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ABSTRACTS

Organized by



IFMeD

International Foundation
of Mediterranean Diet
A healthy and sustainable Future

On the occasion of the
2016 International Year of Pulses

REVITALIZING THE MEDITERRANEAN DIET

From a healthy dietary pattern
to a healthy Mediterranean
sustainable lifestyle

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BROCHURE

WELCOMING ADDRESSES AND OPENING REMARKS

The notion of the Mediterranean diet has undergone a progressive evolution over the past 50 years – from that of a healthy diet to a cultural model and sustainable diet, to a sustainable lifestyle model.

Although the fact that the Mediterranean diet is well documented and acknowledged as a healthy diet, paradoxically, it is abandoned, mainly among the young generation, in most Mediterranean countries

The erosion of the Mediterranean diet heritage is alarming, with undesirable impacts, not only on health, but also on socio-cultural, economic and environmental dimensions in the Mediterranean region. The perception of the Mediterranean diet solely as a “healthy” dietary pattern has overshadowed, until recently, its important benefits for these other dimensions, which link it to sustainable food production, distribution and consumption.

The First World Conference on the Mediterranean Diet continues these historical efforts made by scientists and friends, working together, with independent, open minds, to enhance the Mediterranean diet as a sustainable lifestyle for current times. It will foster open interdisciplinary dialogues among all participants on how to revitalize the Mediterranean diet heritage. Contributions from diverse disciplines and different cultures will provide a broader understanding of the multiplex sustainable benefits of the Mediterranean diet, to be shared with all countries in the Mediterranean, by considering the diversity of their food cultures and food systems.

It is now time, for the Mediterranean diet international community to reach a consensus on how to assess the adherence and the sustainability of the Mediterranean diet at the country level; and how to reconstruct, at least partly, a sustainable eating culture and lifestyle more suited to the times and for all Mediterranean people.

This is the consensus challenge that the Milan World Conference participants have to face and overcome together, in order to contribute operationally towards the revitalization of the Mediterranean diet, as a contemporary life style – a model of well-being that includes the principles of sustainability, food security and nutrition for all.

The IFMeD Board

Lluís Serra-Majem Antonia Trichopoulou Sandro Dernini Elliot Berry Roberto Capone

WEDNESDAY, 6 JULY

Session 1:

The Declaration of Gran Canaria on food and nutrition sustainability in the community. The island on your plate, organized by Nutrition Research Foundation-FIN, University of Las Palmas de Gran Canaria, Research Institute of Biomedical and Health Sciences, and the Project The Island on your plate; with the collaboration of the Cabildo de Gran Canaria.

Decalogue for sustainable food and nutrition in the community: Gran Canaria Declaration 2016. Lluís Serra-Majem, University of Las Palmas de Gran Canaria, Spain, on behalf of the International Working Group on Community Nutrition and Sustainability.

Around thirty national and international nutrition experts elaborated the Decalogue for sustainable food and nutrition in the community: Gran Canaria Declaration 2016, with the aim of improving food sustainability across the globe. This guide is a pioneer in the field, with worldwide significance and developed from conclusions drawn from the Community Nutrition and Sustainability Expert Meeting held at the beginning of April in the Gran Canarian municipalities of Santa Brígida and Vega de San Mateo. It is promoted by the Spanish Academy of Nutrition and Food Sciences (AEN), the Nutrition Research Foundation (FIN), the University of Las Palmas de Gran Canaria via their University Research Institute of Biomedical and Health Sciences and the “**The Island on your Plate**” Project, the Spanish Society of Community Nutrition, the International Foundation of Mediterranean Diet (IFMeD), the NGO Nutrition Without Borders and the CIBER sobre Fisiopatología de la Obesidad y Nutrición.

Moreover, the document has gained the support of over 50 institutions located throughout the world, ranging from Consumer Associations, Research Institutes, Scientific Societies, United Nations Organisations, NGOs and specialised press, that have come together to highlight the importance of Sustainable Nutrition within the current food panorama.

Public Health, Nutrition, Consumer, Social, Marine and Environmental Sciences or Tourism, points out: how ideal it is to consume local products in season to reduce the environmental footprint and the energy consumption linked to transporting goods; the value of reviving traditional recipes, buying and cooking in the company of family and friends, reducing waste and recycling adequately or prioritising plant based foods and limiting the consumption of meat, processed meat and dairy products.

Other recommendations include: the importance of utilising terrestrial and aquatic biodiversity in a sustainable manner to ensure its continuity and to maintain diet variety; take an interest in the sustainability and equity of agricultural, livestock and fishing practices; enjoy companionship and pleasure at mealtimes, always within the context of balance and moderation; and keep in mind that the Mediterranean Diet represents one of the most outstanding and emblematic examples of healthy and sustainable food and nutrition, being recognised as Intangible Cultural Heritage by UNESCO.

The Decalogue for sustainable food and nutrition point by point

1. Select and consume locally sourced foods. Choose products produced in the region made available at local markets

Transporting foods from remote locations to their points of consumption represents an important component of the ecological footprint of food, primarily due to energy consumption and its consequent contamination. Moreover, the purchase of locally sourced products in local markets has a positive effect on the local economy and its development as well as in the reactivation of the rural environment and the protection of the ecosystem and landscape.

2. Preferentially consume foods that are in season.

Seasonal foods respect favourable climatic conditions and facilitate foods with better organoleptic and nutritional characteristics. Moreover, foods bought in season are usually more economic and sustainable.

3. Revive traditional local foods and recipes.

Food education is a fundamental element for the culture and identity of people. Therefore, the protection of gastronomic and cultural heritage in the community should be seen as a priority for the sustainability of food and nutrition in and of itself.

4. Learn to buy and cook in the company of others.

Whether with family or with friends, learning healthy eating habits involves knowing about food and culinary techniques and having basic abilities for the purchase, and even for the production, of foods and ingredients.

5. Plan menus and shopping lists. Try to reduce food waste and recycle adequately at home and in the community.

Planning food purchases and menus should follow the criteria for sustainability: health, environment, economy and culture. Therefore, excess food and waste generated throughout the entire food chain (production, distribution, consumption) should be avoided. Try to adequately recycle both food waste and its packaging, putting food solidarity into practice as well.

6. Prioritise plant based foods. Limit the consumption of meat, processed meat and dairy products.

The production of animal foods (especially commonly consumed red meat, processed meats and dairy products) has an environmental footprint that is greater than that of plant foods (cereals, fruits, vegetables, legume, nuts). This is especially true for greater emission of gases having a greenhouse effect as well as increased water and energy consumption, and usage of land area. What's more, your health will also benefit from making these recommended changes.

7. Utilise aquatic and terrestrial biodiversity in a sustainable manner to ensure its continuity.

The loss of biodiversity over the last few decades in both plant and animal species may jeopardise the sustainability of the global food system and could lead to compromised food security and the deterioration in food quality and variety. The consumer, although having less responsibility for these aspects of food and nutrition, should be proactively aware of their importance and long-term significance. Look for relevant information available in shops and markets and, if you can't find it, ask.

8. Take an interest in the sustainability and equity of agricultural, livestock and fishing practices.

Sustainability is an important aspect of the entire food chain process (production, transformation and distribution) for both plant and animal products. The environment is usually more vulnerable to intensive production than to traditional systems of production, raising livestock and fishing, and therefore sustainable and harmonious food systems should be promoted.

9. Enjoy companionship and pleasure at mealtimes, always within the context of balance and moderation. Reduce portion sizes.

Companionship and pleasure are fundamental elements in the act of eating that provide it with a sense of identity. However, they should be combined with balance, variety and moderation to avoid that entertainment and festivity turn into excess and wastefulness. In a sense, excessive food and energy consumption can be considered as food waste, with important consequences for health.

10. The Mediterranean Diet represents one of the most emblematic examples of healthy and sustainable food and nutrition.

The Mediterranean Diet, Intangible Cultural Heritage of UNESCO, embodies one of the healthiest, most traditional and most sustainable food models in the world. Its preservation and promotion not only has effects on the health of individuals and communities, but also impacts on the health of the planet. Community based actions that promote healthy eating patterns based on locally available foods linked to the territory (aquatic and terrestrial), culture, equity and economy should be developed and supported.

Linking the communities of the Mediterranean islands through food and nutrition sustainability, Sandro Dernini, Forum on Mediterranean Food Cultures/FAO/IFMeD

The Decalogue for Sustainable Food and Nutrition from the Island of Gran Canaria together with the **Island on your Plate** project is a call for action to reconnect together the place of production and the space of consumption in the communities, starting from the islands of the Mediterranean. This connection between a diet and a geographic area has loosened with globalization. The Decalogue provides an operative platform to facilitate meaningful discussions among communities towards a better understanding on how to integrate sustainability and food security and nutrition within their food systems, by encouraging the development of community based actions that promote healthy eating patterns based on locally available foods linked to the territory, culture, equity and economy. Within a period of radical transformation of the contemporary global scenario, the complexity of food security, nutrition and sustainability issues and of their interdependent components requires, within the people-centered development paradigm, new forms of dialogue such as those that will be facilitated by the action plan provided by the Decalogue, as an *Open Call* for the Mediterranean islands communities for connecting themselves together, through the Island in Your Plate project, as new frontiers of life quality and well-being.

THURSDAY, 7 JULY

Mediterranean scientific cooperation across the divide, A joint presentation by Ziad Abdeen¹ and Elliot M Berry² ¹Al-Quds Nutrition and Health Research Institute Faculty of Medicine, I-Quds University, Abu Dies, West Bank; ²Dept of Human Nutrition & Metabolism, Braun School of Public Health, Hebrew University-Hadassah Medical School, Jerusalem, Israel.

One just cannot afford to keep criticizing and criminalizing those who advocate cooperation amongst communities in conflict areas. As critics themselves point out, we have to beware of escalating tensions especially in light of today's political atmosphere of mistrust and unilateralism that destroyed all vestiges of mutual trust.

The Israeli Palestinian conflict faces four major problems:

- We have more “history than geography”
- We are becoming more “nationalistic than humanistic”
- Palestinians and Israelis suffer from “physical siege and mental siege respectively”
- We are “**B**rothers and **S**isters” in blood but in reality suffer from “**B**orders and **S**ecurity” ethos
- What is peace? Is it **piece** of land or peace of mind??

Paradoxically, the majority of Palestinians and Israelis yearn for peace -- and yet expect doom and gloom. There can never be one set of rules for conflict resolution, given the complexities of the violent Israeli Palestinian century-old protracted conflict. What is fundamentally important is to acknowledge that ‘reconciliation’ at all levels, including at a grass-roots level within different communities, is the key to ending conflict and reconstructing peace.

Peace is not the mere absence of war but what contributes to the health and welfare of the populations in conflict areas, which in turn contribute to an environment that allows peace to be achieved and sustained. This is why we are cooperating in the field of health.

Scientific cooperation has no conscience. Collaboration is the key to opening doors which, until now have remained barred. It holds the future of a mutually stronger and deeper understanding not only within the scientific world, but perhaps even more importantly, within interpersonal spheres, as individuals interact to create a new reality.

Our proposed strategy is evolutionary and participatory. It attempts to reduce the gap between transactional aspects of the leadership-driven, formal talks and the needs and perceptions of the societies at large. It aims to transform historical enemies with diametrically opposed views into partners with a shared interest in the future.

We need to look deeper through evolution of our attitudes. We need to promote lives and livelihood. Our prescription for peace in the field of health is based on the acronym SMART: Sensitivity- human sensitivity; Mutuality- of interest to both parties; Appreciation; Respect; and Trust

It is our hope to continue the discussion on the critical need, for the countries of our region, to develop multi-sector and multi-stakeholder approaches – from production to consumption – by developing a network among academic and research institutions, to collaborate towards more Mediterranean sustainable food systems.

Session 2

The MED DIET 4.0: A framework for the Mediterranean diet as a sustainable diet, with four sustainable benefits, Sandro Dernini, FAO/Forum on Mediterranean Food Cultures/IFMeD

During the past years, within the international debate on sustainability, food security and nutrition, sustainable diets have emerged as a public health nutrition challenge as well as a critical issue for sustainable food systems. Sustainable diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources (FAO, 2010). The notion of the Mediterranean Diet has undergone a progressive evolution over the past 50 years, from a healthy dietary pattern to a model of sustainable diet. The new Med Diet 4.0 is as a new comprehensive multidimensional sustainable Mediterranean diet framework, in which the multiplex dimensions of sustainability of the Mediterranean Diet are highlighted together. In the Med Diet 4.0 framework the well-documented health and nutrition mayor benefits of the Mediterranean diet are incorporated with three additional sustainable environmental, socio-cultural and economic benefits: low environmental impacts and richness in biodiversity, high socio-cultural food values, positive economic return locally, with specific country variations. With its interdisciplinary multidimensional approach and easier understanding of its multiplex sustainable benefits, the Med Diet 4.0 provides a possible solution for the revitalization of the Mediterranean diet, by showing also at the same time how it is beneficial values for the individual, as well as for the planet. Despite its increasing popularity and exposure worldwide, adherence to the Mediterranean diet is actually decreasing in the Mediterranean countries. This poses serious threats to the preservation and enhancement of the Mediterranean diet heritage and its transmission to present and future generations.

