due to high percentages of the first option). Participants that had never tried one of the 4 types of fruit (n = 59) were excluded from the analysis.
A multivariate ANOVA was ran, using sex, group (intervention vs. control), baseline total fruit intake, percentage of contribution by each fruit (apple, banana, pear, orange, other) and baseline preferences as predictors of the changes (follow-up minus baseline) in total fruit intake and percentages of contribution. Participants that had never tried one of the 4 types of fruit (n=59) were excluded from this analysis.
Results: All dependent variables were significantly predicted ($p < 0.001$). No main effects of sex or sex*group interactions were observed. The intervention group has a more favorable evolution regarding orange consumption.
The evolutions in total fruit intake and in the contribution of each fruit were negatively associated to their baseline values. Additionally banana's baseline contribution was associated to a more favorable pear's consumption evolution.
Higher baseline preferences for apple and banana were associated to higher change in the proportion of the respective fruit intake, whereas the opposite was verified for pear. Higher preference for orange was associated to an increase in total fruit intake.
Conclusions: This study demonstrates the relevance of considering the preferences on the effects of interventions to promote fruit intake, even when studied concomitantly with baseline consumptions. The evolution on fruit intake mainly depends on consumption and preferences regarding each kind of fruit, but whereas baseline fruit intake tends to be associated to a negative outcome (perhaps due to "ceiling effect"), high preferences mostly associate to more favourable evolutions.

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Overweight/obesity, eating habits and lifestyle among Italian adolescents: the ALIADO study

Objectives: The study aimed to evaluate the prevalence of overweight/obesity in adolescents via measured weight and height, considering eating habits and lifestyle.
Methodology: A representative cluster sample of 369 adolescents in the second class of secondary school in the Lazio region was investigated. Body weight, height and waist circumference were measured. Ponderal status was assessed by the IOTF and the WHO definitions. Waist circumference/height ratio (WC/Ht) cutoff of 0.5 was used to classify subjects with the highest cardio-metabolic risk. Selected food habits and lifestyle characteristics were assessed by questionnaires.
Results: Prevalence of overweight/obesity was 23.3% according to IOTF and 26% according to WHO criteria with higher percentages of males than females (30.2% vs 17.9% with IOTF and 33.9% vs 19.8% with WHO). The WC/Ht>0.5 was observed in 12.7% of the sample (29.8% of the overweight and all the obese). Only 7% of the youth consumed ≥ 5 servings a day of fruits and vegetables as recommended, 14.9% had sweets more than once a day and 11.4% ate between meals every day, outside of the 5 main meals. Breakfast was consumed daily by only 60.4% of the adolescents and 10.3% never did. More than half of the teenagers was not physically active and 15.4% slept less than 7 hours a night, contrary to those recommended (8-10 hours). Moreover, a high percentage of teens watched TV (35.2%) and used the computer (42.3%) ≥ 2 hours a day on weekdays exceeding recommendations and the percentage rose on weekends.
Conclusion: These results from measured data showed a high prevalence of overweight/obesity in the sample and food habits and lifestyle not in accordance with the recommendations. The survey by measured anthropometry in adolescents should be extended to other Italian regions. Interventions are needed to change these unhealthy behaviors, which can influence lifestyle and health of later ages.

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Sustainability metrics: nutritional, environmental, toxicological, affordability and acceptability variables compiled within a single French food database

Introduction: In order to assess and improve the sustainability of food consumption, indicators are needed for all the diet sustainability dimensions defined by the Food and Agriculture Organization i.e., nutritional adequacy and safety, environment, cultural acceptability, and financial affordability.

Objective: To compile and match databases in order to create a unique food database which includes variables for each sustainability dimension.

Method: From the second French total diet study (EAT2) database, toxicological data were obtained for 212 aggregated food items, representing 86% of the total weight of French adult consumption. The energy and nutrient contents were collected for these 212 foods from the national French Food composition database (CIQUAL). Data needed to estimate nutrient bioavailability were also collected, from different databases such as PHENOL EXPLORER, EUROFIR, USDA, and bibliographic researches. The cost of foods, derived from the 2006 Kantar World-panel purchase database, was used as a proxy for affordability. Food intakes distributions and usual portion sizes, derived from the dietary intakes of 1918 adults from the second French individual and national dietary survey (INCA2), were used as proxy for acceptability. Environmental impact data such as greenhouse gas emissions will be incorporated soon.

Results: A 212 food items database was created and includes 67 nutritional variables (macronutrients, essential fatty acids, fibers, 11 minerals, 11 vitamins, added sugars), 20 components needed in order to assess the bioavailability of iron, zinc, proteins, and vitamin A, 47 contaminants (12 mycotoxins, 25 pesticides, non-dioxin like PCBs and dioxin-like compounds, acrylamide, 5 inorganic components and 2 organic components), the mean retail price, the portion size of foods and the distribution of consumptions.

Conclusion: Variables encompassing the complexity of sustainability were compiled within a single food database to identify French sustainable diets and to simulate and model the impact of public policies.

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Food labelling in the EU: law, behavioural research and health inequalities

In Europe, non-communicable diseases (NCDs) account for 86% of all mortality and 77% of all disease burdens. One dominant causative factor of NCDs is the consumption of unhealthy diets, including an insufficient intake of fruits and vegetables.

There is increasing evidence that such consumption of unhealthy diets is linked inextricably with the conditions in which people live and their lifestyles. These social determinants of health have varying impacts on different groups of people. Both within and between Member States of the EU, there is a strong gradient in healthy diet consumption between lower and higher socioeconomic groups.

The EU's introduction of legislation in this area has particularly focussed on the mandatory disclosure of nutritional information on food packaging. However, these rules have been criticised by some as not being sufficiently effective, especially as regards members of lower socioeconomic groups. The disclosures are said to be inaccessible and incomprehensible to consumers, and unlikely to guide consumers towards healthier options. Moreover, the regulations do not fully implement behavioural research which shows that simple signposts, such as traffic light labelling, help consumers to make healthier food choices.

This poster will explore the EU's options to introduce laws on mandatory food labelling. It will contextualise the debates, and highlight the advantages and disadvantages of labelling which takes into account behavioural research. It will present the difficulties faced by the EU, with a particular focus on the debates on nutritional profiles, portion sizes, and the design of any potential EU-wide scheme. Moreover, it will suggest feasible recommendations on how food labelling could be designed in order to improve consumer diets and reduce health inequalities. Such recommendations will be based on the best available evidence, taking into account the perspectives of relevant stakeholders.

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Biobanks. A research infrastructure for the future of nutritional research

Repository banks for biological samples are defined as operational units that provide a service for the storage and management of biological material and associated clinical data. These, if properly complemented with dietary assessment of food and nutrient intake, may offer unique opportunities to investigate the relationships between diet, nutritional status, lifestyle and environmental factors and the incidence of several diseases, as in the case of the EPIC study held within the framework of the European network of Biobanks BBMRI.

All these tasks, however, critically depend upon the availability of a large number of standardized specimens at the point that many research activities are seriously invalidated by the heterogeneous quality of the human specimens used. In particular, pre-analytical variations render the results derived from specimen of different biobanks and, often, within the same biobank, incomparable. Thus, the need to eliminate, as much as possible, all variables arising from specimen collection, preparation or storage, in order to guarantee that the distributed samples meet the required specifications. This would ultimately preserve the accuracy, reproducibility and comparability of results among different research groups.

These objectives are feasible in our Institution thanks to the BioBIM (InterInstitutional Multidisciplinary Biobank, IRCCS San Raffaele Pisana, Rome) project, in which the possibility to gain exhaustive records on the whole life cycle of biobank stored samples and their quality has been achieved by means of RFID tag technology and of standard pre-analytical coding system (SPREC code). Moreover, thanks to a Business Intelligence platform and Service Oriented Architectures, the BioBIM is currently involved in a multi-institutional biobanking network of reference within the southern Italy aimed at defining common preanalytical procedures to standardize biospecimen collection and preservation, identifying a set of "key biomarkers" to be used in assessing sample quality and strengthening of the scientific value of biological collections within the network.

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Characteristics of xoconostles (Opuntia spp.) *accessions from Hidalgo and Zacatecas México*

The genus *Opuntia* generally produces fruits with abundant pulp and sweet taste, but also acidic fruits known as xoconostles, which may have a high potential for use and consumption. The aim of this study was to evaluate the physicochemical, nutritional and functional characteristics of 10 xoconostle genotypes produced in Mexico. The xoconostle genotypes were collected from Hidalgo, Zacatecas and State of Mexico. The pH, soluble solids, and titratable acidity, as well as the proximate composition and content of total phenolic compounds, betalains and antioxidant capacity (Trolox) were determined. Results were analyzed using analysis of variance (ANOVA) procedures and the Tukey test at a significance level of 0.05. It was observed a high variability in weight (44.5–84.3 g FW), soluble solids (4.7–8.60 °Brix), titratable acidity (0.64–1.38 g 100 g-1 FW), and pH (2.97–4.70) among the 10 genotypes of *Opuntia* spp. studied. The protein content varied from 0.80 to 1.10 g 100 g-1 FW. Xoconostle genotypes with high calcium content of 2.57 mg 100 g-1 FW were identified. Some xoconostle genotypes can be a good source of pigments due to their high content of betacyanins (0.80–4.80 mg 100 g-1 FW) and vulgaxanthins (1.83–4.76 mg 100 g-1 FW). The antioxidant capacity of some xoconostle genotypes was higher than that of other common fruits. The xoconostle genotypes evaluated have a potential to be exploited as a suitable source of pigments and antioxidant compounds.

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Method validation for selenium and molybdenum in SRM using an ICP/MS and its application for vegetable produced in Korea

Recently, trace minerals display excellent functions associated with prevention of disease. We estimated an amount of trace minerals in the vegetables produced in Korea in order to build the food nutritional ingredient database. To execute method validation for analytical method used in this study, a SRM 1849a test sample purchased from NIST was used. The SRM test samples were digested using the microwave and then measured by inductively coupled plasma mass spectrometer (ICP-MS). The results of method validation were as follows. Regression analysis of correlation coefficient (r^2) was higher than 0.999 which revealed good linearity. The recovery of SRM 1849a for selenium was 76.39 to 98.28% and for molybdenum was 95.22 to 103.66. The limit of quantification (LOQ) values of selenium and molybdenum were below 0.3524 μg/kg and 0.0110 μg/kg, respectively. The intra-day (n=3) relative standard deviations were ranged from 2.11 to 5.33% for selenium and from 0.73 to 1.44% for molybdenum. The inter-day (n=4) relative standard deviations were also ranged from 2.01 to 4.95% for selenium and from 2.05 to 4.43% for molybdenum.