The MED DIET 4.0: The Mediterranean diet with four sustainable benefits. Socio-cultural dimensions, F. Xavier Medina. Universitat Oberta de Catalunya (UOC) / ICAF-Europe.

In the developed countries, the large number of industrial processes and transformations of all kinds which food goes through before reaching the consumer, generates in the latter a blind mistrust towards it. More and more often, people pursue going back to the origins that give them credibility and calmness when it comes to eating, and concepts like “traditional”, “home-made” or “Bio” succeed. The Mediterranean Diet has been characterised, analysed and promoted through a variety of methods within a number of scientific and applied. It continues to be recognized and appreciated as a sustainable and culturally coherent diet in the Mediterranean Region. But we must always consider the Mediterranean Diet as a part of a significant social and cultural interdependent Mediterranean Food System, and never as an independent item. In this framework, the recognition in November 2010 of the Mediterranean Diet as a World Immaterial Heritage by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the start of the accession of different Mediterranean countries to the candidacy in 2013, can be an important future challenge for the Mediterranean local food productions and manufactures. After their declaration as a Cultural Heritage of the Humanity at UNESCO, Mediterranean Diet is actually being observed as a part of Mediterranean Culture and opening their concept as an equivalent of Mediterranean Cultural Food System

or Mediterranean Culinary System. A new point of view that will be capital in the future discussions about the Mediterranean Diet, their challenges and their future perspectives. But, in this framework, an eventual definition of sustainable Mediterranean Diet should address sustainability of the whole food chain, while acknowledging the interdependencies of food production systems and food and nutrient requirements. This challenge requires a lot of effort. And these efforts should focus primarily on coordination and generation mechanisms to expand and strengthen the collaboration network between backup food heritage structures and, in any case, it is for governments involved to provide urgent adaptation of safeguarding the Mediterranean diet to the period we are going through. This major challenge involves also a big public commitment to safeguarding and promotion that cannot be neglected. In this framework, the active role of the public sector (not only, but mainly) is absolutely necessary. From a local Mediterranean point of view and as a proximity model consumption, Mediterranean food and diet can be a sustainable resource for the Mediterranean Area. In this context (and as every food system in their own bio-social context), the Mediterranean Diet is an outstanding resource -locally produced in cultural coherent contexts- for the Mediterranean basin. But we must have also in mind that the Mediterranean Diet is a complex web of cultural aspects that depend on each other, and we have to remember that every link in the chain must be protected, from the production to the dish and beyond.

Environmental sustainability of Mediterranean Diet: critical literature review and gaps in analytic tool. Milena Stefanova and Massimo Iannetta ENEA, Department for Sustainability, Division of Biotechnology and Agroindustry, Italy.

Recent studies targeting public policy makers or consumers are exploring the quantitative linkages between diets, the environment and human health. In fact, the role of consumer choice as an important driver for orienting food production on a more sustainable pathway is increasingly being recognised by both public policy makers and private sector stakeholders. Therefore there is a growing need for tools, which can enable policy makers or consumers to understand the implications of different consumption models on the food system sustainability. Such tools are not justified by mere need for option ranking, rather they are epistemological devices, which help in structuring a discourse and trigger learning cycles among its users. In such a perspective, many studies address the Mediterranean diet as a sustainable food consumption model in order to inform public policy makers or consumers. The Mediterranean Diet has been studied and disseminated across the world as a healthy model for consumption. In such nutrition-health conception, the Mediterranean Diet is described in terms of dietary patterns focusing on intake of different foods grouped in several food categories. Only recently, with its recognition as a cultural heritage by UNESCO, a second culturally oriented conception of the Mediterranean Diet is beginning to be considered. In such a conception the Mediterranean Diet is emerging as a model of relations: social relations, relations with food and with nature. This presentation reviews literature studies whose aim is to inform policy makers or consumers about environmental performances of different dietary options. The ultimate goal is to design analytic tools, which help in reversing the unsustainable trend of food systems in the Mediterranean region toward models that are culturally and ecologically bound with the region. In order to evaluate the relevance of currently used analytical tools for assessing environmental sustainability of diets, approaches from the discipline of conceptual modelling have been employed. Within such approaches models are not of real-world systems but are epistemological devices relevant to debate about real world systems. Such approaches to modelling differ from those employed in engineering or classical sciences in the way the validation issue is addressed. In fact the nature of systems studied with their help is such that for various reasons modelled system performances cannot be validated by empiric observation or tests. Rather the focus is on system characteristics considered relevant for the debate about a domain perceived as problematic and validation regards relevance of such characteristics. Conceptual modelling approaches have been successfully employed in disciplines whose object of study concerns systems of human activities, such as management sciences, design of safety-critical systems and information management. Our findings indicate that the Mediterranean Diet is considered only in its nutrition-health conception within all studies analysing its environmental performances, notwithstanding of the purpose of the study its commissioner or its target

audience. All examined studies rely on some form of Life Cycle Assessment (LCA) and/or borrow heavily from the conceptual base of LCA. In this sense, the Mediterranean Diet present an option for consumer choice for a diet low in animal-based products, which can potentially lead to a positive from environmental point of view change of land-use patterns. The emerging cultural conception of the Mediterranean Diet as a model of relations has not been yet addressed in studies dedicated to environmental performances of diets. This despite the fact that in this sense the Mediterranean Diet can be considered as an option for transformation of entire food systems from landscape to consumer and not simply for restructuring of the agricultural sector. We will discuss a number of conceptual problems, related to currently used analytic tools for environmental assessment of diets, which undermine their epistemological relevance in the debate about food system transformation toward sustainability. A more general framework, which allows for expressing different points of view and assume different food system characteristics as relevant will be presented and discussed.

Session 3

Assessing the adherence to the Mediterranean diet: Building a scoring approach, Antonia Trichopoulou, Hellenic Health Foundation, Greece

The association of the Mediterranean Diet (MD) with various health outcomes, including but not limited to cardiovascular diseases, some types of cancer, as well as, total mortality has been shown in numerous studies conducted in Mediterranean countries, other European countries but also in the US. In all these studies the nutritional characteristics of the traditional Mediterranean diet, or, of diets that resemble the Mediterranean pattern have been expressed through indexes or scales. To decide which of these numerous MD indexes is “optimal” is rather difficult. In this session Indexes and scores which capture the characteristics of the MD will be presented and we will try to evaluate whether simple and web-based instruments can evaluate the adherence to Mediterranean diet.

Mediterranean diet score and cancer risk, Carlo La Vecchia^{1,2} Department of Clinical Medicine and Community Health, Università degli Studi di Milano - Milan, Italy

Various aspects of the Mediterranean diet are considered to have a favourable effect on several common epithelial cancers. These were analyzed using data from a series of case-control studies conducted in Northern Italy on over 20,000 cases of several major cancer sites and a comparable number of controls. For most digestive tract cancers, the risk decreased with increasing vegetable and fruit consumption, with relative risks (RR) between 0.3 and 0.7 for the highest versus the lowest tertile, and the population attributable risks for low intake of vegetables and fruit ranged between 15 and 40%. Fish tended to be another favourable diet indicator. In contrast, subjects reporting frequent red meat intake showed RRs above unity for several neoplasms. Whole grain food intake was related to reduced risk of several types of cancer, particularly of the upper digestive tract. This may be due to a favourable role of fiber, but the issue is still open to discussion. In contrast, refined grain intake and, consequently, glycaemic load and index were associated to increased risk of different types of cancer, particularly digestive tract and hormone-related ones. Further, olive oil, which is a typical aspect of the Mediterranean diet, has been inversely related to cancers of the colorectum and breast, and mainly of the upper digestive and respiratory tract neoplasms. When a Mediterranean diet score, originally developed by Antonia Trichopoulou et al on Greek data, was applied to our dataset, subjects in the highest score level for adherence to Mediterranean diet had 30 to 50% reduced risks of most common neoplasms, particularly of the digestive tract, but also of the liver, pancreas and endometrium.

Assessment of adherence to the Mediterranean diet with different indices, C. Bamia^{1,2}, G. Martimianaki² and A. Trichopoulou^{1,2}

¹ Hellenic Health Foundation, Athens, Greece, ² National and Kapodistrian University of Athens, Medical School, Department of Hygiene, Epidemiology and Medical Statistics, WHO collaborating Centre for Nutrition and Health, Athens, Greece

The beneficial role of MD on various health outcomes has been shown over the last decades in epidemiological studies conducted in Mediterranean, European, as well as, US populations (Schwingshackl and Hoffmann, 2014; Sofi et al., 2014). Quantification of adherence to MD in these studies has been done through indices and scores which, a) use cut-offs for classifying subjects as high/moderate/low adherers in each of the basic components of MD, and b) perform calculating algorithms, mostly simple summations, on the adherence to each component in order to assess the total adherence to MD (Bamia and Trichopoulos, 2015). These indices/scores differ, with respect to the level of detail of foods/nutrients included, (e.g. meat overall, or, red meat and poultry separated), cut-offs used (i.e., medians, pre-specified values etc), and range of values upon which individuals are ranked according to their adherence to overall MD. Moreover, most of those have been conducted within specific populations and they naturally express better the particularities of MD in these populations. Nonetheless, almost all of these indices/scores revealed favorable, statistically significant and eventually strong associations between adherence to MD and health outcomes (Reedy et al., 2014). Still, the question of which is the “best” index to express the adherence to MD remain. This is particularly challenging since there is no “objective” method to measure MD adherence, nor are there commonly-accepted criteria to evaluate each of these indices. A related issue is whether indices developed for dietary data collected and quantified with specific methods/tools are appropriate for data collected/quantified differently. We therefore investigated whether indices for MD which have been based on dietary assessment with detailed FFQs and operated on quantities (g per day, week etc) of food group/nutrient intakes are appropriate for dietary data expressed as collected with short questionnaires for quick-and-easy assessment of diet and quantified in less detail (e.g. as servings per day). We further assessed the performance of different indices that have appeared in the literature for this latter type of dietary assessment. We used data for 200 participants (convenient sample) from the Attiki prefecture in the national representative health survey, HYDRIA, undertaken in Greece. Usual diet was assessed through interviews with two questionnaires: a) a validated, detailed semi quantitative FFQ (Gnardellis et al., 1995; Katsouyianni et al., 1997), including 150 foods/beverages with pre-specified (through photographs) portion sizes, which was previously used in the Greek segment of the European Prospective Investigation into Cancer and nutrition (EPIC-FFQ) (Trichopoulou et al., 2003) and, b) a selection of questions referring to dietary habits which are included in the Baseline Nutrition Credits4Health (BNC4H) questionnaire (<http://www.credits4health.eu/>). Using the EPIC-FFQ, usual dietary intake during the previous year was estimated as g/day or ml/day for foods and beverages respectively, as well as for nutrients (g/day) with the use of a food-composition data base (Georga and Trichopoulou, 2003). With the BNC4H, number of servings per day/week, with subjective assessment of serving size, were calculated for pre-specified foods/food groups with no further quantification.

The following MD indices were constructed:

1. Using EPIC-FFQ:

The Mediterranean Diet Score (MDS_FFQ) as proposed previously by Trichopoulou and colleagues (2003), based on sex-specific medians. MDS_FFQ was considered as the index based on the most detailed quantification of dietary intakes.

2. Using data from the BNC4H (i.e., servings/day or week with no further quantification):

- a) MDS_BNC4H by applying MDS rules (i.e., sex-specific medians as cut-offs) (Trichopoulou et al., 2003).
- b) The Mediterranean Diet Index (MDI_BNC4H), based on rules and cut-offs developed by the C4H consortium.
- c) The Mediterranean Diet Assessment score (MEDAS_BNC4H) as proposed by Martínez-González and colleagues (2012). MEDAS-BNC4H is based on a questionnaire of the same nature as C4H but slightly more detailed, which was originally operated among Spanish people.

- d) The Mediterranean diet 55 score (MD55_BNC4H) as proposed by Panagiotakos and colleagues (2007). MD55_BNC4H is based on a questionnaire similar in concept to the one used by Martínez and colleagues (2012) but it was modified for the needs of the Greek - ATTICA study.

The correlation between each of the four indices which were based on data from the BNC4H questionnaire and MDS_FFQ was estimated through the Spearman correlation coefficient (SCC) overall, as well as, in specific subgroups defined by sex, age or educational attainment. Overall correlations between MDS_FFQ and the rest of the indices were positive, statistically significant and ranged from 0.19 (MDS_BNC4H) to 0.28 (MD55_BNC4H). Correlations were rather similar among men and women as well as by educational level but seemed to be higher for younger as compared to older people (for those between 18 and 30 years old: 0.39 for MDS-BNC4H; 0.54 for MDI_C4H; 0.52 for MEDAS_C4H; and 0.29 for MD55_C4H). In general MDS_BNC4H had the lowest correlation with MDS_FFQ as compared to the rest of the indices because median values of servings/week are used as cut-offs in MDS_BNC4H and these coincide with the actual values of servings/week for many individuals, i.e. a large number of ties is evident for the median values. With respect to the performance of the four indices (based on servings/day or week from BNC4H) in ranking subjects according to MD-adherence these were rather similar with some of those performing better in certain subgroups, and others performing better in other subgroups. We conclude that the type of dietary data have also to be taken into account when choosing an index to express the adherence to MD.