According to analysis results for real samples (raw vegetables and blenched vegetables) using validated analytical method, the concentration of selenium and molybdenum in raw vegetables ranged from 0.37 to 4.31 μg/100 g and from 0.36 to 17.13 μg/100 g, respectively. In addition, the concentration of selenium and molybdenum in blanched vegetables were from 0.38 to 3.24 μg/100 g and from 0.17 to 10.37 μg/100 g, respectively. It seems that the validated analytical method in this study and obtained analysis results in real samples could be used to build the Korea food nutritional ingredient database.

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Mobile phone short messages service (SMS) related to healthy lifestyle for high school students: The CONVERGI Study.

Objective: The widespread use of mobile phone among younger people could provide a new cost-effective tool to disseminate information on healthy lifestyle and to encourage modifications. This study evaluated the efficacy of SMS in promoting correct behaviours and improving metabolic health.

Methods: 430 boys and girls, aged 14-17 years, from two high schools in Campobasso (Italy) , were assigned to either intervention or control according to their home school. At baseline, all students received biometric evaluations and answered a questionnaire on lifestyle and a one-week frequency food recall. Conferences and meeting with experts were organized in both schools to enhance knowledge and understanding correct lifestyles. Both groups received nine different SMSs, one every three weeks for one year. SMSs sent to the intervention group contained specific news and messages about healthy behaviour, while those sent to the control group contained scientific news. At the end of the intervention period, a follow up evaluation was carried on.

Results: Both groups showed an increase in all anthropometric parameters. The increase in waist circumference was significantly lower in the SMS group as compared to the control one, in both girls and boys (2.58 cm (0.99 to 4.16) in controls vs (0.24 cm (-0.99 to 1.48) in SMS, $p<0.001$ in girls and 2.14 cm (0.35 to 3.94) vs -0.47 cm (-2.36 to 1.42) in boys, $p<0.0002$, after adjustment for age and baseline levels). Similar results were observed in girls, but not in boys, for hip circumference (2.77 cm (1.69 to 3.86) vs 0.24 cm (-1.32 to 1.79), $p<0.06$).

No significant difference was observed neither in physical activity nor in food frequency consumption.

Conclusion: Short messages delivered to teenagers through mobile phone may exert a favourable influence on anthropometric parameters. Further research is warranted on the efficacy of this new tool on behaviour and lifestyle.

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Leveraging Fruit and Vegetable supply policies to tackle the dual burden of malnutrition in India and Bangladesh

Abstract (n=298 excluding Acknowledgment)

Background: Fruit and vegetable (FV) consumption in India and Bangladesh (IaB) is currently inadequate for preventing the existing high burden of short-term micronutrient deficiencies and long-term chronic diseases (obesity, diabetes, cardiovascular disease). Addressing inadequate FV consumption, especially in children and adolescents – the next generation – is critical for ensuring current and future health, as well as economic prosperity. One potential policy lever is through increasing FV supply; it is therefore important to understand how existing policies in IaB impact FV supply.

Objectives: Our objectives are three-fold: (1a) To understand external factors that affect FV consumption in children and adolescents in low- and middle-income countries (LMICs); (1b) To identify existing FV supply policies in IaB that impact the external factors identified in 1a; (2) To analyze these policies in terms of aims, coverage and implementation; (3) To make policy recommendations for increasing FV supply in IaB.

Methodology: The proposed research is divided into two phases of policy analysis, using the Walt & Gilson framework. Phase 1 will focus on policy content and actors, and include two key tasks: (1) an evidence review of external factors that determine FV consumption among children and adolescents in LMICs (objective 1a) and (2) identifying and mapping FV supply chain policies in IaB using Hawkes' Consumption-Oriented Supply Chain analysis framework (2009) and formal consultation with heads of relevant government ministries (objective 1b and 2). Phase 2 will focus on policy context and process, and will include an analysis of policies, their implementation, and opportunities for strengthening existing policies (objective 3). Phase 2 will involve in-depth interviews with policy makers, industry representatives, and national experts.

Conclusion: This study, currently underway, will eventually help to bring out a set of recommendations and implementation strategy for strengthening policies towards improved FV supply in IaB, especially targeting young children.

Acknowledgment: This study has been recently funded by LANSA (Leveraging Agriculture for Nutrition in South Asia) and the study team is currently engaged in the above-mentioned phase one of the study.

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The impact of mother-infant interactions on vegetable intake

Objectives: Whilst seminal previous research examining vegetable intake in infants demonstrated that carrot flavour exposure through breast milk reduced negative infant facial expressions and increased mother's evaluation of the feeding event, intake itself was not influenced. Limiting the interaction between mother-infant dyads potentially created an artificial feeding situation and this, along with limited behavioural analysis, could influence the outcome. The current study incorporated a comprehensive observational analysis in a naturalistic setting to examine the impact of mother-infant interactions on the intake of traditional (carrot) and novel (spinach) weaning vegetables.

Methodology: In a within subjects design, four weeks after the initiation of weaning (maternally defined), 14 mother-infant dyads (age 28.16±2.77 weeks) attended two laboratory-based maternal-led feeding sessions. Vegetables were presented in a randomised order and one week apart. All feeding sessions were recorded. The Nursing Child Assessment Satellite Training (NCAST) feeding scale was employed to examine mother-infant interactions during feeding. Total intake and maternal evaluation of infant liking was also assessed for each vegetable.

Results: No differences in intake were observed between feeding sessions (carrot: 36.61.65±35.79g; spinach: 33.36±30.90g; p=0.810). However, a positive correlation (p=0.040) was identified between maternal evaluation of liking during the carrot feeding and the total NCAST feeding scale scores. Additionally, negative correlations were identified between total spinach intake and the Responsiveness to the caregiver subscale of the NCAST scale (p=0.033) and between the maternal evaluation of spinach liking and the same subscale (p=0.014).

Conclusion: This study suggests that while a strong mother-infant interaction does not influence infant food intake during consumption of a well-liked traditional weaning food, it does provide mothers with a positive evaluation of the event. However, infants who are more responsive to their caregivers may react to subtle cues of maternal reluctance or dislike of a novel weaning food by restricting their intake. Ongoing examination of maternal and infant facial expressions during feeding may reveal further insight to these interactions.

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Extrauva®: extract of uva di troia canosina

Farmalabor has developed Extrauva®, a patented grape extract, characterized by high polyphenolic content: the assay in catechin and epicatechin is 10.37%; moreover, Extrauva® is heat stable up to 100°C. Extrauva® is the result of the research project *"Enhancement of the health qualities of Uva di Troia with small berry for the production of nutritional supplements"*. The extraction was carried out through percolation, using a mixture of ethanol-water (70:30). The extract is analyzed by LC-DAD for the definition of the polyphenolic composition. The extract was subsequently purified on a synthetic adsorbent resin, brominated (Sepabeads SP-207) which led to an enrichment of the content of polyphenols. The grape analyzed in this study has been cultivated in the "Experimental Vineyard" Farmalabor.

The properties of Extrauva® have found application in the project "*Pro.ali.fun" (Technological innovation and clinical protocols for the production of functional foods)* in which the major goal is to prepare a final food product that functionally keeps intact both organoleptic characteristics and stability of its basic constituents.

The project "Vis Maris", carried out by Farmalabor in collaboration with the University of Bari consisted in the enrichment of traditional feed for fish with the phytocomplex extracted from grapes of *Uva di Troia Canosina*, in order to improve fish health thanks to the high antioxidant concentration. The study was conducted on 132.000 young basses, divided into three tanks: one with traditional feed and the others with functionalized one containing Extrauva® at two different doses (respectively 100 and 200 mg/kg). The results of this study demonstrated the beneficial effects of Extrauva® on fish health (see tab. A), showing a better anti-inflammatory activity (measured in cytokine production and a decrease in the mortality rate. This improvement of fish immune system not only ensures healthy fish, with less use of antibiotics and/or vaccines, but also higher quality and well-being for final consumers.

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Influence of cultivar and soil on the micronutrient composition of garlic commonly consumed in Italy

Among vegetables products, garlic (*Allium sativum)* is the most important culinary seasoning throughout the world. Besides to be used like food, it is considered one of the most widespread and ancient medicinal plant. Garlic is mainly agamically propagated and its variability arises from mutations[1]; this particular reproduction has favored the spread of local ecotypes that are well adapted to different environmental situations[2]. In order to typify and value Italian traditional products, four "Italian typical varieties" of garlic well-known for their organoleptic properties, have been studied: *Rosso di Castelliri, Bianco Piacentino, Rosso di Sulmona, Rosso di Proceno.* These ones were produced, under the same agronomic intervention practice, in two different geographical areas of Lazio (Viterbo and Alvito).

The aim of the study was to evaluate the potential influence of soil and cultivar on the content of some micronutrient in four garlic varieties.

Minerals (Ca, Mg, Na, K, P) and oligo-elements (Fe, Zn, Cu, Mn) were determined by ICP-Plasma on a Perkin-Elmer after mineralization in a microwave digestion system. B-group vitamins were detected with HPLC method: niacin and riboflavin were analyzed using UV detector[3] while vitamin B_6 and thiamine by fluorescence detector[3,4]. Vitamin C content was measured as total ascorbic acid (TAA) and ascorbic acid (AA) by HPLC and UV detector[5,6], and dehydroascorbic acid (DHAA) was calculated by subtraction method.

All the varieties studied were found to be a good source of vitamins, minerals and oligo-elements; statistical evaluation showed a significant soil influence on the most of micronutrients considered. Potassium content was the highest among minerals evaluated and was influenced only by geographical area. Sodium content showed a large range of values and was affected by both - cultivar and soil. Among vitamins, B_6 content was susceptible to cultivar and soil while vitamin C content was not significantly influenced by any variable.

References

1. Gonzalez E. O. et al. 2009. *J. Agric. Food Chem.* 57: 10282–10288
2. Brandolini V. et al. 2005. *J. Agric. Food Chem.* 53: 7-14
3. Gambelli L. and Marconi S. 2010 Atti del VIII° *C. Naz. Chim. Alimenti*, 496-499.
4. Arella F., Lahey S. et al., *Food Chem.* 56, 81-86, 1996
5. Valls F. et al. 2002. *Journal of Food Protection*; 65, 11: 1771-1774
6. Lee M., Coates G.A. 1999. J. *Liquid Chromat. & Related Techn.* 22,15: 2367-2382.

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Contribution of fresh vegetables and meat products daily consumption to nitrate exposure in Italy

Human exposure to nitrate mainly occurs through the consumption of water, plant foods and meat products. Generally the main dietary sources of nitrate are vegetables in which occur naturally as part of the biological cycle of nitrogen and as contaminant. Nitrate accumulation in vegetables is in fact determined by several factors, among these genetically based plant metabolism, harvesting time, light intensity and nitrogen fertilization are predominant. Furthermore, nitrate can be present in foods as additive. It is widely utilized in the curing process of meat for microbial growth prevention and as color enhancer. The JEFCA and the European Commission's Scientific Committee on Food (SCF) have set up an ADI for nitrate of 0-3.7 mg/Kg bodyweight.