Assessing Mediterranean diet with the scoring approach in multi-center studies: the experience within the EPIC study Genevieve Buckland, MSc, PhD, Unit of Nutrition and Cancer, Cancer Epidemiology Research Programme, Catalan Institute of Oncology (ICO), Barcelona, Spain

Research into the health benefits of the Mediterranean diet (MD) has been aided by the development of priori MD scores, which operationalise the MD pattern as a single exposure. MD scores take into account the consumption of the essential components of the traditional MD (specific foods, broad food groups or nutrients), in order to estimate an individual's degree of adherence to this dietary pattern. Although various MD scores have now been developed, the mostly frequently applied is the original MD score developed by Trichopoulou and colleagues. This scores includes 9 key MD components and assigns 0 or 1 point to consumption below or above the sex-specific medians of intake when components fit the MD, the direction of the scoring is reversed for components that do not fit the MD. This MD score, along with its various modifications or adaptations, has been a key tool for research into the association between the MD and mayor chronic diseases within the European Prospective Investigation into Nutrition and Cancer (EPIC) cohort study. EPIC is a multi-centre cohort of approximately half a million people recruited from 10 European countries between 1992-2000, with detailed baseline information on dietary intake and lifestyle, socio-demographic and reproductive factors. Data on incident cancer endpoints and vital status are periodically collected, and additional information has been collected on incident coronary heart disease, type II diabetes, overweight/obesity and neurological diseases. The cohort's long follow-up time (average of 11 years) and thus large number of these disease endpoints and inclusion of Mediterranean and non-Mediterranean countries (resulting in large heterogeneity in degree of adherence to the MD between and also within the countries) means that EPIC is a unique setting to research the MD's effect on health parameters; to date over 20 articles in EPIC have been published in this area. However, there are many complex issues in the development, use and interpretation of MD scores, especially within multi-centric study settings such as EPIC. This presentation will discuss the experience within EPIC on developing MD scores. For instance the selection of the components of the score will be considered, in particular the controversies behind the inclusion of alcohol in MD scores when assessing cancer endpoints where alcohol is a known risk factor, and the different ways that dietary fats have been addressed in the score. Another issue to consider is the number of partitions for each component and whether the cut-offs to define high and low intake for each component should be based on country-specific, EPIC-wide, or Mediterranean-specific intakes. How to deal with MD components with a minimal intake in northern-European countries is another methodological challenge. In summary, different modifications of the original MD score have

been applied within EPIC, taking into account the specific characteristics of such a multi-centre setting and endpoints being studied. In terms of the interpretation of the MD score, it is necessary to highlight that the definition of low and high adherence to MD within the EPIC cohort is directly related to the range of intakes within this population, and at a specific point in time. There is clear evidence of erosion of the MD in many Mediterranean countries even by time of recruitment of the EPIC cohort in the mid/late 1990's, thus close adherence to a MD in this population is a 'relative' term as it may not reflect the quantities of Mediterranean foods traditionally consumed, although it remains a good reflection the overall food pattern. Despite the complexities of assessing the MD with a scoring approach within EPIC, it has facilitated intensive scientific research in this area, which has contributed to furthering our understanding on the relationship between the Mediterranean diet and health. For example, the WRCF/AICR concluded in 2007 that "currently no firm judgment can be made on any possible relationship between dietary pattern and cancer risk", however there are now several studies that have shown a clear relationship, including results from EPIC where high adherence to the MD pattern was significantly associated with a protective effect against gastric, breast and colorectal cancer risk (although more studies are needed to confirm these results). In addition, research within EPIC has confirmed the MD's role in reducing overall mortality, increasing longevity among older people, in the primary prevention of CHD in healthy populations and increasing survival after a myocardial infarction. Results from EPIC also show that the MD can help prevent weight gain and the development of obesity and reduce risk of developing type II diabetes. The potential impact of the MD on neurological diseases is an emerging field within EPIC and results are still pending. Overall, findings from EPIC underscore the potential scope for chronic disease prevention and increased longevity by following key attributes of the traditional MD.

Assessing the Mediterranean diet via an online web tool development of the Credits4health (C4H) Mediterranean diet questionnaire J. Ngo¹, L. Ribas-Barba¹, B. Roman-Viñas¹, B. Pampaloni², L. Cianferotti², ML Brandi², A. Trichopoulou^{3,4}, E. Vasilopoulou^{3,4}, L. Serra-Majem¹

¹ Nutrition Research Foundation (FIN), Barcelona, Spain, ²Università degli Studi di Firenze, Florence, Italy, ³Hellenic Health Foundation, Athens, Greece, ⁴WHO Collaborating Centre for Nutrition and Health, Department of Hygiene, Epidemiology and Medical Statistics, National and Kapodistrian University of Athens Medical School, Athens, Greece, on behalf of the Credits4Health (C4H) Nutrition Workgroup.

Background: Credits4Health (C4H) is an FP7-EC funded project (#602386) inspired in the "nudge" concept for health promotion. Using a web platform, it aims to stimulate users to increase their physical activity and adopt healthy Mediterranean-based eating habits via personalized paths derived from existing behaviours, enhancing motivation, and further reinforcing motivation through an incentive system. The purpose of the C4H Mediterranean Diet (MD) questionnaire was to identify inadequate diet patterns and diet related behaviours and to propose nutrition interventions that healthy adults aged 18-65 could address as part of the C4H online platform. The same instrument was administered before, at midpoint and after the intervention to detect the degree of change in nutrition behaviours. The C4H pilot study sites were set in Mediterranean Countries (Italy, Spain and Greece) and nutrition interventions were based on the traditional Mediterranean diet, with adaptations to local cultures. Material & Methods: Nutrition experts in the pilot sites established the Mediterranean Diet (MD) Pyramid as the standardised reference C4H project food guide. This consensus based tool (Bach et al 2011) was elaborated by experts from the Mediterranean Basin and is available in Spanish, Greek and Italian. The C4H nutrition team defined 21 nutrition key performance indicators (KPIs), specific nutrition habits and related lifestyle components that could be monitored over time. The C4H MD questionnaire was developed, adapted from the Mediterranean Diet Adherence Screener (MEDAS), which had been validated in a sample of 7146 adult Spanish subjects published by Schröder et al in 2011. However, as MEDAS did not cover all the project indicators, additional questions were added to create the C4H MD Questionnaire. The MD pyramid food groups and recommended frequencies were used to establish cut off points and enable quantitative assessment of nutrition KPI progress per study subject. These were also aligned with biweekly dietary progress assessment tools. Country specific food portions and images were maintained to respect cultural norms. Usability testing was conducted in the first

2 pilots and the final C4H MD questionnaire was implemented in the randomized controlled multicentre community trial that comprised the last phase of the project. Results: A 37-question self-administered semi-quantitative web-based FFQ was developed which addressed the following 21 C4H indicators: olive oil, fish, fruits, vegetables, legumes, cereals, sweets, nuts/seeds/olives, dairy products, meat, egg, salt, water, alcohol, fast food/junk food consumption, companionship during meals, adequate sleep, TV watching, daily breakfast, food preparation and diet sustainability. The C4H MD questionnaire was translated into the four pilot languages, was compatible with biweekly online assessment tools and took an average of 15-20 minutes to complete. Conclusion: The C4H MD questionnaire was developed to be used as a tool to meet C4H project needs. Although designed for this specific study, once validated, it could be applied to other MD studies as well as streamlined for use in mobile applications.

Session 4

Winning Abstracts. Best Communications:

Sustainability of organic and Mediterranean diets: an approach based on individual L. Seconda¹, J. Baudry¹, B. Allès¹, O. Hamza², P. Galan¹, S. Hercberg^{1, 3}, D. Lairon^{4*}, E. Kesse-Guyot¹ ¹Equipe de Recherche en Epidémiologie Nutritionnelle (EREN), Université Paris 13, Inserm (U1153), Inra (U1125), Centre d'Epidémiologie et Statistiques Paris Cité, Cnam, COMUE Sorbonne-Paris-Cité, F-93017 Bobigny, France ; ²INRA Aliss UR 1303, Ivry sur Seine, France; ³Département de Santé Publique, Hôpital Avicenne, F-93017 Bobigny, France ; ⁴Nutrition, Obésité et Risque Thrombotique (NORT) Aix Marseille Université, INSERM, UMR S 1062 ; INRA 1260, Marseille France Introduction: Mediterranean diets are often seen as promising models of sustainable diet, as described by the FAO. Besides, organic farming is seen as an alternative production system which may provide health and environmental benefits. The aim of this study is to draw up a comparative analysis of the diets of four different groups of consumers using sustainability-related characteristics. Material & Methods: Data were collected from 22,866 participants of the NutriNet-Santé study who had completed a semi-quantitative organic food frequency questionnaire and a questionnaire providing information on attitudes and motivations related to purchase. Four groups were defined according to the proportion of organic food in their diet ($\geq 50\%$ of diet from organic sources) and the adherence to the Mediterranean diet (using Sofi score, cut-off was score $\geq 11/18$). The 4 groups obtained LowOrgNoMed, LowOrgMed, OrgNoMed and OrgMed, were then compared using sustainability-based indicators. Results and discussions: Apart from the cost of the diet, OrgMed exhibited better scores. Following the Mediterranean diet substantially improved health and nutrition indicators. The adherence to nutritional recommendations was higher among OrgMed and LowOrgMed compared to LowOrgNoMed (using the mPNNs-GS score: 9.28 (95%CI=9.22-9.34) versus 8.18 (95%CI=8.15-8.21)). Body mass index mean for OrgMed consumers was almost 2 points lower compared to LowOrgNoMed. The mean of vegetable to animal protein intake ratio was 1.39 (95%CI=1.01-1.74) for OrgMed compared to 0.44 (95%CI=0.28-0.60) for LowOrgNoMed. The costs of OrgMed and OrgNoMed diets were the highest: 13.38€/d and 12.52€/d while it was 9.33€/d in LowOrgNoMed. OrgMed and OrgNoMed were also more prone to value sustainability criteria as motivations when purchasing food. They also purchased food from alternate places. Conclusion: This study highlighted the importance of continuing to promote the organic and Mediterranean diets as sustainable diets but economic issues remain.

Low versus high adherence to the Mediterranean diet in the Italian food consumption: a case study on water footprint implication L. Mistura, F.J. Comendador, A. Turrini and M. Ferrari, CREA-Council for Agricultural Research and Economics - Research Center for Food and Nutrition, Rome (Italy) Introduction: Foods are produced, processed, distributed and consumed and these actions have consequences on both human health and environment, in terms of ecological, carbon and water footprint (Tukker et al., 2006). Literature reports that food choices adhering to the Mediterranean diet could limit the environmental impact of the agro-food sector (Capone et al., 2013; Almendros et al., 2013). The aim of this

study was to compare the water footprint (WF), associated with the food consumption of a sample of Italian adults, depending on the degree of Adherence to the Mediterranean Diet (AMD). Materials and Methods: The latest Italian food consumption survey (INRAN-SCAI 2005-06) was used to estimate the AMD such as proposed by Sofi et al (2013). The survey was conducted on 3,323 subjects. Food consumption was assessed on three consecutive days through individual dietary records. WF was estimated using the values published by Mekonnen and Hoekstra (2010). The food consumption data of the adults sample (n= 2,317) were transformed into ranks distribution using the Sofi's portions cut-off points of the 9 food categories selected by the authors. The AMD Sofi's scale varies between 0 and 18. The tails of the AMD distribution were taken, i.e., the lowest (5%) and the highest (95%) percentiles, to compare the difference in WF. Student's t-test was used to test whether the difference between the means was significant ($p \leq 0.05$). Results and discussion: The mean and median of AMD ranks distribution are 10.7 ± 2.4 and 11 respectively and represent a moderated degree of adherence to the MD. Significant differences among gender were not observed. The mean of WF of the distribution is 3,719 liters. The individuals with ranks ≥ 15 ($n_1 = 114$) are the most adherent to the MD while those with ranks ≤ 7 ($n_2 = 244$) are less adherent and the mean values of WF are 3,243 and 4,347 respectively, with significant difference between the two values. The decrease is 25% whereas it is 13% when comparing to the mean value of all adults distribution. Conclusions: The results confirm that the higher the adherence to the Mediterranean Diet lower is the environmental impact in terms of Water footprint.