The aim of this study was to assess the contribution of some fresh vegetables and meat products to the dietary intake of nitrate in Italy. The evaluation of nitrate levels in meat products and fresh vegetables with high consumption frequency in the Italian total diet was thus the first step of the study being these foods consumed on a daily basis. An extensive sampling of meat products (PDO, PGI, typical) was carried out: raw hams (*San Daniele, Parma, Modena, Nazionale*); cooked ham; salami (*Cacciatore, Milano, Napoli, Ungherese*); bresaola Valtellina; mortadella Bologna; speck Alto Adige; coppa and rolled bacon was carried out. Nitrate content in meat products ranged from trace level to 30 ppm with a reduction of up to 90% compared to the previous survey carried out in 1993. Among plant foods the impact of different types of cultivation (organic, biodynamic, no soil) on leafy vegetables (lettuce, rocket, radicchio) showed a nitrate accumulation 1.3-2 times less than in conventional ones. The assessment of dietary intake of nitrate was calculated by combining the concentration data obtained by analyses with the daily food consumption data described in the last Italian National Food Consumption Survey INRAN-SCAI (Leclerq et al., *Publ.Health Nutr.*2009).

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Pilot study of changes in eating habits and physical exercise in people with non communicable chronic disease

Purpose: Non communicable chronic diseases are the most common cause of death in the world. Studies have shown that healthy eating habits associated to physical exercise can play a role in some non communicable disease prevention and in reducing mortality. The pilot study aims to improve eating habits and the potential positive effects in reducing risks factors of moderate physical activity.

Material and Methods: 13 patients, aged 63 ±15 with different non communicable chronic diseases (cancer, hypertension and diabetes), were enrolled in an individualized exercise and diet program for at least 6 months. Among the anthropometrics parameters, weight, BMI (body mass index), body folds (biceps, triceps, subscapular and supra- iliac) were considered. Food diaries were completed in two different check up, at the beginning of the study (T0) and after six months (T6). The eating habits evaluated were energy intake and macronutrient distribution, daily number of meals, and daily consumption of fruits and vegetables. According to ACSM guidelines, moderate physical activity was prescribed: 3 times a week for at least 30 minutes each session. From T0 and T6 evaluations a special nutritional advice, individualized per each patients, and following FDA bases (Food and Drug Administration) guidelines were available. Statistical analysis was performed using the paired Student T test.

Results: From the analysis of food diaries, it emerges that after 6 months there was a significant reduction of frequency of meals a day ($p<0,05$) and a very significant reduction of food intake ($p < 0,01$). In addition the anthropometrics parameters showed that the triceps fold were significantly reduced ($p<0,05$).

Conclusion: Simple proper nutritional guidance and physical exercise, in a short time, induced significant positive modifications in eating habits and decreases anthropometrics parameters associated to disease risk. The results of this study shows the intervention could be applicable to larger populations.

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MaestraNatura®: a new tool for nutrition education

Eating behavior develops in response to personal characteristics and genetics as well as physical and social environments. School plays a pivotal role in promoting health and preventing obesity. Although a number of expensive educational programs have been carried out in the last few years in Italy, evidence for the real effectiveness of those school-based programs is quite equivocal. Moreover, contrary to the international literature suggestions, a very limited involvement of parents in these programs have been observed.

The objective of our work was to design and implement a new methodology able to fill the gaps in children knowledge on nutritional issues together with increased engagement of the families. In particular, we aimed at extending correct knowledge about the origin and function of different food and at using food as a tool to strengthen the relationship between children and parents.

As preliminary step, in order to fulfill these objectives, we carried out a survey in 25 primary and intermediate schools of Rome. First of all, we interviewed 200 teachers to know if and how nutritional issues had been presented to the students. We found that the teachers considered these topics very relevant and dedicated about 4 hours/year to food pyramid-based nutritional program. Secondly, we administered a questionnaire to 3400 children (7-12 years) to evaluate their knowledge on food and nutrition.

Results showed a high grade of confusion and misunderstanding and allowed us to elaborate 8 educational and experimental modules (150 hours) specifically aimed at filling those gaps. The didactical content were distributed by a web platform, which also allowed a complete traceability of both school and home activities. Data collected in the first year of experimentation are reported.

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Evaluation of the effect of high pressure technology on bioactive compounds of a mixed tropical juice

High pressure technology is recognized as a mild treatment that best preserves nutritional and sensory characteristics of fruit juices as they do not use high temperatures. Fruit juices consumption is no longer a result of taste and personal choice, but it has become a concern of health due to their nutrient content. The aim of this work was to evaluate the effect of the processing conditions (pressure and time) of high pressure technology on the bioactive compounds (vitamin C, total phenolics) and antioxidant activity of a mixed tropical juice.

The mixed tropical fruit juice was constituted of acai, acerola, yellow mombin, cashew apple, camu-camu and pineapple, added with water and sucrose. The product presented high content of bioactive compounds like vitamin C (118 mg/100g) and total phenolics (250 mg/100g) and 9 µg/g Trolox of antioxidant capacity. For processing, the mixed juice was packed in plastic bags and submitted to isostatic pressure in hydrostatic high pressure equipment. As experimental design, it was employed a two central composite rotational design (2^2) where pressure varied from 159 to 441 MPa. In experiment I, processing time varied from 5 to 19 minutes and in experiment II the time range was 2.5 to 13.5 minutes. The vitamin C and total phenolic contents, as well as the antioxidant activity were determined by standard methods.

The results were evaluated by variance analysis and they showed that either vitamin C or phenolic contents, as well as antioxidant activity of the tropical blend, were not affected ($p<0.05$) by the parameters employed (pressure and time). This suggests that high pressure is a suitable technology for conservation of fruit juices in the studied range of process conditions.

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Evaluation of the increase of fruit content on bioactive compounds, antioxidant capacity and amount of added sugar of orange and grape drinks

In the search for more healthy and convenient food, some products like fruit drinks, for example, need to have their composition fitted in order to achieve these aspects. Nectars, according to Brazilian standards, are fruit drinks that contain whole fruit juice, water and added sugar. They are an alternative for a healthier diet as they are made from fruits and present a growing consumption due to their convenience. However, although it is a fruit-based product, it usually contains low amounts of fruit juice and high added sugar content.

Considering the benefits of fruits and the risk of consuming high sugar products, Brazilian food law has been changed aiming to meet the increase of consumer´s demand for better quality products. It has been established that until 2016 nectars of orange and grape must have at least 50% of whole fruit juice in its composition instead of the former 30%. In this sense, the objective of this work was to evaluate the effect of the increase of the fruit content (as whole fruit juice) of orange and grape nectars on their specific bioactive compounds, antioxidant capacity and amount of added sugar. For comparison, nectars samples were prepared based on the soluble solids of available commercial products, which can be related to their sugar content.

Results showed an increase of 60% on total anthocyanin content of grape nectar and 59% on vitamin C content of orange nectar. The antioxidant capacity has increased 56 and 47% in orange and grape nectars, respectively. In addition, the amount of added sugar was reduced about 18 and 33%, respectively, for orange and grape nectars. As expected, it was possible to conclude that the increase in juice content from 30 to 50% has contributed to the improvement of the fruit drinks quality considering their health aspects.

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Does the presence of brand equity characters on food packaging affect the taste preferences and food choices of children?

Food marketing is a key factor contributing to childhood obesity. Packaging is an under-researched marketing activity, but could have a significant impact on the foods children choose. Licensed-characters, such as Shrek, on packaging have previously been shown to affect children's food choices and taste preferences in favour of the product they appear on. However, no study has examined the influence of brand equity characters (BEC) in this context. These are characters developed specifically to represent a particular brand/product, for example, Coco the Monkey for Kellogg's Cocopops. The use of licensed-characters in TV advertising is regulated in the UK, but BEC are currently exempt. Therefore, it is crucial that we increase our understanding of their impact on children's food choices, as they almost exclusively promote high fat, sugar, salt (HFSS) foods. In a mixed-measures design 136 children (4-8yrs) were asked to rate their taste preferences and preferred snack choice for three matched food pairs, presented to them either with/without BEC on packaging. Phase 1 addressed congruent food-character associations and Phase 2 addressed incongruent associations. Participants were also asked to rate recognition and liking of characters used. Children were significantly more likely to rate the food with a BEC present on packaging as tasting nicer than a matched food without a BEC, for both congruent and incongruent food-character associations. The presence of a BEC (congruent and incongruent) also significantly influenced the children's within-pair preferences, and overall snack choice (congruent associations only). This is consistent with findings for other types of promotional character, suggesting their use in promoting HFSS foods to children should be restricted. Further research could establish whether BEC could be a useful tool for the promotion of more healthful foods, such as fruit and vegetables, amongst children.

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The impact of genetic taste sensitivity and repeated taste exposure on vegetable acceptance in children

Objective: Vegetable intake is often reported to be low among children even though it is known that high intake of vegetables offers various health benefits. Previous studies reported that repeated taste exposure to a particular food contributes to an increase in consumption of that food. However, it is still not known whether repeated taste exposure works similarly in all individuals, regardless of their sensitivity to bitter tastes. The objective of this study is to determine the effects of repeated taste exposure on the acceptance of vegetables in children with varying bitter taste sensitivity.

Methodology: This study involves healthy children aged 2 to 5 years. We used a *Brassica* vegetable (turnip) as our target vegetable based on data from a previous study that showed it was likely to be unfamiliar to children in England and bitter in taste to bitter-sensitive children. We also distributed a 'Vegetable Preference and Familiarity Questionnaire' to parents to ensure their child was not familiar with turnip. Children were randomly assigned to one of two groups, Group A was the intervention first condition and Group B the control/delayed intervention condition. During the intervention, children were exposed to pureed turnip once a day for 10 days. Intake and liking were measured before and after the intervention also at day 5 and 8 of exposure. Genotypical and phenotypical measures of bitter taste sensitivity were taken for each child. DNA was extracted from saliva to genotype for a bitter receptor (TAS2R38) and the ability to taste 6-n-propylthiouracil (PROP) was also tested. The density of fungiform papillae on the tongue was measured as it relates to the concentration of taste receptors.

Expected results: Children in both groups will increase intake and liking of the target vegetable after 10 days of taste exposure regardless of different taste sensitivity. Data collection is ongoing.

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A combined sensory-instrumental tool for quality evaluation of packaged and unpackaged wild rocket during cold storage

Objective. A combined approach for perceptible quality profiling of packaged and unpackaged wild rocket (*Diplotaxis tenuifolia* L.) based on sensory and instrumental techniques was developed to investigate the changes in sensory attributes, volatile compounds, physicochemical parameters during postharvest refrigeration storage.