Knowledge and uses of wild edible plants in the rural area of El Jadida (center of Morocco): preserving biodiversity for improved moroccan diet M. Tbatou^{1*}, M. Fagroud², A. Belahyan¹, R. Belahsen¹,

¹Laboratory of Biotechnology, Biochemistry and Nutrition. Department of biology, Faculty of Sciences, Chouaib Doukkali University, El Jadida, Morocco

²Department of Agronomy and Plant Breeding, National School of Agriculture of Meknes, Meknes, Morocco

Introduction: The simplification of diets with a limited selection of high energy foods leads to loss of biodiversity and exposes the population to new health challenges related to emerging diseases. The potential of the biodiversity of wild edible plants (WEPs) to provide opportunities adapted to several public health issues is currently recognized. However, traditional knowledge related to the use of these natural resources is declining today. Objectives: The present study is a contribution to a better understanding of this phenomenon in Morocco. It aimed to evaluate and compare the impact of two factors, "age" and "gender", on the homogeneity of knowledge among the rural population of El Jadida region in Morocco. Materials and methods: An ethno botanical survey was conducted among 80 informants aged 45 and above using a semi-structured questionnaire. The data collected for each plant focused mainly on the local name, the part used and the method of consumption. The results were then analyzed and compared to those collected on 339 younger informants (18-44 years old). Results: The results showed that traditional knowledge associated with the use of wild edible plants is not homogeneous within the population of the rural region of El Jadida. Both "age" and "gender" factors may explain some of these differences. Conclusions: Understanding the distribution of traditional knowledge within a population is needed in order to guide the strategies and projects aimed at preserving biodiversity, local traditional food system and promoting sustainable use of these neglected products.

12.15-13.00 Satellite Session 5:

Mediterranean diet and fish consumption

Silvia Migliaccio, Department of Sports Science and Human Health University of Rome "Foro Italico"

Satellite Session 6:

The role of meat in the Mediterranean diet

Elisabetta Bernardi, Nutritionist, Italy

Session 7:

From the Heart to the Earth: The new Mediterranean diet sustainable pyramid

Lluís Serra-Majem, President, IFMED

The first Mediterranean Diet pyramid was developed in 1993 in collaboration with Oldways (Willett et al, 1995). With the recognition of the Mediterranean diet pattern as an intangible cultural heritage of humanity by UNESCO (November 2010), the pyramid was updated between 2009 and 2010 by a network of institutions and experts coordinated by the Mediterranean Diet Foundation in collaboration with the Forum on Mediterranean Food Cultures, *Centre International de Hautes Etudes Agronomiques Méditerranéennes* (CIHEAM), Centro Interuniversitario Internazionale di Studi sulle Culture Alimentari Mediterranee (CIISCAM), Sapienza University of Rome, Hebrew University, Jerusalem and International Commission on the Anthropology of Food and Nutrition (ICAF) (Bach-Faig et al, 2011). The International Mediterranean Diet Foundation (IFMED) was founded in November 2014 as a center of multi-disciplinary knowledge and expertise, internationally in order to re-value the Mediterranean diet. It works together with the above-mentioned and other organizations and experts who were involved in the previous revision. It has continued this consultation process of gathering scientific opinion towards an updated consensus position on a new revised representation of the Mediterranean diet pyramid to incorporate recent scientific evidence concerning the benefits to sustainability. This representation of the MDP responds to the need for a common framework among Mediterranean countries in the form of food-based dietary guidelines (World Health Organization, 2002). The event EXPO 2015 MED DIET CALL: TIME TO ACT, to take place on the 24 May 2015, at the Milan EXPO 2015 represents a major opportunity which should be taken to disseminate the MDP in support of sustainability and respect for feeding the Planet. In order to balance the worldwide interest in the MD with increasing sustainability, especially environmental concerns, the IFMED, through this updated representation of the MD Pyramid, aims to contribute to a much greater adherence to this dietary pattern and its way of life in the Mediterranean, as well as in other countries. The main goal is to shift the perception of the MD benefits from a focus on the *person* - individual benefits- to a focus on the *earth* benefits for the planet as well as its populations. This revision has fostered an interdisciplinary dialogue among scientists and experts in public health nutrition, food sciences, social anthropology, sociology, home economics, agriculture, environment and cultural heritage in order to provide a unified representation of the MD as a sustainable dietary pattern encompassing the entirety of the Mediterranean Area. This new revision of the MD pyramid is created by scientific consensus among experts and is grounded upon evidence-based research in the field of nutrition and health; concerning the healthfulness of the MDP derived from large epidemiological studies published in peer-reviewed scientific journals over the last decades. However, it should be emphasized that *no one single MD Pyramid is being prescribed*. It is suggested that each country takes the basic updated MD pyramid recommendations as a guiding general pattern, and adapts them to its own contexts and culturally established cuisine(s).

The history of Pyramids in the Mediterranean Diet Antonia Trichopoulou, President Hellenic Health Foundation, Greece

The first Mediterranean Diet pyramid was developed in 1993 (Willett et al, 1995), reflecting Mediterranean dietary traditions, which historically have been associated with good health. This Mediterranean diet pyramid is based on food patterns typical of Crete, much of the rest of Greece, and southern Italy in the early 1960s, where adult life expectancy was among the highest in the world and rates of coronary heart disease, certain cancers, and other diet-related chronic diseases were among the lowest. Work in the field or kitchen resulted in a lifestyle that included regular physical activity and was associated with low rates of obesity. The diet is characterized by abundant plant foods (fruit, vegetables, breads, other forms of cereals,

potatoes, beans, nuts, and seeds), fresh fruit as the typical daily dessert, olive oil as the principal source of fat, dairy products (principally cheese and yogurt), and fish and poultry consumed in low to moderate amounts, zero to four eggs consumed weekly, red meat consumed in low amounts, and wine consumed in low to moderate amounts, normally with meals. This diet is low in saturated fat ($\leq 7-8\%$ of energy), with total fat ranging from $< 25\%$ to $> 35\%$ of energy throughout the region. The pyramid describes a dietary pattern that is attractive for its famous palatability as well as for its health benefits. The principal objective of this pyramid is to foster discussion among international scientists and government officials with expertise in public health, nutrition, agriculture, and the environment about this culturally based dietary pattern likely to promote good health as suggested by current clinical and epidemiologic research. In 2011 a new graphic representation has been developed (Bach et al 2011). The innovations raised since the previous graphical representation of the Med Diet refers to the qualitative, cultural and lifestyle elements which are taken into account, such as conviviality, culinary activities, seasonality, biodiversity, and traditional, local and eco-friendly products. This new pyramid provides also key elements for the selection of foods, both quantitative and qualitative, indicating the relative proportions and consumption frequency of servings of the main food groups that constitute the Med Diet. The use and promotion of this pyramid is recommended without any restrictions, and the material is available in English, Spanish, Catalan, Galician, Basque, French, Arabic, Italian, Portuguese and Greek. Considering the acknowledgment of the Med Diet as an Intangible Cultural Heritage of Humanity by UNESCO (2010), and taking into account its contribution to health and general well-being, this graphic representation of Med Diet contribute to a better adherence to this healthy dietary pattern and its way of life. The graphic representation of the Med Diet as pyramids may be revised in response to new data from ongoing and future research.

Cultural and emotional dimensions of food sustainability, Carmen Pérez-Rodrigo, President Spanish Society of Community Nutrition (SENC), Spain

According to FAO, sustainable diets are those that generate reduced environmental impact, contribute to food and nutrition security as well as to healthier lives of present and future generations. They are protective and respectful to biodiversity and ecosystems, are culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy, and optimize natural and human resources.

Sustainable diets address the consumption of foods with lower water and carbon footprints, and promote the use of food biodiversity, including traditional and local foods. The major determinants of sustainable diets have been classified into 5 categories: agriculture, health, sociocultural, environmental, and socioeconomic. Changes in any single determinant category, affect other determinant categories and the sustainability of a diet. A growing body of evidence supports the health benefits of the Mediterranean diet; the analysis of the environmental impact of a Mediterranean Dietary Pattern yielded positive results compared to other dietary patterns. There is a consensus on what constitutes the traditional Mediterranean Dietary Pattern. However, several issues arise when considering the Mediterranean Diet as a healthy sustainable diet from a holistic approach. Preference for the consumption of fresh, minimally processed foods and seasonal foodstuffs maximize the nutrient content. In addition, key elements in the Mediterranean Diet, such as olive trees and grapes, are traditional foods adapted to the climatic and geographical conditions of the region in which they grow, reducing the need for extensive watering, fertilizing and pesticide use. Such crops are key elements of the landscape in many areas surrounding the Mediterranean. Encouraging the consumption of locally grown foods contributes not only to reduce the environmental burden of long-distance transportation. It also helps maintain the landscape, enhances local economy and supports local producers in rural areas. Furthermore, buying in traditional local food markets, and small shops in neighborhoods helps to fill a food basket plenty of fresh or minimally processed food products, and supports life in local communities, thus cultural diversity. Food is valued in the traditional Mediterranean Diet and a frequent topic for conversation. Conviviality is a relevant feature. Sharing the enjoyment of food, tastes, colors, food preferences or food preparation is part of the social and cultural value of meals, food and eating. Cooking, sharing food and conversation during a formal meal or an informal occasion with family and friends is a social support and builds a sense of community. It deserves adequate time and attention. Indeed, food is a connector in life and can help to life satisfaction. It must be acknowledged that the Mediterranean

Region is a vast area including many different people and cultures who share several commonalities. There is not such a single Mediterranean diet, but many. Diversity is a characteristic of the intangible space for creativity and intercultural dialogue and a common cultural heritage shared by all Mediterranean populations.

Organic foods in Mediterranean diet, Denis Lairon & Emmanuelle Kesse-Guyot, Aix-Marseille University/INRA/INSERM, & UREN/Paris 13 University, France

The new Mediterranean Diet Pyramid for Today that we collaboratively elaborated and published (Bach-Faig et al, Public Health Nutrition, 2011) highlighted some new important issues. Part of them are related to the sustainability of the Mediterranean dietary pattern, including biodiversity and seasonality, traditional, local and eco-friendly products as well as culinary activities. Indeed, the Mediterranean area, and the whole world, is facing a dramatic context, mixing high level of food insecurity and malnutrition, unhealthy dietary patterns and epidemic of obesity and related chronic diseases, as well as climate change. Thus, sustainable and eco-friendly production and consumption systems are coming on the top of the agenda as highlighted by the FAO definition of sustainable diets raised in 2010 and the recently launched 10-year Sustainable food system programme by FAO and UNEP. One can remind that the famous and healthy traditional Mediterranean food system was based until the 1950's on eco-friendly agricultural methods (without chemical fertilizers and pesticides), adapted to the local ecosystem. It is thus necessary nowadays to reconcile the Mediterranean Diet pattern with a truly sustainable way of food production and consumption. Despite this growing concern and development in agro-ecological farming (essentially organic agriculture), very limited information was available until recently concerning the patterns of eco-friendly consumption in our countries. Our groups published recently several papers describing the life-styles, food selection and consumption patterns, nutritional intakes and adherence to dietary recommendations of organic food consumers versus non-consumers thanks to the large French Nutrinet-santé cohort follow-up (PlosOne, 2013 ; Br J Nutr, 2015; Nutrients, 2015; Br J Nutr, 2016 in press). We indeed observed that the current dietary pattern of the organic food consumers is a plant-based one, with overall better nutrients and fiber intakes, within a healthier lifestyle (less smoking, more physical activity, less overweight/obesity). We thus aimed to further investigate in this large cohort of adults the relationship that could take place between the Mediterranean diet pattern (seen as a promising model of sustainable and healthy diet, as described by FAO) and the organic food pattern (as an alternative food system which may provide health and environmental benefits). We thus performed a comparative analysis of the diets of four different groups of adult consumers based on adherence to Mediterranean diet and Organic food preference using some sustainability-related characteristics. Data were collected from about 23 000 participants of the NutriNet-Santé study who had completed a semi-quantitative organic food frequency questionnaire (never, occasionally or most frequently) and a questionnaire providing information on attitudes and motivations related to purchase. Repeated 24h dietary records provided data about food consumption and nutrients intakes. We identified 4 groups according to the proportion of organic food in their diet ($\pm 50\%$ of foods from organic sources) and the adherence to the Mediterranean diet pattern (using Sofi et al score, cut-off $\pm 11/18$). The 4 groups obtained (LowOrg-NoMed, LowOrg-Med, Org-NoMed and Org-Med) were compared using some sustainability-based indicators. The Org-Med group generally exhibited better scores ($p < 0.001$). Following the Mediterranean diet substantially improved nutrition and health indicators. The adherence to nutritional recommendations was higher among Org-Med and LowOrg-Med compared to LowOrg-NoMed (using the mPNNS-GS score: 9.28 vs 8.18). Mean Body mass index for Org-Med consumers was 2 points lower compared to LowOrg-NoMed (22.9 vs 24.9). The mean of vegetable to animal protein intake ratio was 1.39 for Org-Med compared to 0.44 for LowOrg-NoMed. The costs of Org-Med and Org-NoMed diets were the highest. Org-Med and Org-NoMed consumers better value sustainability criteria as motivations when purchasing food and purchased food from alternate places. Apart for the cost of the diet, combining adherence to Mediterranean diet and consuming organic foods is associated with the highest sustainability indicators values. In turn, this data noticeably support the soundness of the implementation of the Mediterranean Diet Pyramid made in 2011, especially the addition

of sustainability/culture items. This study highlighted also the importance of continuing to promote the Mediterranean and organic diets as sustainable diets and the need to further investigate economic issues to better sustain affordability.