Methodology. The plant material was grown in greenhouse, harvested to a length leaf of 12 cm, washed and dried. One portion was packaged in bags of polypropylene anti-fog film (200 g), while another portion unpackaged, and stored for up to seven days at 4°C. The treatments were evaluated at 24h, 72h and 7 days ('expiration date") from harvesting. Determinations of volatile compounds (GC-MS), vitamin C (ascorbic acid and dehydroascorbic acid), total phenol content, °Brix, moisture content were carried out.

Sensory descriptive analysis was performed as a tool to identify and quantify the underlying sensory attributes of freshness of wild rocket leaves. A trained panel evaluated the samples according to 31 sensory attributes relating to texture, odour, flavour and appearance in a sensory evaluation laboratory.

Results. Univariate and multivariate analyses highlighted the perceivable changes in quality induced by storage conditions. Until 72h sensory quality was almost stable. At 7 days, the visual quality (leaves integrity/turgidity) decreased under both packaged and unpackaged storage when compared to the initial quality, while the green leaf colour intensity decreased in unpackaged samples. The perceived flavour freshness diminished for a concomitant lessening of wild rocket and green flavours (given by C6-aldehydes) and development of off-favours (leaf rot odour, fusty odour). Leaves packaged in the film maintained better their texture properties (hard, body, crunchy), bitter and spicy notes (for higher total phenol content) and retro-nasal pungency, but developed other light off-favours. Vitamin C was stable during storage until 72h, while it degraded in unpackaged samples.

Conclusions. Our data indicate that packaged ready-to-eat wild rocket is a good dietary source of phytonutrients, and maintains more stable many sensory attributes with refrigeration storage compared to the unpacked samples. However, near the expiration date, it develops specific off-flavours.

Acknowledgment: This work was supported by a grant from the Italian Ministry of Agricultural, Food and Forestry Policies project FRESCO "The freshness of fruits and vegetables".

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Technology transfer and knowledge awareness for Georgian farmers

Current Climate change is climbing up the agenda of Georgian farmers and rural communities as episodes of extreme weather has raised questions about the anthropogenic warming and concerns about its future impact on emerging economies, agriculture, renewable energy and the competitiveness of local Farmers.. Temperature rises increase the pressure on land, energy use and the environmental, and threaten the agro biodiversity of soils, forests, waters and all these changes and trends are challenging our need for new technology, knowledge transfer, and the development of social entrepreneurship in rural areas. With our Association we are now embarked on new analyses of alternatives to the food sub-sector as well as new developments in food production recognizing our regional and national differences. The focus will be on how farmers, local inhabitants and consumers respond to increasing demands for safe and palatable, acceptable food produced by smart technologies, without the involvement of gene modification and recognizing our finite resources.

We need to gain from adding local value to the food sector, improving our ability to cope with the requirement for food traceability using different innovative methods, technologies and recognizing the different food needs for new markets. The methods used include a new approach to farmer training through our special a comprehensive programme for Ag Cooperative member farmers. We will focus on generating groups with policy-makers, advisers, farmer's organizations and include a literature review. The core research questions relate to the significance and role of climate change, deforestation, groundwater protection and demands for the creation of sustainable agriculture development in the agriculture/food sectors.

Thus our Association aims to make use of farmer's local know-how and innovative ideas for their communities. The potential effects on farm profitability, biodiversity, long-term soil productivity, rural employment and consumer demand satisfaction will be evaluated and policy recommendations given as well as setting out best practices based on work from our research team. We are proud to have Membership of **Groupe de Bruges** and our Association needs to develop our work with farmers of all sizes to realize sustainable intensification: producing more food per unit of land, while safeguarding their soils, using less water and other natural resources and adopting integrated pest management. Farmers also need to adopt a focus on quality inputs, weather insurance and other support to be more resilient to the impacts of climate change. Given the diversity of landscapes and agro-ecological zones, sustainable intensification will require a mosaic of farming practices and solutions.

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Recent trend of fruit and vegetable consumption among Italian children: the surveillance system OKkio alla SALUTE

Objectives: Unhealthy diet is related to increased susceptibility to diseases such as diabetes and cardiovascular diseases, reduced immunity and increased likelihood of developing obesity. Low fruit and vegetable intake is among the potential dietary determinants of obesity (together with skipping breakfast, high consumption of sugar-sweetened beverages and energy dense snacks). Dietary Guidelines recommend eating a variety of fruit and vegetables five or more times a day. The aim of this abstract is to describe fruit and vegetable consumption among Italian children aged 8-9 years and its recent trend using the information collected by the national school-based nutritional surveillance system OKkio alla SALUTE, financed by the Ministry of Health.

Methodology: Cluster sampling in all Italian regions was used to select the third primary classes for participation. Data on fruit and vegetable consumption were collected through questionaires addressed to children and parents. Until now there have been four rounds of data collection (2008/9; 2010; 2012; 2014).

Results: In 2014, more than 48,000 children and 50,000 parents participated. Sixty six percent of children consumed fruit daily, 28% sometimes during the week and 7% never or less than once a week; the level of vegetable consumption was also low (respectively 51%, 36% and 13%). The consumption of fruit and/or vegetables was much less than that recommended: only 8% of children consumed these foods five or more times a day and 25% didn't consume them daily. If we consider the consumption of at least two portions per day, the prevalence slightly increased from 53% in 2010 to 57% in 2014. Although the Southern Regions had the higher growth (from 44% to 49%), they were low compared to Central and Northern Regions.

Conclusion: Despite the known health benefits of eating fruit and vegetables, in Italy, children eat less than is recommended. The trend of consumption shows a slight improvement, but there is still scope for improvement.

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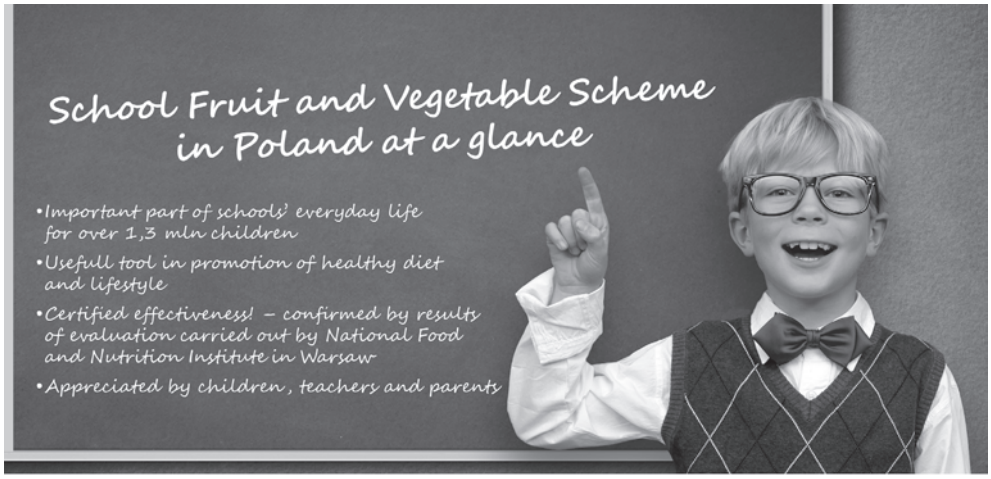


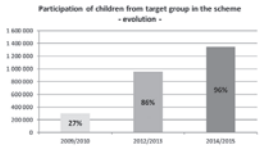
Our goals

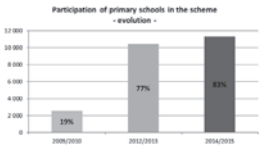
- **To make the scheme easily accessible and attractive for schools and suppliers of fruits and vegetables**
- **To guarantee the intensity of action and its effectiveness**
- **To guarantee high uptake of budget and its effective usage**
- **Multi-sectoral approach: agriculture, education and public health benefits from the scheme**

How we achieved them?

Scheme easily accessible and attractive for schools and suppliers of fruit and vegetables

- Simple rules of participation (schools don't have to apply for aid – they use services of suppliers who apply for aid)





- Keeping high quality and variety of products – increasing the range of products year by year (apples, pears, strawberries, blueberries, carrots, sweet pepper, small radishes, kohlrabi, cherry tomatoes, fruit and vegetable juices)
- Portions delivered to schools ready to eat
- Focus on domestic production – species of fruit and vegetables cultivated in Poland
- Introducing flat rate per portion – to simplify the application for aid process
- Experienced suppliers: in Poland there are over 100 approved suppliers in the scheme (producers of F&V, processors and traders)

Intensity of action and its effectiveness

Intensity

- Target group: children from 0-III classes in primary schools: 1,389 mln pupils in 2014/2015 school year
- Smaller target group with guaranteed high frequency of provision of fruit and vegetables - at least 2-3 times a week for 20 weeks in a school year

Good practices increasing scheme effectiveness in shaping pupils' eating habits

- Children receive portions consisting of a fruit product and a vegetable product – promotion of consumption of fruit and vegetables at the same time
- Children consume fruit and vegetables together in the classroom or canteen – good example of peer group - role modelling

High uptake of budget (above 90%) and its effective usage

- Total budget of the scheme in 2014/2015: 23,3 mln EUR (88% from EU budget)
- National co-financing of the scheme financed totally from national budget
- Fruit and vegetables free of charge for children
- Flexible system of calculation of number of portions per child depending on number of children participating – to guarantee high uptake of budget

Not only agriculture - multi-sectoral cooperation

- The support of the Ministry of National Education – especially as regards accompanying measures carried out by schools (setting schools gardens, cooking classes, excursions to orchards, green markets, etc.)
- Public health – advise on products distributed to schools and their health benefits

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Dysphagia and nutritional risk in Parkinson's disease

Parkinson's disease (PD) patients may be at higher risk of malnutrition because of the symptoms associated with the disease and the side effects of drug therapy.

Dysphagia (feeding and swallowing difficulties), reaching up to 80% of PD patient in a very mild form in early stage and 95% in advanced stage, is one of the main factors contributing to malnutrition and dehydration in PD, leading to increased mortality and comorbidity.

The true prevalence of malnutrition in PD has yet to be accurately quantified. A systematic review (2011) found the prevalence of malnutrition is ranging from 0% to 24% in PD patients, while 3-60% of PD patients were reported to be at risk malnutrition[1].

Therefore, the nutritional status should be screened and regularly monitored for a best manage by interdisciplinary team of specialists.

Screening for malnutrition can be performed using simple tools such as the Mini Nutritional Assessment (MNA)[2], which latter requires minimal training.

In this study, 16 patients (12♂ e 4♀, mean age = 73, age range 59 -87), rated with the Hoen and Yahr Scale[3] and undergone the Bedside Swallowing Assessment Scale (BSAS), with the combination of oxygen saturation monitoring[4], were included. The Dysphagia Outcome and Severity Scale (DOSS)[5] was used to establish the severity of dysphagia.