Fruits and vegetables, key foods of the healthy effects of Mediterranean Diet. Carlo La Vecchia
Department of Clinical Sciences and Community Health, Università degli Studi di Milano, Milan

We considered several aspects of Mediterranean diet on cancer risk using data from a series of case-control studies conducted in Northern Italy on over 20,000 cases of 20 cancer sites and a comparable number of controls. For most epithelial cancers, the risk decreased with increasing vegetable and fruit consumption, but this has to be evaluated with reference to the findings of other (mainly cohort) studies. The favourable effect of vegetables and fruit was stronger on the (upper) digestive tract, with relative risks of the order of 0.6-0.7 for the highest consumption quantiles. A number of antioxidants and other micronutrients and food components (including carotenoids, lycopene, flavonoids, proanthocyanidins and resveratrol) showed an inverse relation with cancer risk, but the main component(s) responsible for the favourable effect of a diet rich in vegetables and fruit remain undefined. Likewise, an *a priori* defined dietary inflammatory index (DII) was inversely related to most epithelial cancers, particularly of the digestive tract. Olive oil, which is the most typical aspect of the Mediterranean diet, was inversely related to the risk of several cancer sites, particularly of the digestive tract, but the role of various fats remains to be quantified. A Mediterranean diet score, including vegetables and fruit, appears to be favourable not only on cardiovascular, but also on cancer risk. This points to the importance of dietary patterns more than specific foods, food components and nutrients. **Acknowledgements** This work was conducted with the contribution of the Italian Leagues Against protagonist

Cancer and the Italian Association for Cancer Research. The work of this article was undertaken while CLV was a Senior Fellow at the International Agency for Research on Cancer.

Legumes: the “new” protagonist, Laura Rossi, Centro di Ricerca per gli Alimenti e la Nutrizione (CREA-NUT), Rome, Italy

The 68th UN General Assembly declared 2016 the International Year of Pulses (IYP) with the aims to heighten public awareness of the nutritional benefits of pulses as part of sustainable food production aimed towards food security and nutrition. The Year will create a unique opportunity to encourage connections throughout the food chain that would better utilize pulse-based proteins, further global production of pulses, better utilize crop rotations and address the challenges in the trade of pulses. The specific objectives of the IYP 2016 are to (i) raise awareness about the important role of pulses in sustainable food production and healthy diets and their contribution to food security and nutrition; (ii) promote the value and utilization of pulses throughout the food system, their benefits for soil fertility and climate change and for combating malnutrition; (iii) Encourage connections throughout the food chain to further global production of pulses, foster enhanced research, better utilize crop rotations and address the challenges in the trade of pulses. Pulse crops such as lentils, beans, peas and chickpeas are a critical part of the general food basket. Pulses are a vital source of plant-based proteins and amino acids for people around the globe and should be eaten as part of a healthy diet to address obesity, as well as to prevent and help manage chronic diseases such as diabetes, coronary conditions and cancer; they are also an important source of plant-based protein for animals. In addition, pulses are leguminous plants that have nitrogen-fixing properties which can contribute to increasing soil fertility and have a positive impact on the environment. As an excellent source of complex carbohydrates, protein and fiber, legumes are a highly satiating food. This means that for a relatively low amount of calories legumes make feel fuller longer and, therefore, help prevent the hunger that can lead to unhealthy snacking and unwanted pounds. For about 115 calories, a 1/2-cup serving of cooked lentils provides about 9 grams of protein, 20 grams of mostly complex carbohydrates and less than half a gram of fat. It also supplies nearly 8 grams of fiber, or 31 percent of the recommended daily value. Most legumes contain significant amounts of insoluble and soluble fiber. Eating legumes several times a week promotes bowel regularity and helps keep blood sugar levels in check. Legumes are sometimes called “poor people’s

meat” because they are an inexpensive source of quality plant protein having also a good vitamin and mineral profiles of legumes without cholesterol and saturated fat. For just over 110 calories, a 1/2-cup serving of cooked black beans delivers 32 percent, 15 percent and 14 percent of the daily values for folate, magnesium and thiamine, respectively, and about 10 percent each of the daily values for iron and potassium. Opting for legumes instead of meat two or three times a week promotes healthy cholesterol levels and helps protect against heart disease. Legumes are high in minerals and fiber without the saturated fat found in some animal proteins. Eating legumes as part of a heart healthy diet and lifestyle may help improve blood cholesterol, a leading cause of heart disease. Adding legumes to the diet may help keep healthy longer. In Italy low consumption of legumes is an issue. At population level less than a portion per week (0.8 p/w) is consumed with population subgroups, such as children, in which legumes are definitely not consumed. At Country level there is general efforts to promote the consumption of these foods in the Italian diet considering their importance in order to shift the proportion among animal protein source, too high, to vegetable protein source, too low. Overall, the evidence of the health benefits of legume consumption is very convincing. To have a varied and balanced diet it is appropriate to include 2-4 servings a week of legumes. The proposed limits of the frequency of consumption should not be considered as dose or level strictly fixed; the only limit is the general balance of the diet and the presence of all other foods in the right proportions. This does not mean that if we consume more we make a mistake we must read these amounts as advice as part of a diet that should include all foods. Legumes are suitable for different and various modality of consumption as a part of the local traditions as well as innovative recipes from appetizer to unique plate. Legumes are considered a time consuming products for preparation and cooking. Canned legumes could be used in order to increase the consumption of this food. Better to rinse the canned legumes with water to remove some of the excess salt; or buy canned legumes with no salt added if available.

Session 8:

The Milan Urban Food Policy Pact: an opportunity to revitalize the Mediterranean diet, in collaboration with the Milan Urban Food Policy Pact Secretariat,. Co-Chairs: Claudia Sorlini, president, president EXPO Milan 2015 Scientific Committee; Florence Egal, independent expert, Food for the Cities

Over 120 cities worldwide – 25% of which Mediterranean - have signed the 2015 Urban Food Policy Pact promoted by the City of Milan (MUFPP). They have committed to promote sustainable food systems and recognized the importance of sustainable diets and nutrition in raising consumer awareness and reorienting food supply. This political process led by municipalities requires the active involvement of academia, civil society and private sector. This session intends to promote linkages between IfMed related processes, initiatives and networks and MUFPP activities in Mediterranean cities. The concrete example of Milan will provide the basis for a discussion with participants from signatory cities and supporting institutions.

Milan Urban Food Policy Pact

Raffaella Scalisi, Milan Urban Food Policy Pact Secretariat,

Milan Urban Food Policy Pact (MUFPP) is one of the most important legacies of Expo 2015: an initiative that has achieved the goal of bringing the theme of the sustainability of the food system in the debate on urban policies as well as an operation of international relations that has positioned the city of Milan in the first row in the scenario of city diplomacy. The MUFPP is a document promoted by the City of Milan in 2015 and signed by 123 mayors from around the world - representing 450 million people - to build healthier, sustainable and fair urban food systems, underlining the value of the territorial approach for the best balance of the global food system. The rate of global urbanization is expected to rise gradually in the coming decades from 50% today, up to 70% in 2050. It is therefore crucial that cities must start a strong and concrete commitment that allows to reverse the course of two great contemporary problems: climate change and food. The Pact has been written with the contribution of 45 cities from around the world and an Advisory Group (AG) formed by some of the most important international organizations engaged to ensure a more sustainable, healthy and equitable future for the entire Planet. After signing the Pact on 15th October 2015

and the delivery of the document to the Secretary General of the United Nations, the activities have been going on in a structured and methodical manner, thus not stopping at the mere signing ceremony. A MUFPP Secretariat has been established at the International Relations Department of the Municipality of Milan in order to coordinate all MUFPP-related activities. The text of the Pact is structured into three parts. An introduction to the document that gives the background and context as well as the enunciation of the main principles and international documents for reference. A part with seven commitments aimed at developing sustainable, inclusive, resilient, secure and diversified food systems, to ensure healthy and accessible food on the basis of the Framework for Action (FFA) - which constitutes the third part of the Pact - which articulates 37 operational recommendations. These recommendations are divided into six chapters: 1) providing a favorable environment for effective action (governance); 2) nutrition and sustainable diets; 3) social and economic justice; 4) food production; 5) food supply and food distribution; 6) food waste. Thanks to the collaboration with Fondazione Giangiacomo Feltrinelli, it has been possible to realize a publication entitled *Urban Food Policy Milan Pact: selected good practices from the cities*, by the technical team of the Pact. The collection includes 49 best practices from 28 cities in the world. Each of the six sections of the Framework for Action is represented by one or more good practice from signatory cities. The theme of sustainable diets is then protagonist of MUFPP and today all the signatory cities are working together through networks and *ad hoc* platforms to exchange operational practices and replicate successful models. This is a central element of the joint work in progress and thanks to Fondazione Cariplo, in 2016 it has been set up an award (Milan Pact Awards) for the best practices in the field of food policy, as public recognition tool that can generate innovation. At the same time, we are also working to identify indicators and set up a monitoring process. Thanks to an agreement with FAO, it has been started an analytical work that, by the end of 2016, will enable cities to have indicators to measure their progress in implementing MUFPP's recommendation and activities. These indicators will be developed in tight connection with the global sustainable goals, set out by the UN for the 2030 Agenda for Sustainable Development.

Local diets for sustainable food systems, Florence Egal, independent expert, Food for the Cities

There is increased awareness that malnutrition, poverty and environmental degradation in the context of climate change are related to the food we eat and the way it is produced, processed and distributed; and that the concept of sustainable diets can provide the foundation of more sustainable food systems. Until fairly recently, people's feeding practices, in particular in rural areas, were closely related to the ecosystem they lived in. Farming practices and livelihoods were determined by natural resources (land, water, forests, coastlands...) and climate. Traditional diets reflected local lifestyles, shaped local economies and landscapes and often remain an essential dimension of people's culture. Local diets have however evolved drastically due to a variety of factors including urbanisation, technological change, expansion of market economy and international trade. While change has indeed led to increased availability of food worldwide, the prevalence of an economic development model based on value chains is being increasingly questioned. It is urgent to address simultaneously health, social equity and environmental concerns. Signatories of the Milan Urban Food Policy Pact have committed to promote sustainable diets for sustainable food systems. Local diets classically made sustainable use of local natural resources, relied on seasonal combination of plant and animal foods - whether cultivated/raised or collected/hunted from the wild - which were processed at household or local level, thereby allowing off-season consumption and trade and providing jobs and income. Traditional farming systems were risk-adverse and together with traditional solidarity networks helped people to cope with recurrent hazards. Revisiting and revitalizing traditional diets and related food systems should therefore help mayors to reorient and complement existing food systems with a view to improve health, social equity and environmental sustainability. Cities with similar ecological and cultural backgrounds would benefit from sharing knowledge, experience and lessons learnt.

The Milan Urban Food Policy Pact: an opportunity to revitalize the Mediterranean diet” - The role of nutrition professionals. Marisa Porrini, Department of Food, Environmental and Nutritional Sciences, University of Milan.

Convincing scientific evidence has shown that Mediterranean-style diets play a positive role in promoting health and preventing chronic diseases. A peculiar aspect to take into consideration is that the Mediterranean diet is much more than a healthy eating pattern: it is also an environmentally sustainable model as well as a cultural heritage that confers identity and belonging. This is the reason why we need to revitalize the Mediterranean-style diet and we can much easily attain this goal starting from the cities, where it is easier to experiment and implement operative models as well as build up strategies for a more healthy, sustainable and equitable food system. Nutrition professionals must play a central role in promoting nutrition education and consumer awareness in diverse population groups. To achieve a good fit, an inclusive and multifactorial model that involves approaches at different levels (policy, community, institutions and individuals) may be useful. Intervention plans adapted and tailored to schools, workplaces, hospitals, as well as markets, catering services and the media must be the crux of the debate. Healthy eating patterns in childhood and adolescence, for example, is a priority to promote optimal childhood health, growth and intellectual development as well as to develop eating, lifestyle and behavior patterns that may persist throughout adulthood. Schools offer an important opportunity for prevention, as they provide the most effective way of reaching large numbers of people, including not only youth but also school staff, families and community members. School-based nutrition policies and programs must be locally implemented identifying specific goals and a strategy for achieving them, and cities can play an important role in this regard. Another very important aspect to consider is that exposure to conflicting messages about the health benefits about foods, nutrients and supplements often results in confusion and backlash against nutrition recommendations. Dissatisfaction with body image and unhealthy behaviors are important issues that can worsen the situation. The high prevalence of individuals who follow unbalanced or unlikely dietary patterns emphasize the problem. Public organization and communities must overcome this problem: everyone must have access to correct, feasible, comprehensive and science-based information through multiple communication challenge.

The Milan Urban Food Policy Pact: an opportunity to restore Mediterranean diets Gabriella Iacono, sole administrator of Milano Ristorazione

School menus in the Municipality of Milan, managed by Milano Ristorazione S.p.A., a company owned by the Milan Municipal Authorities, are drawn up and elaborated in agreement with the criteria expressed in the following official documents:

- National Guidelines for School Meals (Italian Ministry for Health 2010);
- Guidelines for school meals in the Lombardy Region (ed.2002);
- Service Contract with the Milan Municipal Authorities.

Each menu drawn up respects the requirements laid down by the LARN (recommended energy and nutrient intake for the Italian population), ed. 2014, for the relative age brackets. To this end, quantity analysis is carried out of the calories and main nutrients provided by lunch and each recipe proposed: calories, animal proteins, plant proteins, saturated, monounsaturated and polyunsaturated fats, carbohydrates and fibre, respecting the LARN and adhering to the main related scientific recommendations, both for nutritional suitability for growing children, according to age, and for early prevention of metabolic diseases.

The above guidelines, adopted by Milano Ristorazione, do not refer explicitly to the **Mediterranean diet**, however the methods used for drawing up the menus are inspired by this model. The menu is elaborated on a seasonal basis (summer and winter, respectively) and each of these is then further divided into 4 weeks. The national guidelines provide indications on the optimal frequency of each food category during the week. The recipes, on either a daily and weekly basis, are organised so that they can be combined with balanced evening meals, for which Milano Ristorazione provides suggestions for families. With the aim towards encouraging all children to eat, Milano Ristorazione also adopts other criteria for its school menu formulas: the sensorial and geographic characteristics of the recipes, the colour of the meals and how they are combined for the lunch, their level of acceptance, measured via feedback from the primary school children on the selected and statistically valid consumer panel, as representatives of the school population.

Special attention is paid to the choice of ingredients, with the greatest priority going to local produce (25%) and short-supply-chain products (60%). As from the next academic year, rice from the DAM (Distretto Agricolo Milanese – Milan Farming District) will be used for school meals, with a view to even further encouraging local produce, as detailed in the Milan Food Policy improvement measures. As well as attention to the proposed menus, Milano Ristorazione is proactive in schools with a series of educational projects and initiatives. Spreading the bases for a healthy diet for schoolchildren and providing families with practical instructions for preparing recipes that include fresh, seasonal foodstuffs is the aim of the “Educating for aware consumption” programme that Milano Ristorazione has promoted in a variety of contexts. As part of this context, cookery workshops entitled “Dall’orto alla tavola” (from the allotment to the table) have been devised, a learning/educational course for families and children that teaches an eco-sustainable lifestyle and enhances meal preparation and its consumption.

The role of the Chambers of Commerce Network in promoting the food sector - the Lombard Excellencies project and the Mediterranean diet

The Lombard Chambers of Commerce Network has long been committed to the enhancement of local food chains and their products

PDO - Protected Designation of Origin and Protected Geographical Indication IGP

Traditional Products - characteristic of a given territory and the requirements of historicity

Products with territorial value (eg. South Milan Agricultural Park)

To consolidate the identity, authenticity, the quality of regional territorial excellence the Lombardy Chamber of Commerce Network have chosen the way of “*Mediterraneanness*” which means how our agricultural products – and the recipes in which they are used - reflect the principles of the Mediterranean diet. Through the project "Excellence in Lombardy" we want to emphasize what we've called "gastronomic chains": the heritage of relationships between economic operators and relationships able to express the value of a territory, its agricultural production and its historical and cultural values conveyed through the kitchen. The outputs – typical recipes nutritional cards – aim at supporting the attractiveness of the region through the union between gastronomy, environmental heritage and tourism. The activities included desk study (reconnaissance and observation of previous studies/research on local food production and the existing traditional recipes or other similar documents), field interviews and recognition, nutritional profile analysis. In particular, we analyzed any publications, papers and other information about local agricultural products covered by quality mark within the Lombardy region and their representative recipes. We've coded them for their typological characteristics, ingredients, performance, variants. After that, we catalog the agricultural and regional recipes and calculate the nutritional code for each recipes using professional tools and converted them in a graphical format that facilitate the reading and allow to highlight the most significant in terms of territorial representation and congruence with the parameters of the Mediterranean Diet. In this way we wanted to show the richness, variety and, where possible, the actuality and the pride of Lombardy agriculture and food model, often openly demonized. At the end we selected seven regional recipes able to evoke the ancient typical local cuisine food wisdom, intercept the growing trend to consume the traditional agricultural product by a always greater number of consumers that don't belong to the fast food and mass products culture and to raise the awareness of potential new lovers in the med' dietician perspective. Each recipe analysis has been accompanied by a deepening in terms of history, ingredients, curiosity in a simple and elegant infographic which displays food values, to underline the connection between wellness, nutrition and origin.

Role of the Philanthropic organizations:

Fondazione Cariplo and its contribution to the MUFPP

Fondazione Cariplo is a private philanthropic foundation operating in four areas: environment, arts and culture, social services and scientific research. Sustainable food systems and healthy diets are key topics under our strategy and we are particularly committed to promoting a holistic approach to this challenge. We are contributing to make the food systems more efficient, sustainable, equitable and supportive of healthy diets, taking into account that such systems operate within and are influenced by the social, cultural, political, economic and environmental contexts. We are committed to sustainable agriculture as a mean to help stopping the urban sprawl in the Lombardy region by creating new job opportunities and preserving the natural environment for local fruition. We are also supporting services for Community Supported Agriculture (CSA) development in peri-urban areas. Mountains depopulation and related natural disasters make sustainable agriculture also paramount in rural areas, where the Foundation is supporting projects to empower local communities on their food heritage (i.e restoration of local typical dairy and meat chains or traditional fruit growing). The Foundation is also targeting sustainable development in marginalized area and in developing and emerging countries, mainly in Africa. Sustainable food systems, empowering city-rural areas dynamics, piloting social enterprises in the agro-food sector, strengthening farming organizations at all level, boosting community gardens, tailoring inclusive finance products for small holder farmers and supporting microfinance institutions have been some of the key focus of the various supported initiatives. Finally the Foundation supports scientific research to contribute towards the understanding and the promotion of diverse agricultural production for more sustainable food systems and healthy diets, with particular attention devoted to local food products. It was in this context that in July 2014, Fondazione Cariplo and the Municipality of Milan signed an agreement aimed at developing an urban *Food Policy*, an innovative project supporting the local government in making the city more sustainable and equitable, starting from food-related issues. The long term objective is to coordinate all policies dealing with these topics from a host of different perspectives: community, welfare, education, environment, wellbeing and international relations. Cities are increasingly compelled to develop sustainable food systems and promote healthy diets. While serving as centers of economic, political and cultural innovation, managing vast public resources, infrastructure, investments and expertise, cities now play host to an increasing percentage of global population, currently estimated to be more than 50%. City-dwellers are said to have access to about 75% of all natural resources and, at the same time, account for 60- 80% of global GHG emissions across the planet. As such, and with an ever-increasing number of people to feed, cities thus exert considerable pressure on both local and global resources. Cities can therefore play a strategic role to build more sustainable, equitable and healthier food systems and should be helped in this challenging process. The *Milan Urban Food Policy Pact* is engaging a large number of cities committed to strengthen and disseminate effective solutions toward this end. Among the most recent initiatives developed under the Pact, a Milan Pact Award has been launched, as a collaboration between the City of Milan and Fondazione Cariplo. The Award is aimed at fostering technical assistance exchange in between cities in different thematic strands, including sustainable diets and nutrition. As you may see, philanthropic bodies can make a difference not just as economic resources but for the innovations they can pursue, in particular when they work together with the public sector as in the case of the Milan Food Policy. The research community, the third sectors, the private sector and other foundations represent other important stakeholders the Foundation is working with, aiming at re-localizing jobs and revitalizing local economies, managing differently the land available locally, reducing malnutrition and improving health, increasing the participation of all stakeholders in policy and planning at a local level. With particular reference to “sustainable diets”, it is now recognized that food nutritional content is directly linked to the environmental impact generated by its production, distribution, processing and consumption. Therefore it seems that public and environment health can be pursued through the adoption of diets in line with nutritionists recommendations. Nutritionists and increasingly the World Health Organization and the Food and Agriculture

Organization are also promoting the need to diversify agro-ecosystems, in order to ensure that farming systems support more diverse healthier diets. Many experts are also recommending a shift to more diverse production systems in order to meet the increasing demand for food while improving soil health, dynamic equilibrium of the agroecosystems, providing economic and social resilience of farming systems and communities, as well as nutritional and health benefits. Together with our partners we are convinced that the demonstration effect of local initiatives could have a significant influence in scaling-up more sustainable food systems and triggering policy change at a higher level.

Session 9:

Interventions to enhance the Mediterranean diet, Suzanne Piscopo, University of Malta/President, SNEB; Barbara Burlingame, Massey University, New Zealand

The Mediterranean Diet is well-accepted as a diet which goes beyond food consumption. It encompasses behaviours which promote a lifestyle that helps to reduce the risk for multiple health conditions and diseases and which facilitates overall wellbeing. Around the world, governments, research institutions, community groups, industry and not-for-profit organisations who have an interest in food, nutrition, health and/or, sustainability have been utilising the concept of the Mediterranean diet to help improve individual, family and community quality of life. From education for kindergarten teachers and parents to adult community courses, from national dietary guidelines to school food standards, and from dietary enhancement projects with the aid of industry to development of quality food labels, these and a myriad of other interventions have been implemented to encourage individuals to adopt a Mediterranean-style diet or at least embrace some of its key concepts. This session will present an array of initiatives which have been carried out in different countries to revitalise the Mediterranean diet and encourage or facilitate its adoption, as well as reflections on the various factors, including cultural and socio-economic factors, which need to be considered when formulating such actions and when evaluating interventions. Notably, interventions sometimes evolve around nutrition education and sometimes are complemented by it. Whatever the case, the educator has to be competent.

Paths to Peace through the Mediterranean diet and nutrition education initiatives, a Joint presentation by Ziad Abdeen¹ and Elliot M Berry²

¹Al-Quds Nutrition and Health Research Institute Faculty of Medicine, Al-Quds University, Abu Dies, West Bank; ²Dept of Human Nutrition & Metabolism, Braun School of Public Health, Hebrew University-Hadassah Medical School, Jerusalem, Israel. Over the years, we have tried to maintain contact and collaboration through joint supervision of students involved in public health nutrition initiatives. The focus has been on school education interventions to improve healthy lifestyle through the Mediterranean diet pattern. We will describe two projects. One involved kindergarten pupils in a suburb of Jerusalem and the other, girls from grade 4/5 in East Jerusalem. The first program gave 42 kindergarten teachers 52 hours of instruction throughout the school year for their 842 pupils. This led to a significant improvement in fruit and vegetable intake, an increase in drinking water and a decrease in sweets. Further, the children acted as “agents of change” to improve the content of the mid-morning sandwich brought from home. The second program was aimed at joint participation of pupils, their mothers and the teachers. It succeeded in improving eating breakfast, fruits and vegetables, and physical activity. There was, however, no changes in screen time. Both programs appear to be sustainable and have been adopted by the relevant Ministries of Education for scaling-up in other settings. ***Arabian Food Composition Database Needs, New Opportunities and International Collaboration*** by Ziad Abdeen¹ and Elliot M Berry² Due to the increasing trend in food imports and exports, food aid programs, preparing and consuming foreign food dishes, studies on the relationship between diet and disease, nutrition intervention projects, nutritional assessment of specific populations, food labelling and food fortification, and other nutrition-related activities, food composition data from Arab countries are an essential resource for understanding and

analyzing dietary intake data for both individuals and communities, and for developing healthy recipes and food products. This in turn requires reliable data on both the consumption of foods and their nutritional composition. The Al-Quds Nutrition and Health Research Institute at Al-Quds University can provide data on 83 nutrients in over 10,000 commonly consumed foods and composite dishes prepared by traditional cooking procedures in the MENA region. The nutrient database is primarily based on the USDA food composition database, modified appropriately with reference to local food composition tables, and supplemented with recipes of locally eaten mixed dishes. By doing so we have ensured that the units of measurement, method of selection of foods for testing, and assays used for nutrient estimation are consistent and as current as possible, and yet have taken into account some local variations. Using this common metric for nutrient assessment will reduce differential errors in nutrient estimation and improve the validity of between-Arab country comparisons.