62% of patients assessed showed a mild to mild-moderate swallowing impairment (DOSS: level 5, level 4) such as to require diet restriction and compensatory mechanism through direct and/or indirect manage by a team of specialized professionals (speech language pathologist/therapist, neurologist, nutritionist, gastroenterologist).

In 38% of patients was detected swallowing within functional limits.

Nutritional risk screening at the time of swallowing assessment allowed us to monitor dysphagia complications and make appropriate referrals to nutritional healthcare professionals, for a full assessment and specialized nutritional support integrated with nutritional recommendations for dysphagia.

Reference:
[1]Michou E, Baijens L, Rofes L, Cartgena PS, Clavé P (2013) Oropharyngeal Swallowing Disorders in Parkinson's Disease: Revisited. *International Journal of Speech & Language Pathology and Audiology, 2013,1,76-88*
[2] Vellas B, Villars H, Abellan G, et al. Overview of MNA- Its History and Challenges. *J Nut Health Aging 2006; 10: 456-465.*
[3] Hoen M, Yahr M (1967) Parkinsonism: onset, progression and mortality. *Neurology 17:427-42* [4] Smith HA, Lee SH, O'Neill PA et al. (2000) The combination of bedside swallowing assessment and oxygen saturation monitoring of swallowing in acute stroke: a safe and humane screening tool. *Age Ageing 29, 495-499.*
[5] O'Neil KH, Purdy M, Falk J et al. (1999) The Dysphagia Outcome and Severity Scale. *Dysphagia 14, 139-45.*

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Poor early growth and salt overcosumption in indian babies: combined risk factors for hypertension

Recently, has been demonstrated the presence of a high prevalence of hypertension in a population of both Indian adults and children living in West Bengala. The incidence and outcome of hypertension is associated with birth weight, growth and feeding patterns in early childhood.

Objective: The purpose of this work was to analyse the influence of feeding patterns, in a children cohort of West Bengala, on anthropometric characteristics during the first year of life.

Methodology: 517 children (0-12 months) were recruit for the study. For the anthropometric analyses, height and weight were measured and body mass index (BMI) calculated. The z-scores of weight-for-lengths, weight-for-age and length-for-age were considered. At mothers were administered a questionnaire about nursing and solid food introduction in the first year of life of their children. The children were divided into three groups (0-3, 3-6 and 6-12 months).

Results: 73% of the group 0-6 months received exclusive breastfeeding. The z-scores of weight and BMI were negative in all groups, but there was a significant improvement between 0-3 months and 3-6 months ($p < 0.05$). The percentages of malnutrition were 59% (0-3 months), 38.9% (3-6 months) and 41.6% (6-12 months) ($p < 0.002$). At 6th month, 92% of children took salt and 72% assume the adult food. The children who did not take salt and those who were not fed with the adults food had a weight and BMI z-scores less negative than their peers (+0.404 and +0.364, $p < 0.05$ and +0.501 and +0.505, $p < 0.001$, respectively). The percentage of malnourished children was higher among those taking early salt (44.7% vs 10%, $p < 0.03$).

Conclusion: The breastfeeding produces an improvement of nutritional status. The early salt intake and adult food assumption combined with the low weight could encourage the early onset of hypertension in these children.

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How can we promote the consumption of fruit and vegetables in an unfriendly policy environment ? A case study from France

Objective: Understand the barriers to the promotion of fruit and vegetables (F&V) in France.

Methodology: expert's opinion based on their understanding of the sector.

Results: F&V have undeniable health benefits. They are an important source of fiber, vitamins and minerals essentials for the proper functioning of the body; they are thus a way to solve the problem of "hidden hunger"; they have a protective effect against chronic-diet related diseases and they are markers of a healthy diet. However their promotion faces several barriers at (i) scientific, (ii) political or (iii) legislative level. (i) Recent data have shown a significant decrease of trace elements and micronutrient content of common foods in the last few decades. The "empty foods" term was used to highlight the depletion of essential nutrients in F&V, term commonly used for low-nutrition-density diets. Similarly, the WHO recently included fruit juices and fruit concentrates in the free sugars group. In these two examples, we can see the emergence of a negative connotation for F&V that can lead to confusion in the non-scientific community. (ii) Politically, so far F&V producers could not benefit from the CAP (common agricultural policy) direct payments. In the New CAP, since 2015, some of them are eligible for direct subsidies but at a much lower level than other farmers and breeders; such subsidies are subject to strong constraints. However, indirect support is provided to farmers through the SFS (School fruit Scheme) programme that subsidizes the distribution of F&V in European schools. In the future, the SFS programme will be combined with the School Milk Scheme which removes its specificity. (iii) Concerning the French SFS programme, legislation is inconsistent. The National Plan for Food (PNA) encourages F&V distribution at school, but not during school meals. On the contrary, the Ministry of Education recommends not organizing snacks at school. The National Health Safety Agency for Food (ANSES) and the National Health and Nutrition Plan (PNNS) recommend suppressing snacks and are in favour of F&V distribution during any of the 4 main meals.

Conclusion: promoting F&V requires a series of converging actions and regulations.

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The Interistitutional Multidisciplinary Biobank (BioBIM): a valuable resource for the study of the interactions between migraine and food

Migraine is a common disabling pathology. It is a multifactorial and polygenic primary neurological disorder characterized by a condition of cerebral cortical hyperexcitability associated to several stimulations (hormonal changes, weather, food). Studies have shown a strong correlation between nutrition and migraine. Several commonly used drinks and foods, such as red wine or chocolate, may be involved in the mechanisms triggering the headache attack.

The development of Biobanks and recent advances in molecular biology have enhanced the identification of genetic factors involved in diseases onset, the investigation of interaction between genes and environmental factors and the development of an appropriate nutritional plan to avoid adverse interaction between disease and food. The Interinstitutional Multidisciplinary BioBank (BioBIM, IRCCS San Raffaele Pisana, Rome, Italy) is a large structured collection of biological samples, organized in different sections of pathology-based specimens, including a biobank dedicated to migraine.

Starting from January 2008, more than 800 migraine patients referring to the Headache and Pain Unit of the Department of Neurological, Motor and Sensory Sciences (IRCCS San Raffaele Pisana) have been systematically cryo-preserved in the BioBIM.

In this context, the availability of a migraine-dedicated biobank has already allowed the realization of several case-control genetic association studies. These biological samples, associated to detailed clinical, socio-demographic and lifestyle data, have opened new interdisciplinary research lines addressing the interactions between genetics of migraine and food. Therefore our current efforts are aimed to the analysis of polymorphisms of genes coding for the enzymes involved in the metabolism of catecholamines and elusive amines, with the purpose of identifying the genetic basis of the individual sensitivity to migraine trigger-foods. In conclusion, the migraine biobank provides an indispensable resource to define a, customized and tailored diet for the numerous subjects affected by migraine.

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Impact of different distribution scenarios on carotenoids in ripening fresh tomatoes

Objective. To study the impact of different distribution scenarios on carotenoid content in fresh tomatoes by simulating in the laboratory different distribution chain conditions.

Methodology: Fresh tomato (*Solanum lycopersicum* cv. Rebelion) fruits were harvested at Breaker and Red ripening stage and subjected to conditions corresponding to:

- short chain (Red): 1 day at room temperature (21 ± 1 °C). Samples were analyzed 0, 1 day after harvest;
- long chain (Breaker): storage at 6÷9°C for 8 days. Samples were analyzed 0, 2, 4 and 8 days after harvest.

To evaluate the effect of harvesting at early ripening stages and refrigeration on fruit ability to develop the carotenoid content of the fruits harvested at Red stage, a group of Breaker fruits exposed to conditions of long chain was transferred afterward to room temperature, allowed to achieve full ripeness (Red), and analyzed.

Carotenoid composition was determined by HPLC.

Data were analyzed by univariate statistic methods.

Results: β-carotene and lycopene content (µg/g f.w) in Red tomatoes was 3.01±0.27 and 26.18±2.91, respectively. After 1 day at room temperature, a reduction of their concentration (-18% and -20%, respectively) was registered.

β-carotene and lycopene content (µg/g f.w) in Breaker tomatoes was 1.96±0.04 and 3.43±0.04, respectively. At the end of the storage, β-carotene content resulted unchanged, whereas lycopene concentration showed an increase (4.40±0.03 µg/g f.w). After achieving a full ripeness, an increase of both lycopene and β-carotene content was detected, but their levels were still significantly lower than those in tomatoes harvested at Red stage.

Conclusions: Tomato fruits of cv. Rebelion marketed at full ripeness were characterized by a higher carotenoid content than the Breaker fruits subjected to the long chain conditions. The latter did not develop the same content of carotenoids of the samples harvested at a full ripeness, even after having achieved a Red stage.

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Perception of freshness associated with fruits and vegetables, in groups of consumers from a representative Italian sample

Background and Objective: The objective definition of freshness of foods is a complex topic. However, the interpretation of freshness given by consumers is one of the most relevant variables determining his/her food purchase behaviour. Perception of freshness varies, depending on individual experience[1,2], food product, and even in the same group of product[3]. In spite of, consumer perception of freshness has not been much studied. Thus, this study was aimed at understanding the perception of freshness associated with fruits and vegetables.

Methodology: A sample of 1000 subjects, representative of the Italian population by age classes and rural/urban classification, was interviewed by using a self-administered questionnaire. In the present study, only the sections related to the perception of freshness for the category "fruits and vegetables" and social-demographic information, are discussed. To identify different patterns underlying the perception of freshness, a PCA (Varimax rotation) and, then, a Cluster Analysis (CA; Kmeans method) were applied.

Results: Four factors, explaining 57.4% of variance, highlighted a multi-component interpretation of freshness associated with fruits and vegetables: 1) *fresh is also processed food*; 2) *fresh is natural and organic*; 3) *freshness is based on sensory properties*; 4) *fresh is from the country*. The CA underlined 5 segments of consumers showing a few differences. Concerning the sensory properties, the subjects belonging to the smallest group (8,1%), based their perception of freshness only on product appearance. This segment included the highest percentage of males and of people in the age 35-64. The greatest cluster (32%) associated freshness also to packaged and frozen vegetables.

Conclusions: The findings provided interesting information on how the Italian consumers perceive and describe the freshness of fruits and vegetables. The interpretation of freshness given by consumers highlighted a composed meaning including also packaged and processed foods.

References

[1]Bech, A.C., Grunert, K.G., Bredahl, L., Juhl, H.J., Poulsen, C.S., 2001. Consumer's quality perception. In: Frewer, L.J., Risvik, E., Schifferstein, H. (Eds.), Food, People and Society: A European Perspective of Consumers' Food Choices. Springer, Berlin, pp. 97–113.

[2]Péneau, S., Brockhoff, P.B., Escher, F., Nuessli, J., 2007. A comprehensive approach to evaluate the freshness of strawberries and carrots. Postharvest Biology and Technology 45, 20–29.

[3]Heenan, S.P., Hamid, N., Dufour, J.P., Harvey, W., Delahunty, C.M., 2009. Consumer freshness perceptions of breads, biscuits and cakes. Food Quality and Preference 20, 380–390.

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How to increase diet sustainability through food consumption changes: a review of studies based on self-selected diets in Europe

Background: Sustainable diets, defined as nutritionally adequate, healthy, culturally acceptable, economically affordable and with low environmental impact, are needed to ensure food security and food quality. Many studies on diet sustainability are based on theoretical dietary patterns, therefore compromising the cultural acceptability of the resulting food choices recommendations to reduce diet's environmental impact.

Objective: To provide a review of published research studying the compatibility between the environmental and nutritional/health dimensions of diet sustainability based on the analysis of self-selected existing diets in European countries.

Methodology: Literature search with the following inclusion criteria: studies based on individual food consumption data and analyzing both the environmental impact (greenhouse gas emissions (GHGE) or land use) and nutritional quality or health impact of individual diets.

Results: Some key messages emerged from the nine studies meeting the inclusion criteria. Firstly, reductions of meat consumption and energy intake were identified as main levers for reducing diet-related GHGE. However, the choice of meat replacement foods was crucial, with some foods possibly increasing total diet GHGE in isocaloric substitutions. Secondly, nutritional adequacy was rarely assessed, or only partially, therefore compromising diet sustainability assessment. Thirdly, high nutritional quality was not necessarily associated with affordability or lower environmental impact. Finally, some existing non-vegetarian self-selected diets, already consumed by a substantial fraction of the population, showed a good compatibility between the nutritional, environmental, affordability and acceptability dimensions.

Conclusion: Each dimension of diet sustainability needs to be carefully considered when identifying sustainable diets. Particular attention should be paid to nutritional quality which needs to be assessed through relevant nutrient-based indicators, and to cultural acceptability, a key - although often ignored - dimension of sustainability. Altogether, the reviewed studies suggest that diet sustainability might be increased with moderate dietary shifts and without excluding any food category.

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Effects of polyphenol treatment on neuronal precursor proliferation and differentiation events in a transgenic mice model of Contactin-1 gene misexpression

In this study the protective effects against neurodegeneration of polyphenols from red grape (Nero di Troia cultivar) have been evaluated by using as a model transgenic mice undergoing delayed neural development as a consequence of overexpression of the axonal adhesive glycoprotein Contactin-1 (Bizzoca et al., Development. 130: 29-43, 2003). Pregnant transgenic and control mice have been administered with polyphenols contained in the feed (18.5 mg g/gr) and postnatal day 8th animals have been evaluated from either Contactin-1 overexpressing mice and wild-type littermates. The cerebellar cortex has been used as a tissue model, in which proliferation and commitment of neuronal precursors have been studied by morphometric analysis of BrdU incorporation and NeuN expression. 2 animals were analyzed for each genotype, and for each treatment, an overall number of 20 sections being used for each condition.

Statistically significant results ($p<0.05$), obtained by using the t-test, demonstrated specific effects of polyphenol treatment on proliferation events in developing cerebellum. In particular, at postnatal day 8th, when precursor proliferation appears to be significantly enhanced by Contactin-1 overexpression, a significant inhibitory effect is observed, thus indicating that polyphenols counteract the positive Contactin-1 effects on precursor proliferation.

Neurogenesis has been estimated through expression of the NeuN neuronal marker, whose levels are significantly increased upon polyphenol treatment in both TAG/F3 mice and wild-type littermates, in agreement with the general polyphenol effects on the neuronal phenotype. However, when neuronal commitment is specifically estimated on proliferating cells, much more marked effects are observed upon polyphenol treatment, with a more than twofold increase in transgenic mice. These data clearly indicate that polyphenol treatment specifically enhances neuronal commitment in a transgenic animal model of delayed neuronal development by increasing the ratio between commitment and proliferation of neuronal precursors, thus expanding the neuronal pool and suggesting a specific therapeutic approach.

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Effects of early harvesting and refrigeration technologies on the flavour of fresh tomatoes

Objectives. The aim of this study was to investigate the effects of early harvesting, conventional and passive refrigeration, on the flavour of fresh tomatoes.

Methodology. Tomato fruits from cv. Caramba were harvested at different ripening stages (breaker and full ripeness). Fruits harvested at the breaker stage were subjected to conventional refrigeration (at 6°C) for 4 and 7 days, then kept at room temperature until they reached full red external colour. These fruits were compared to fruits fully ripened on the vine. On the vine fully ripened fruits were also subjected to 2, 4 and 7 days of conventional and passive refrigeration (6°C) and then evaluated. Flavour of tomato fruits was evaluated by means of sensory analysis, chemical determination of organic acids, sugars, volatile compounds, and instrumental measurement of texture properties and external colour.

Results. Slight, significant differences (more intense green and less intense ripe tomato notes) were detected in the sensory properties of early harvested tomatoes, evaluated at full ripeness, when compared to fruits ripened on the vine. Conventional refrigeration of fruits ripened on the vine produced significant effects on the sensory profile only after 7 days of cold storage (more leathery skin and reduced sourness), whereas passive refrigeration did not differ in its effects from conventional refrigeration. Associations between some sensory attributes and volatile compounds (green notes/ *b*-ionone and methylbutanoic acid; ripe tomato notes/ geranial) and instrumental texture parameters (fruit hardness/firmness) were observed.

Conclusion. Early harvesting followed by refrigeration, as well as conventional refrigeration of fruits ripened on the vine, had a slight impact on the flavour of full ripe tomatoes from cv. Caramba. Conventional and passive refrigeration had similar effects on tomato flavour.

Acknowledgment: This work was supported by a grant from the Italian Ministry of Agricultural, Food and Forestry Policies project FRESCO "The freshness of fruits and vegetables".

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Averrhoa carambola *L. peel extract suppresses adipocyte differentiation in 3T3-L1 cells*

Obesity is associated with an increased risk of many chronic diseases such as cardiovascular disease and diabetes mellitus. Recently, a growing body of evidence shows that phytochemicals, especially polyphenols, may inhibit adipogenesis and obesity. *Averrhoa carambola* L., commonly known as star fruit, is known to be rich in polyphenols such as epicatechin and proanthocyanidins. In this study, extract from the peel of *Averrhoa carambola* L. (star fruit) was utilized to investigate its effectiveness to modulate adipogenesis in 3T3-L1 preadipocytes. For the first time, we report that adipocyte differentiation was markedly suppressed by star fruit peel (SFP) extract and identified the bioactive compound likely responsible for this suppression.

The identification of the bioactive compound from the crude extract was first done by separating the crude extract into smaller fractions and subsequently subjecting each fraction to adipocyte differentiation assay using 3T3-L1 cells. The chemical composition analysis of the active fraction was done via HPLC, LC-MS and computational analysis of which (–)-epicatechin was successfully identified as the major polyphenolic compound responsible for the anti-adipogenesis activity of SFP extract.

As the genetic expression studies revealed that the adipogenic activity of SFP extract was due to the simultaneous downregulation of the adipogenic genes C/EBPα and PPARγ as well as the upregulation of PPARα receptor genes, a detailed computational docking studies was also elucidated to reveal the likely binding mode of (-)-epicatechin to the PPARá receptor via the formation of hydrogen bonds with Y464 in the AF-2 helix, that essentially accounts for its activation and the mechanism involved in the overall adipogenesis suppression observed in SFP extract.

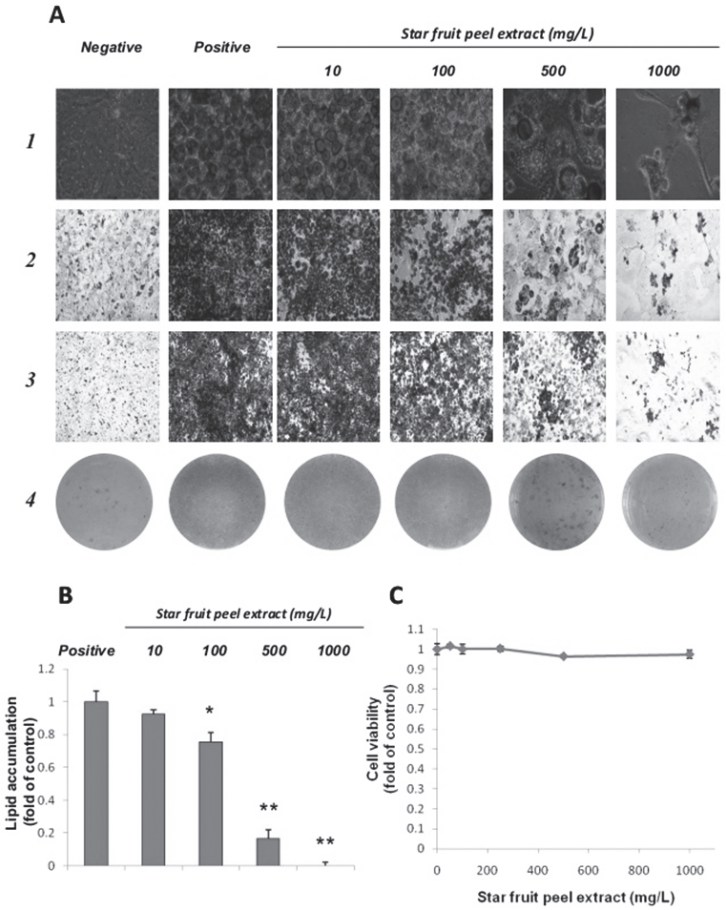

Figure 1. Effect of star fruit peel extract on adipocyte differentiation in 3T3-L1 cells. Adipocyte differentiation was performed with or without treatment of 1000 mg/L, 500 mg/L, 100 mg/L, 10 mg/L star fruit peel extract for the whole adipogenic period. On day 8, cells were stained with Oil Red O. (A) Observation of cell after Oil Red O staining under phase contrast microscopy 40X objective (lane 1), 10X objective (lane 2), 4X objective (lane 3) or naked eye (lane 4). (B) Quantitation of lipid accumulation determined by Oil Red O. (C) Cytotoxicity of star fruit peel extract measured by cell viability assays. *p<0.05 compared with positive control. **p<0.01 compared with positive control.

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Consumption of vegetables among children in Japan by socio-economic status

Objectives: We examined consumption of vegetables among Japanese children. Further, we evaluated whether the consumption of vegetables is different across socio-economic status.

Materials and methods: We collected the data from Mothers and/or guardians living with their 2–6-year-old children in 4 prefectures in Japan. Subjects were enrolled by the network of professional dieticians and public health centres from March to June 2012. The participants' background characteristics were collected with an additional questionnaire. Detailed dietary information was collected into 3 or 7 days weighted dietary record. We estimated consumption of vegetables by the dietary records. In current analysis, we excluded data with missing information of socio-economic status as well as the consumption of vegetables.