Mediterranean diet: nutrition situation of turkey and approaches to enhance the Mediterranean diet

A. Gülden Pekcan, Hasan Kalyoncu University School of Health Sciences Department of Nutrition and Dietetics, Gaziantep/Turkey

The Mediterranean Diet (MedDiet), recognized as an Intangible Cultural Heritage of Humanity by UNESCO in 2010, has long been reported to be the optimal diet for preventing non-communicable diseases and optimizing good health. Although the MedDiet has been proposed as an optimal diet, a recent research has found that the Mediterranean countries are abandoning the MedDiet and adopting unhealthy food patterns. Recent changes in adherence to the actual Mediterranean diet include a reduction in energy intake, reduction in physical activity and a higher consumption of foods with low nutrient density. In Turkey many surveys were held at local and regional levels, showing the nutritional status in different age groups. The last Turkey National Surveys on Food Consumption and Health were conducted in 1974 and 1984. The recent survey, Turkey Nutrition and Health Survey (TNHS)-2010 is the largest and most detailed survey ever undertaken of the dietary intake and health status of people in Turkey. TNHS-2010 provides detailed information on dietary intake, physical examination including clinical and biochemical variables, physical activity status and anthropometric measurements. It was conducted in collaboration of Ministry of Health, Hacettepe University Faculty of Health Sciences Department of Nutrition and Dietetics and Ankara Numune Training and Research Hospital. In the survey nutritional status (*nutritional habits, 24-h dietary intakes, anthropometric measurements, etc.*) of the population was determined. According to the results it was found that different age and gender groups had different nutritional problems. Minimization or elimination of nutritional problems (such as; wasting, stunting, iron-deficiency anemia, iodine deficiency disorders, deficiency of folic acid and vitamin D, tooth decays, obesity, etc. and nutrition-related chronic diseases; cardiovascular diseases, hypertension, some types of cancer, diabetes, osteoporosis, etc.) are the priorities of the country. This could be done by improving and developing the environmental conditions, and by ensuring accessibility and consumption of healthy foods. Sustainable food security can be possible through training and raising awareness of the public on the subjects of food security, foods, nutrition, and health with the aim to promote health. For the improvement of nutrition and health status of the population, more comprehensive efforts are needed to increase the awareness on the MedDiet, planning and implementing intervention studies showing adherence to the MedDiet and monitoring of dietary intake of the population are needed. Nutrition education of the population on the adherence to Med Diet should be the priority. In this presentation results of TNHS-2010 and also the results of studies which applied PREDIMED (Prevención con Dieta Mediterránea) and KIDMED (Mediterranean Diet Quality Index) developed by Serra-Majem et al. in evaluating adherence to Mediterranean diet in adults, children and adolescents will be presented. As approaches to increase awareness are imported a newly developed “Turkey Dietary Guidelines” presenting “Healthy Food Plate” and “Healthy Nutrition and Physical Activity Pyramid” will be presented. Also an interesting festival called “Alacati Herb Festival” held every year in April held since 2010, to promote the traditional dishes and to keep the style of cooking alive, with cooking workshops will be presented. The program for 2016 included seminars on nutrition and diets, exhibitions,

nature walks, the selling of local products and plants, activities for children linked to the festival theme, food and cooking workshops and visits to the Wild Edible Plants Collection Garden.

Interventions to enhance the Mediterranean diet, Denis Lairon, Aix-Marseille University/INRA/INSERM, France

This presentation deals with our experience in South-East of France on how to try to revitalize the Mediterranean Diet at regional level. This project has been supported and funded by the Provence-Alps-Cote d'Azur Regional council and the Regional directorate of French Ministry of food and agriculture. In a general context of a marked decline in the adherence to the Mediterranean Diet and the present unsatisfactory dietary patterns, the project was dedicated to highlight the benefits of the Med Diet in secondary schools "lycées" (teenagers 14-18 y) and universities (students ≥ 18 y). The Regional council raised "Orientations for better eating at canteens" illustrated by an Health-Diet engagement Charter « Eating better at school » with several objectives and especially : n°1 : nutritional quality of lunches ; n°3 : quality of foods and sustainability ; n°4 : food safety and reducing losses ; n°5 : service quality. Within this general context, and based on the idea that the Mediterranean Diet could be a very relevant option, I have proposed and have been in charge to coordinate this two-steps project on Mediterranean Diet promotion. STEP 1. Project 2012-2013 : « Mediterranean Diet is good for us » The Aims and plans were : to apply concepts of Med Diet/2011 consensus ; to favor purchases from local producers and from organic agriculture when possible ; to improve teaching of youngs about diet, nutrition, health and culture ; to teach and train staffs at schools/universities ; to evaluate the impact of sessions on teenagers and young adults. The practical actions included : elaborating 3D Med Diet Pyramids / 2 seasons for canteens ; brochures (24 p) developing all pyramid items ; A3 posters for each teenager/student involved ; ppt presentations for teaching and training ; teaching university students in 11 university canteens ; downloadable numeric documents from institution internet websites. STEP 2. Projet 2014-2015 « Teaching on Med Diet for teenagers at secondary schools » The aims and plans were : to teach teenagers at 21 secondary schools in Région PACA ; to implicate canteen and administration staffs and teachers ; to evaluate the impact of sessions on teenagers . Practical actions included : Call for participation & selection of 25 pilots secondary schools around Marseille, Avignon, Nice, Toulon, Briançon ; lots of sessions and actions with 5 trained dieticians and school staffs ; evaluation questionnaires filled before/after by teenagers ; project final report. Summary of achievements : For the first time : pedagogic documents have been elaborated to promote Mediterranean Diet and on a large scale (several hundred thousands) ; thousands of teenagers and students have been involved during sessions ; 21 secondary schools and 11 university restaurants have been involved ; numerous administrative directors, teachers, nurses and chefs /or canteen staffs have been involved. Lots of Mediterranean Diet lunches have been elaborated collectively and served in numerous canteens. Based on questionnaires filled before and after actions by thousands of teenagers, we can show that : their awareness and knowledge about Mediterranean Diet was markedly improved ; Mediterranean products and recipes have been popularized ; most chefs have made Mediterranean Diet menus from various countries and teenagers mostly liked them ; after sessions and actions, about one third of teenagers declared that they are now willing to change their dietary habits in the direction of Mediterranean Diet : Great ! In conclusion, based on political will and Mediterranean Diet expertise, one can act to reverse the present negative trends and revitalize the Mediterranean Diet pattern... For a better future.

Increasing adherence to the Mediterranean diet at the Spanish universities

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Introduction: The Universitat de València (UV) participates in the "Red Española de Universidades Saludables" (REUS) [Spanish Network of Healthy Universities], one of the main aims of which is to promote healthy lifestyle among subjects studying and working at the university setting. Among healthy lifestyle factors, diet has been considered one of the most relevant. Mediterranean diet (MedDiet) is

currently considered one of the best diets to prevent disease. However, adherence to the Mediterranean Diet (MedDiet) is dropping in Spain, especially among young people, so mechanisms must be found in order to reverse that trend. Therefore one of the main projects of the University of Valencia within the framework of the Network of Healthy Universities is to promote adherence to the MedDiet. Therefore, our aims were: 1) To know the level of adherence to MedDiet among subjects working at the University of Valencia as well as the association between adherence to the MedDiet and other lifestyle and health-related variables; 2) to measure adherence to the MedDiet among students and to analyze the relationship between adherence to MedDiet and other variables; 3) to know which healthy foods are on offer in the cafeterias of the UV and the factors that underlie the choice of set meals, as well as the degree of proximity of those set meals to the MedDiet pattern; and 4) to increase educational intervention in order to increase adherence to the MedDiet at the University. Methods: We carried out three cross-sectional studies as well as a pilot intervention program to increase adherence to MedDiet. Among the cross-sectional studies, we undertook the following: 1) a study on 867 (aged 41 \pm 11 years and 44.5% males) workers (including faculty, staff and others) of the UV, that were randomly selected. Interviewer-administered questionnaires were used to assess demographic, clinical, lifestyle, dietary and health-related quality of life (HRQoL) variables; 2) a study on 700 students (aged 26 \pm 12 years) of the UV that were invited to participate; 3) A cross-sectional study on 627 users of the UV's cafeterias (218 men and 409 women; 64% students). A questionnaire was designed to assess food preferences, set meal consumption, degree of satisfaction and improvement suggestions. The 14-items PREDIMED validated questionnaire was used in each survey to measure adherence to the MedDiet. HRQoL was evaluated using the Spanish version of the 36-item Short Form (SF-36) questionnaire. Statistical analyses were carried out. Results and conclusions: For aim 1, in the study including subjects working at the UV, regarding the mean score from the 14-item questionnaire on MedDiet adherence, no statistically significant differences were found between men and women (9.4 points for men and 9.5 points for women ($p=0.467$)), but statistically significant differences were found per age group, the highest adherence being among the more elderly both for men and women. We found direct associations between higher adherence to the MedDiet and various dimensions of HRQoL. After additional adjustment for smoking, educational level, and physical activity, the highest associations were found with the mental health dimension "vitality" (B:0.73; 95% CI:0.06-1.40; $p=0.032$) followed by the physical health dimension "physical functioning" (B:0.47; 95% confidence interval, CI:0.06-0.87; $p=0.024$). In aim 2, we clearly observed a lower adherence to the MedDiet in University students (7.6 \pm 2.0 points) in comparisons with that detected in workers. In addition, adherence differed depending on the type of degree as well as on age. In aim 3, eight cafeterias were evaluated. 45% of the population had lunch in the cafeteria two or more times a week. When it came to choosing a set meal, 66.2% chose the option that they most liked instead of choosing the healthiest option. Only 17.4% chose fruit for dessert every day and a 11.5% never chose it. The offer of other foods typical of the MedDiet (vegetables, pulses, etc.), as well as the preferences in the choice of the same, were also low. Using an evaluation scale of 1 (min) to 5 (max) for whether the set meals of the cafeterias lived up to what is known as a MedDiet, only 2.5% of those questioned responded with a score of "5", whilst the majority (54% of the population) responded with a "3". Conclusions: Adherence to MedDiet at the university setting decreased with age. Among workers, higher adherence to the MedDiet was associated with higher scoring for self-perceived health. In addition to increase the nutritional education interventions, we have detected that both the offer and choice of healthy MedDiet set meals are low and must be improved.

Nutritional indicators to assess the sustainability of the Mediterranean diet

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Melbourne, Australia; ⁶ Chouaib Doukkali University, El Jadida, Morocco; ⁷ Council for Agricultural Research and Economics-Research Center on Food and Nutrition (CRA-NUT, formerly INRAN), Rome, Italy; ⁸ Hellenic Health Foundation, Athens, Greece; ⁹ Braun School of Public Health, Hebrew University-Hadassah Medical School, Jerusalem, Israel, ¹⁰ CIISCAM-International inter-university center for Mediterranean food culture studies

There is increasing evidence of the multiple effects of diets on public health nutrition, society and environment. Sustainability and food security are closely inter-related. The traditional Mediterranean Diet (MD) has been studied in-depth and recognized as a healthier dietary pattern characterized by a lower environmental impact. As a case study, the MD may guide innovative inter-sectorial efforts to counteract the degradation of ecosystems, loss of biodiversity and homogenization of the diets due to globalization through the improvement of sustainable dietary patterns with their health benefits.

A consensus position paper was recently published aimed at the definition of a suite of the most appropriate nutrition and health indicators for assessing the sustainability of diets, using the Mediterranean diet as a case study. The working group selected 13 nutrition indicators of sustainability relating to different domains: biochemical characteristics of food (Vegetable/animal protein consumption ratios; Average dietary energy adequacy; Dietary energy density score; Nutrient density of diet), food quality (Fruit and vegetable consumption/intakes; Dietary diversity score), environment (Food biodiversity composition and consumption; Rate of Local/regional foods and seasonality; Rate of eco-friendly food production and/or consumption), lifestyle (Physical activity/Physical inactivity prevalence; Adherence to the Mediterranean dietary pattern and clinical aspects; Diet-related morbidity/mortality statistics; Nutritional Anthropometry). The sustainability of food systems represents an urgent area of action for governments and international organisations and the proposed nutrition indicators form a methodological framework for designing health, education and agricultural policies in order, not only to conserve and preserve traditional diets, such as that of the Mediterranean area, as a common cultural heritage and lifestyle, but also to enhance the sustainability of diets in general.