Results: The mean (SD) of vegetables intake was 89.7 (45.6) g per day. Of the study subjects of annual income of family, less than two million yen(>2%); 2 to 4 million yen (16%); 4 to 6 million yen (33%); 6 to 8 million yen (26%); and >8 million yen (23%). We performed analysis of variance to evaluate whether the consumption of vegetables vary according to socioeconomic status.

Children's vegetable intake was (mean(SD)= 61(±14)g/day) in the families with the income of less than four million yen. By contrast, that was 128(±13)g/day in the families with the income of eight million yen over. Children in richer families might tend to take more vegetables. We observed a statistically significant difference in children's vegetable intake by annual income of family ($p<0.05$).

Conclusion: There was a statistically significant difference in children's vegetable consumption by socio-economic status of family in Japan. Our results suggested that the higher the income of the family, the more the children's intake of vegetables. Further studies need to confirm our results.

Acknowledgement: This study was supported by research grants from Advanced Research Programs in National Institute for Environmental Studies, Japan. (A part of the Children's Dietary Survey).

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The Mediterranean diet, a sustainable one: food-related behaviours in a sample of Italian adolescents from the Lazio region

Objectives: Apart from its protective effects on several diseases, the Mediterranean diet (MD) is also known as a sustainable one. Unfortunately, children and adolescents living in the Mediterranean countries have shown a gradual abandonment of the Mediterranean dietary patterns and Italy is among those according to previous research. The aim of this study was to evaluate the relationship between the KIDMED index and food-related behaviours in a sample of Italian adolescents.

Methodology: A representative cluster sample of 369 adolescents attending the second class of secondary school in the Lazio region was investigated. The KIDMED test was administered to each subject by a nutritionist. Food habits and lifestyle were assessed by questionnaires.

Results: 48.6% of the subjects said they had Mediterranean food habits but only 17.6% had an optimal rate of adherence to the MD (due mainly to a low consumption of fruit and vegetables). Subjects had higher optimal rates if reading food labels ($p=0.001$), ingredients list ($p<0.0001$), nutrient content ($p<0.0001$), additives ($p=0.002$) and origin of products ($p=0.019$); had breakfast with family ($p=0.002$); did not eat in front of TV ($p<0.0001$) and PC ($p=0.007$) or in fast-food restaurants ($p=0.02$); did not drink hard liquors ($p=0.027$).

Conclusion: Younger Italian generations, as also remarked by these results, show a very low optimal rate of adherence to the Mediterranean diet. They do not follow the recommendations for fruit and vegetables at all. Interventions are necessary for them to learn to appreciate these foods but better to start, if possible, earlier in life.

Acknowledgment: This work was supported by a grant from the Italian Ministry of Agricultural, Food and Forestry Policies project REGALIM.

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Adherence to the mediterranean diet and its association with lifestyle and socioeconomic factors

Objectives: Identify possible clinical, lifestyle and socioeconomic factors associated with adherence to a Mediterranean dietary pattern.

Methodology: This is a cross-sectional study of 899 adult women of child-bearing age, participating in the "Programme of prevention and early diagnosis of cardiovascular disease (CVD) risk factors in women in Crete" (MIS 365462). 540 women were already participants in the mother-child RHEA cohort and 359 responded to our open-call to the local population; all met with a clinician who evaluated their CVD history and risk factors including blood lipid measurements and questionnaires on sociodemographic characteristics. Adherence to the Mediterranean diet was assessed with an 11-component score (MedDiet Score) applicable to the Greek population.

Results: Participants had a mean (SD) age of 36.4 (±5.1) years, were mostly Greek (95%), and 37.2% were current smokers. More than half the women had dyslipidaemia (54%), were overweight/obese (53.3%), while 11% were diagnosed with metabolic syndrome. From a range of 0-55, women scored a mean (SD) of 29.1 (±3.5) in the MedDiet Score. 22.6% of the participants had high adherence to the Mediterranean diet (>32), 43.9% had moderate (28-31) and 33.5% had low adherence (≤27). The lowest scores were reported for the components of fruits, vegetables, non-refined cereals, fish and legumes. In multivariate linear regression analysis, adherence to the Mediterranean diet was associated with working status (β=0.83; 95% CI: 0.29, 1.37), non-smoking (β=0.92; 95% CI: 0.04, 1.79), age (β=0.06; 95% CI: 0.01, 0.11), and CVD knowledge levels (β=0.09; 95% CI: 0.04, 0.14), whereas hypertriglyceridemia showed a borderline significant positive association (β=1.31; 95% CI: -0.22, 2.84, p-value=0.093).

Conclusion: Sociodemographic and lifestyle factors such as age, smoking, working status, and CVD knowledge and individual CVD risk factors are associated with the degree of adherence to Mediterranean diet, which is significant for primary and secondary CVD prevention.

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Environmental impact of omnivorous, ovo-lacto-vegetarian, and vegan diet

Introduction. There is a lack of information about the real impact of specific food choices on parameters associated to environmental impact. The aim of this study was to determine the environmental impact of omnivorous, vegetarian, and vegan diets in the real-life context of an Italian small cohort of volunteers.

Materials and methods. In an Italian observational multicentre cohort study, 153 volunteers were enrolled (51 omnivorous, 51 ovo-lacto-vegetarians and 51 vegans, matched for gender, age, BMI and smoking habits). Food intake was monitored with a 7 days dietary record. The European Institute of Oncology database was used to calculate nutritional values. The Barilla Center for Food and Nutrition database was used to evaluate environmental impacts, taking into account three indexes: carbon footprint, water footprint, and ecological footprint.

Results. Energy intakes were similar among the three diets: 2471 ± 366 kcal in omnivorous, 2393 ± 314 kcal in ovo-lacto-vegetarians, and 2326 ± 324 kcal in vegans. Considering the food categories, the intake of legumes, vegetables, fruit and dried fruit was significantly the highest for vegans and the lowest for omnivorous. Consequently, the omnivorous choice generated significantly worse carbon and ecological footprints ($p < 0.001$) when compared to other diets, whereas the water footprint was significantly lower for the ovo-lacto-vegetarian choice ($p < 0.001$) with respect to other diets.

Conclusions. A plant-based diet, especially the ovo-lacto-vegetarian approach, represents a clear environmental advantage. To reach an environmentally sustainable scenario, animal-based foodstuffs should be partially replaced with fruits and vegetables, legumes, cereals, according to nutritional guidelines. To maximize these effects, seasonal and locally grown foods should be preferred. Educating people to make little changes in their dietary behaviours could be a key action towards the diseases prevention as well as the environment preservation.

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Do we produce enough fruits and vegetables to meet global health need?

Objective: Low fruit and vegetable (FV) intake is a leading risk factor for chronic disease globally, but much of the world's population does not consume the recommended servings of FV daily. We examine whether global and country-level supplies of FV are sufficient to meet current and growing population needs.

Methodology: We used global data on agricultural production and population size from the United Nations' 2009 Food Balance Sheets and World Population Prospects, respectively, to compare supply of FV in 2009 with population need, globally and in individual countries. Using agricultural production and population projections, we also estimated supply and need of FV for 2025 and 2050.

Results: We found that the global supply of FV falls, on average, 22% short of population need according to nutrition recommendations (supply:need ratio: 0.78 [Range: 0.05–2.01]). This ratio varies widely by country income level, with a median supply:need ratio of 0.42 and 1.02 in low-income and high-income countries, respectively. A sensitivity analysis accounting for need-side food wastage showed similar insufficiency, to a slightly greater extent (global supply:need ratio: 0.66, varying from 0.37 [low-income countries] to 0.77 [high-income countries]). Assuming medium fertility and projected growth in agricultural production, the global supply:need ratio for FV increases slightly to 0.81 by 2025 and to 0.88 by 2050, with similar patterns seen across country income levels. In a sensitivity analysis assuming no change from current levels of FV production, the global supply:need ratio for FV decreases to 0.66 by 2025 and to 0.57 by 2050.

Conclusion: Increased FV production and consumption are required to meet current and future population health needs, particularly in low-income countries.

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The changing trends, patterns and seasonality of fruits and vegetables consumption in the United States

Introduction: Fruits and vegetable intake (F&V intake) is associated with occurrence of obesity (Heo-2011) and chronic diseases (WHO-2014). In the United States (US), F&V intake increased among children (Kim-2014). Overall, F&V intake increased concomitantly with increased prosperity in 1979-1999 (Pollack-2001). Adult obesity prevalence increased in 1999-2010 but may have stabilized in the US (Ogden-2012).

Objectives: We evaluated if F&V intake and obesity time trends are related; and whether associations of F&V intake with obesity and sociodemographics explained trends.

Methods: We used Behavioral Risk Factor Surveillance System data for nine alternating years in 1994-2009 when nearly all 50 states plus DC collected F&V intake (except for 1994 in Rhode Island) using a consistent survey questionnaire. We calculated yearly prevalence of five/day (F&V intake of 5+/daily) and obesity (BMI e"30) overall and for each values of selected covariates (SAS-Surveyfreq). We computed covariate-adjusted odds ratio of five/day and obesity for level of covariates using first-order effects but stratified by year (SAS-Surveylogistics). We calculated predicted probabilities for the reference group (55+ years-old, female, white, 50k+ income, married / unmarried couple, 4-year college degree or more, Pacific region, and when applicable: not obese and a high level of fruit/vegetable intake) and groups formed by varying each of the variables one-by-one from the reference group to examine the effect of each variable holding everything else fixed.

Results: Associations of five/day with age, race and education changed over time. We observed an expected five/day and obesity inverse trends over time only for specific age subgroups (55+).
Conclusion: Except for one specific age subgroups, five/day and obesity changes over time are mostly unrelated. Five/day may be appropriate for policy, but may be an insensitive indicator of actual population changes in F&V intake. Observed gap in F&V intake between education, race-ethnicity and age subgroups have narrowed in 1994-2009.

References:

Heo M, Kim RS, Wylie-Rosett J, Allison DB, Heymsfield SB, Faith MS. Inverse association between fruit and vegetable intake and BMI even after controlling for demographic, socioeconomic and lifestyle factors. Obes Facts. 2011;4(6):449-55. doi: 10.1159/000335279. Epub 2011 Dec 6.

WHO technical staff September 2014. Increasing fruit and vegetable consumption to reduce the risk of noncommunicable diseases: Biological, behavioural and contextual rationale. WHO e-Library of Evidence for Nutrition Actions (eLENA). Accessed: 5/2/2015 http://www.who.int/elena/titles/bbc/fruit_ vegetables_ ncds/en/ 1/7.

Kim SA, Moore LV, Galuska D, Wright AP, Harris D, Grummer-Strawn LM, Merlo CL, Nihiser AJ, Rhodes DG. Vital Signs: Fruit and Vegetable Intake Among Children - United States, 2003–2010. MMWR August 8, 2014 / 63(31);671-676.

Pollack, S. "Consumer Demand for Fruit and Vegetables: The U.S. Example," Changing Structure of Global Food Consumption and Trade, Agriculture and Trade Report, WRS-01-1, U.S. Department of Agriculture, 19 Dietary Assessment of Major Trends in U.S. Food Consumption, 1970-2005 / EIB-33 Economic Research Service/USDA Economic Research Service, May 2001, pp. 49-54, www.ers.usda.gov/publications/wrs011/wrs011.pdf/. Accessed: 5/2/2015.

Cynthia L. Ogden, Ph.D.; Margaret D. Carroll, M.S.P.H.; Brian K. Kit, M.D., M.P.H.; and Katherine M. Flegal, Ph.D.. Prevalence of Obesity in the United States, 2009–2010. NCHS Data Brief No. 82, January 2012.

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School Fruit Scheme and fruit and vegetable consumption among polish school children during the first year of implementation

Objectives. The School Fruit Scheme has been created as one of the priority activities of the European Committee aiming at the development among children of a permanent habit of eating fruit and vegetables. In Poland children receive for free fruit and vegetables (F&V) portions, eaten at school, 2-3 times a week. The aim of this study was to study School Fruit Scheme impact on fruit and vegetable consumption among school children during the first year of evaluation.

Methodology. The evaluation of the School Fruit Scheme was performed among grade 1 pupils (7 years old) from 85 randomly selected primary schools in the area of 5 selected voivodeships representative for north, south, central, east and west regions before launching the distribution of F&V (October 2012) and at the end of distribution period (May-June 2013). The study was conducted in schools participating in the Scheme (intervention group) and in schools not participating in the Scheme (control group). The F&V consumption of pupils was evaluated on the basis of the 3-day food record method.

Results. After the first year of School Fruit Scheme implementation, F&V consumption on school days was significantly higher in the intervention group than in the control group ($p<0,0003$) but was still below the recommendations. At the same time in the control group fruit consumption decreased, vegetables consumption remained at the same level. At the end of the first year of the Scheme the consumption of fruit on school days in the intervention group was 11% higher in comparison to the control group and the total consumption of F&V was 9% higher.

Conclusions. The evaluation results show that the Scheme has a very strong potential and is an appropriate tool to improve the eating habits of children towards consuming more fruit and vegetables for the future.

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Could farm visiting be a useful educational tool in order to improve children's eating habits?

Introduction. Farm visiting is claimed to be effective in improving children's eating habits. The theory behind it relies on children developmental stages and testes the benefit of providing them with the opportunity to discover in an interactive manner how fruit and vegetables are grown. Few studies, however, have been conducted using the Evidence Based Medicine approach in order to test this hypothesis. A protocol based on nutritional education rules to be used during farm visiting, and a tool enabling to identify and quantify children's subsequent eating habits modifications are lacking.

The aims of this study are 1) to build up a standard protocol on how to perform farm visits using nutritional education rules 2) to evaluate the impact of these farm visits on children food choices on objective criteria.

Methods. Participation to the research programme was offered to 13 primary schools in the province of Brindisi, 9 of which gave their consent. The whole sample consists of 700 children aged 9 years old. Parents have filled a questionnaire about their attitudes toward and children feeding style and a child food frequency questionnaire at the beginning of the study (January 2015) and will fill again at its end (June 2015).

Children fill a questionnaire on their eating habits and the perception they have of their parents feeding style at the same intervals. Two classical nutritional education lessons are addressed to parents and teachers.

Children participate to five visits to certified *educational farms* where they take part to learning labs dedicated to fruit, vegetables, legumes, bread, and milk. All the visits follow the same protocol. Educational activities include food history tips, demonstration on the way foods and vegetables are cultivated, gathered, prepared and cooked. Children taste all foods and receive information regarding their health benefits.

Assessment of the project will be performed by comparing answers to the questionnaire before and after the intervention.

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Fruits, vegetables and lung cancer risk: a systematic review and meta-analysis

Objective: Lung cancer is the most common cause of cancer deaths. Although tobacco smoking is the main risk factor, diet is thought to play a role in its development. As part of the WCRF-AICR Continuous Update Project, we conducted a systematic review and meta-analysis of prospective studies to assess the dose-response relationship between fruits and vegetable intake, and incidence and mortality for lung cancer.

Methods: We searched PubMed up to December 2014 for relevant prospective studies. We estimated summary relative risks (RRs) and 95% confidence intervals (CIs) for the highest compared to the lowest intakes, conducted dose-response meta-analyses. We examined possible nonlinear associations using restricted cubic splines.

Results: When comparing the highest with the lowest intakes, the summary RR estimates were 0.85(95% CI: 0.77-0.93; 18 studies [n]) for fruit and vegetables, 0.90(95% CI: 0.85-0.96; n=24) for vegetables and 0.82(95% CI: 0.77-0.87; n=28) for fruits. The association with fruit and vegetables intake was marginally significant in current smokers and inverse but not significant in former or never smokers. Significant inverse dose-response associations were observed for fruit and vegetables (RR per 100 g increase: 0.96; 95% CI= 0.94-0.98, I^2 =63.9%, n(studies)=14, N(cases)=9609), vegetables (RR per 100 g: 0.94; 95% CI= 0.89-0.98, I^2 =47.9%, n=19, N=12 563), and fruits (RR per 100 g: 0.92; 95% CI= 0.89-0.95, I^2 =56.8%, n=23, N=14506) for fruits. There was evidence of a non-linear relationship ($p < 0.01$) between fruit and vegetables intake and lung cancer risk showing that no further benefit is obtained when increasing consumption above approximately 600 g per day.

Conclusion: Eliminating tobacco smoking is the best strategy to prevent lung cancer. Although residual confounding by smoking cannot be ruled out, the current evidence from prospective studies is consistent with a role of fruit and vegetables in lung cancer aetiology.

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An update of the WCRF/AICR systematic literature review on oesophageal and gastric cancers, and citrus fruits intake

The World Cancer Research Fund/American Institute for Cancer Research (WCRF/AIRC) Second Expert Report from 2007 concluded that relationship of the intake of foods containing vitamin C with a decreased risk of oesophageal cancer and of fruits intake with decreased gastric cancer risk were ***probable***. We conducted a systematic literature review of prospective cohort studies on citrus fruits intake and risk of oesophageal and gastric cancers as part of the WCRF/AIRC Continuous Update Project. PubMed was searched until 1st January 2015. Random effects meta-analysis was conducted to calculate summary relative risks (RRs). For oesophageal cancer, the summary RR for an increase of 100 g/day of citrus fruits intake was 0.86 (95% CI: 0.74-1.00, 6 studies). When the only study that did not adjust for smoking and alcohol intake was excluded from the analysis, the summary RR was 0.85 (95% CI=0.73-0.99, 5 studies).

The summary RR for the highest compared to the lowest intake was 0.77 (95% CI: 0.64-0.91). Inverse but not significant associations with oesophageal squamous cell carcinoma and oesophageal adenocarcinomas respectively were observed in 3 studies that reported on cancer subtypes. For gastric cardia cancer, the summary RRs of for 100 g/day increase was 0.75 (95% CI: 0.55-1.01, 3 studies) and for the highest compared to the lowest intake, the RR was 0.62 (95% CI: 0.39-0.99). Citrus fruits was not associated with noncardia gastric cancer risk: the RR for 100 g/day was 1.02 (95% CI: 0.90-1.16, 4 studies) and 1.01 (95% CI: 0.79-1.28) for the highest compared with the lowest intake.

In conclusion, the data suggest an inverse relationship of citrus fruits intake and the risk of oesophageal and gastric cardia cancer when comparing highest with lowest intake, but no significant dose-response associations were identified. More data from prospective studies are needed to confirm any inverse association. The data don't support an association of citrus fruits intake and noncardia gastric cancer risk.

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Do warnings limit the impact of television food adverts?

Television advertising is a critical area for policy intervention given studies into its effects on children's food consumption and the current global childhood obesity pandemic. The UK government introduced regulations for TV food advertising to children in 2009 but in Brazil, statutory legislation is being impeded by pressure from the food industry. The present study investigated whether textual warnings of a) the unhealthiness of the food or b) the persuasive nature of marketing had an effect on Brazilian children's intake response, as a potential alternative strategy to regulation. 120 participants (62 male) aged 7-11 years (Mean=9.3; SD=1.19y) were recruited from a primary school in Rio de Janeiro, Brazil. In a mixed, counterbalanced design, children were exposed to two conditions: control (toy advertisement exposure) and experimental (food advertisement exposure) on two separate occasions.

The food adverts featured one of three warning exposures (no warning, health warning or persuasiveness warning). Immediately after viewing on both occasions, children completed a hunger measure and ate *ad libitum* from a selection of snack foods. All children also completed a television viewing questionnaire and height and weight measurements were recorded. Of the participants, 66.7% of children were normal weight and 33.3% were overweight or obese. There was no main effect of warning condition on baseline-adjusted intake. However, normal weight children consumed on average 20 more calories after exposure to the persuasiveness warning relative to control. This may be explained by the small proportion of children in this condition who correctly interpreted the meaning of the warning (26%).

Results imply that warnings may not protect children most affected by unhealthy food advertising (overweight/obese) and may increase consumption in some children, especially if the warning message is misunderstood.

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Influence of the School Fruit Scheme in the development of children's eating behaviors in Poland

Objectives: The School Fruit Scheme (SFS) has been created as one of the priority activities of the European Committee aiming at the improvement of the nutritional habits of children. In Poland, children receive free fruit and vegetables (F&V) portions, eaten at school 2-3 times a week. The aim of this study was to analyze SFS's impact on children's eating behaviors after first year.

Methodology: The study was conducted in first classes of primary schools in Poland among 2531 students (7-years old) on the basis of anonymous questionnaires, in schools participating in the SFS (n=1387) and control group (n=1144). The study was carried out in two stages: before launching the distribution of free F&V (October 2012) and at the end of distribution period (May-June 2013).

Results: The first year of the program contributed significantly to increase children's awareness about the link between F&V consumption with health. In the intervention group on open-ended question "What should you do in order to live a healthy life?" there was a significant increase in response: "eat vegetables" and "eat fruit", "be more physically active" and "do not eat sweets." The children, when asked what they like to eat or drink - more frequently showed fruit in the intervention group. The Scheme proved to have an influence on lowering the barriers of F&V consumption. In the second stage of the study in the intervention group were significantly less responses "I don't eat fruits because colleagues do not eat", "I prefer to eat something sweet instead of fruit" and "I don't eat vegetables because colleagues do not eat". The awareness of the recommended daily amount of F&V in diet increased more significantly also in the intervention group.

Conclusions: The results prove that ensuring free F&V portions at school is an effective strategy leading to positive changes in some eating behaviors of children.

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