The Mediterranean diet connects territory and health the past, the present and the future: The Apulia case study, Giuseppe Maiani, Ex CREA, Italy

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The Mediterranean diet (MD) was recognized by UNESCO as intangible cultural heritage of humanity. The term “Mediterranean diet” implies the existence of some common dietary characteristics in Mediterranean countries such as high consumption of olive oil and olives, fruits, vegetables, cereals (mostly unrefined), legumes, nuts and fish, moderate amounts of dairy products (preferably cheese and yogurt), low quantities of meat and meat products and moderate intake of alcohol (mainly wine during meals) (Bach-Faig et al., 2011). Moreover, the MD is adapted to the different nutritional and socio-economic contexts of the Mediterranean region and takes into consideration updated recommendations considering the lifestyle, dietary, socio-cultural, environmental and health challenges that the current Mediterranean populations are facing (Capone et al., 2013). The pioneer Seven Countries Study (Keys et al., 1968) and numerous recent epidemiological studies have established the health benefits associated with the adherence to the MD pattern, mainly in relation to reducing the risk of developing the metabolic syndrome, type 2 diabetes, cardiovascular diseases (CVD) and some neurodegenerative diseases and cancers (Trichopoulou et al., 2003, Serra-Majem et al., 2006, Sofi et al., 2010). But while we are still studying to better understand the peculiar health-promoting compositional features of this diet, an evolution of dietary habits has occurred over the years, with a progressive convergence in lifestyle towards the Northern European dietary profile, with an erosion of the specific lifestyle and food habits in the Mediterranean region. In Italy, during the last ten years different strategic research projects have been funded by the Italian Ministry of Agriculture Food and Forestry Policies and conducted by CREA on food quality (Food Quality project), on tools for

describing the Italian agro-food system (Biovita project) and on *biodiversity, territory and nutrition: sustainability agri-food system* (Terravita project, currently underway). Azzini et al. (2011) showed that a higher adherence to the Mediterranean dietary pattern was associated with significant improvement of multiple risk factors, including a better cardiovascular risk profile, reduced oxidative stress, and modulating inflammation. Recently the Apulia region, through CIHEAM institute of Bari (CIHEAM-Bari), has conducted two research projects for the promotion of local products: first project funded by the EU entitled *Valorization of Traditional Food Products for competitiveness and Innovation of Italian and Greek SMEs*, and the second project under Agriculture & Quality program of the Regional Government of Apulia (south-eastern Italy) aimed to enhance regional products by combining quality and sustainability. The minimum sustainability criteria taken into account include food safety (compliance with safety and hygiene requirements), quality (quality of raw materials, organoleptic properties), traceability and transparency of label information. Results of several research projects have shown a close correlation between the potential health benefit, the possible "feature" of a food and territory. The area is becoming an important "strategic factor of production and market": the promotion of products should be aimed at a sustainable production system that respects the environment and the principles of traceability from the reintroduction and enhancement of species locally grown in the past and now neglected, protecting consumer choice. In conclusion, the prospect for the future of the Mediterranean dietary style is therefore rather uncertain, and the health protective attributes of the MD may be lost even before we have fully understood the nature of the compounds and the mechanisms by which health outcomes were achieved. In addition, it is crucial to pay more attention to the preservation of traditional products and a faithful reflection on traditions of people and the Mediterranean diet for the optimization of the potential healthy benefits and supporting local agro-biodiversity.

A fruit and vegetable intervention in European schools – The PRO GREENS intervention, Agneta Yngve, School of Hospitality, Culinary Arts and Meal Science, Örebro University, Sweden; and Department of food, nutrition and dietetics, Uppsala University, Sweden.

In the PRO GREENS project, universities in 10 countries collaborated with a retail chain (ICA) and with FRESHFEL, a European organization for promotion of fresh fruit and vegetables. PRO GREENS was funded by the European Commission, DG Health and Consumers, and was coordinated from Sweden and the Karolinska Institutet. The project aimed at promoting fruit and vegetable intake among 11-year olds in a school based intervention. The countries represented were Sweden, Norway, Finland, Iceland, Netherlands, Germany, Portugal, Bulgaria, Greece and Slovenia. This project was a continuation of a previously conducted project, Pro Children, where an assessment tool for baseline and follow up of results was developed and a test intervention was performed in three countries: Norway, Spain and The Netherlands. The Pro Children assessment tool for assessing intake includes a 24 h registration and a food frequency part. For PRO GREENS, it was updated by inclusion of berries in both parts. Four of the participating countries are located in the Mediterranean Region. The project was performed in schools in all participating countries in regards to the baseline study and in all except the Netherlands for the intervention study and follow-up. The intervention was developed using intervention mapping and was based on a school based intervention with three mandatory parts and some voluntary additions. The teachers reported the intensity of the intervention (parts used in the class room, time spent etc.) The intervention included classroom tasting sessions, discussions on own intake combined with teaching about recommendations, encouragement to bring a fruit or vegetable and finally a class room or homework event related to cooking a meal or a dish using recipes from the project. The ICA retail chain provided classroom material for free which could be used without the ICA logo. The results show vast differences in fruit and vegetable intake among children from the participating countries. Results were evaluated using the WHO recommendation of >400 g/day, even though country recommendations were very diverse. The highest intakes of fruit and vegetables at baseline could be identified in Norway, Bulgaria, Sweden and Greece, ranging from 26-31% of the children reaching 400 grams per day or more. For Portugal and Slovenia, also classified as Mediterranean countries, the intake was lower at baseline – ranging from 16.8 to 21 % of

children reaching 400 grams per day or more. The intake was higher among girls than among boys in most countries, with the exception of Germany and Greece. The intervention showed that the more time the teachers invested in the project, the better the intervention results. We could also see that the intervention as such was much appreciated by the children. Vast differences in the intake of both fruit and vegetables remain after the intervention between the countries, also in regards to cooked or raw vegetables served. The intake was mediated by parental educational level and the existence of school lunch provisions. Conclusions: This intervention was as effective as its level of intensity of the implementation. The hands on sessions for children, tasting and cooking, seemed to be the most interesting parts in regards to the intervention results. The Mediterranean countries involved do not always show the highest intake of fruit and vegetables and the preparation of vegetables differs a lot between countries. The differences in educational level of parents should be taken into account when it comes to interventions on children's diet. The existence and quality of school lunch provisions is a key matter in developing a healthy and equitable intake.

Interventions to enhance the Mediterranean diet in the United States, Sara Baer-Sinnott, Oldways Preservation & Exchange Trust, USA

Oldways, the Harvard School of Public Health and an international scientific group developed and introduced the Mediterranean Diet Pyramid in 1993 at the 1993 International Conference on the Diets of the Mediterranean, organized by Oldways in Cambridge, USA. Since then, Oldways has created and implemented many different types of initiatives and programs to bring the Mediterranean Diet to Americans. This presentation will describe the different types of interventions enacted to introduce, reintroduce and revitalize the Mediterranean Diet in the United States.

Attaining health by creating development: the DiMeSa Project, Giuseppe Carruba, ARNAS-Civico, Di Cristina, Benfratelli, Palermo, Italy.

We have recently completed the DiMeSa project, a multicenter study - Valorization of typical products of Mediterranean Diet and their use for health and nutraceutical purposes - where DiMeSa stands for **Di**eta **ME**diterranea e **SA**lute, simply Mediterranean Diet and Health. The project, leaded by the The AgroBioPesca Technology Cluster, was mainly aimed at multiplying the attractiveness and market capacities of the traditional products of Mediterranean diet in regional agriculture through the development and implementation of industrial research and experimental development activities that would eventually lead to improve their health potential and that, at the same time, would validate scientifically the relationship existing between selected Mediterranean food products and health, both in terms of maintaining a well-being state and, especially, of primary disease prevention.

In this framework, we have conducted a randomized clinical trial for the assessment of the health impact of extravirgin olive oil (EVO) on 2 cohorts of study subjects represented by healthy postmenopausal women and patients with breast cancer. All subjects were recruited at the Azienda di Rilievo Nazionale e di Alta Specializzazione (ARNAS) - Civico, Di Cristina, Benfratelli (CDB). Overall, 103 healthy postmenoausal women and 35 breast cancer patients were enrolled in the study. Two different mono-cultivar EVOs, one at lower (BL) and one at higher (CS) content of polyphenols and oleocantal, were used in the study; both EVOs were produced by the SAF Department of Palermo University. As regards healthy women, after an initial one week wash-out period ("no EVO" week), the subjects consumed a daily amount of 30 ml of the BL EVO for 4 weeks, followed by another wash-out week ("no EVO") and an additional 4 weeks intervention with the CS EVO. Conversely, breast cancer patients were randomized into one BL EVO and one CS EVO intervention group that consumed daily amounts of 30 ml of either BL or CS EVO for 4 weeks. Both healthy and breast cancer study subjects, before and after any EVO intervention, undertook the following: (a) compiled a food frequency questionnaire originally developed for the EPIC study; (b) measured anthropometric indexes, including height, weight, waist-to-hip ratio; (c) were administered psychometric tests (HADS, SF-36); (d) collected both fasting blood samples and 12-hour urine samples. These latter were obtained to determine the potential effect of dietary intervention on an array of both

plasmatic and serum biomarkers, the expression profiles of a set of previously selected genes, the whole miRNome and the urinary profile of sex steroid hormones. Biological samples (plasma, serum, urine) were collected and stored in a biobank that included over 6,000 plasma/serum aliquots and 750 urine aliquots. A web-based study database was also created and data processed using advanced statistical analysis. Currently, results of the EVO trial are available, concerning specifically a series of plasmatic biomarkers, before and after dietary intervention, in both healthy women and breast cancer patients. In particular, consumption of BL EVO resulted in significant changes of various plasmatic biomarkers in both healthy subjects and breast cancer patients. In particular, the reduction of glycaemia, insulinaemia and total cholesterol levels appears of special interest. On the other hand, the consumption of CS EVO produced several modifications in selected biomarkers, including a significant increase of HDL cholesterol and reduction of LDL cholesterol. Interestingly, this EVO also induced a marked decrease of plasmatic levels of estradiol. It appears noteworthy that, when comparing the two EVOs, BL EVO appeared to be more effective in reducing glycaemia, while CS EVO proved to be more effective in decreasing plasmatic estradiol. This would imply that different EVO may have a distinct impact on either glycemic control or hormonal (sex steroid) status, also depending on the cultivar and on the phenology of fruit ripening (the earlier the stage, the greater the content of polyphenols). Results of gene expression, microRNA profiling and patterns of urinary sex steroids are currently under statistical analysis and will be presented and discussed.

Reduce the socioeconomic gaps to revitalize the Mediterranean diet, a priority challenge at a time of economic crisis. Giovanni de Gaetano, Marialaura Bonaccio, Augusto Di Castelnuovo, Maria Benedetta Donati and Licia Iacoviello, IRCCS, Istituto Neurologico Mediterraneo Neuromed, Pozzilli (Isernia), Italy.

The traditional Mediterranean diet (MD) is reportedly associated with lower risk of major chronic diseases and has long been considered to contribute to the reduced rates of cardiovascular and cerebrovascular events and to the highest life expectancy in adults who lived near the Mediterranean Sea. But despite its widely documented health benefits, adherence to the traditional MD has been rapidly declining over the last decades. Ecological studies reported a substantial shift from this eating pattern all over Europe, but more evidently in Countries of the Mediterranean area that have experienced a ‘westernisation’ process of food habits, by sharing similar patterns of non-Mediterranean food availability. Data from the “Moli-sani” study, a large population-based sample from Central-Southern Italy, showed that the percentage of people following a Mediterranean dietary pattern in 2009 was equal to the lowest rates of adherence recorded in Nicotera and Pollica studies during the Sixties (1). Moreover, the Moli-sani study has shown a dramatic shift from this dietary pattern starting in 2007, the period when the global economic crisis became manifested, with prevalence of high adherence falling from over 30% to 18% in the whole population (2). Among possible causes, the increasing cost of many key-foods of the Mediterranean diet has been proposed as a major factor, leading people to give up this eating pattern in favour of less expensive products which are usually nutrient-poor. This hypothesis is supported by previous studies, mainly produced in non-Mediterranean Countries, showing a linear relationship between food cost, eating patterns and obesity.

There is reason to believe that in a period of economic crisis the burden of socioeconomic factors might rapidly accrue to wider social gaps across the population. Early investigations have tried to predict possible health outcomes deriving from the economic crisis by analysing what already happened during previous economic downturns, whereas other studies sought to establish a link between the decrease in the adherence to the Mediterranean diet and the increase in the cost of some basic Mediterranean food items.

To date, evidence on the effect of recession on dietary behaviours has been recognized in developed Countries with large numbers of vulnerable households having reduced both the quality and the quantity of foods consumed. Overall, the interest on the possible adverse health outcomes of the economic crisis is more focused on changes in risk factors for mortality rates rather than on the nutrition-transition and the loss of protective factors (i.e. healthy diets) across socioeconomic strata within Western societies. Interesting suggestions mainly come from recent reports by non-governmental organisations showing that

diets are becoming less healthy, while fast-food companies have reported profits during the present financial crisis. Some studies have revealed that a period of recession is likely associated with a deterioration of dietary habits or with a decline of nutritional quality of foods purchased. However, other findings seem to suggest that, while the economic crisis could limit access to a bundle of healthy foods, it may also lead people to shift toward staple foods and away from products such as meat and dairy products. Thus evidence is contrasting to draw firm conclusions, but the topic surely deserves greater attention by the scientific community. Data from the Moli-sani study document how financial resources have become strong determinants of the adherence to the MD just after the recession started in 2007-2008, while they had no or limited role in the previous years (2). Consistently, evidence from a recent Italian national survey (INHES study) revealed that undesirable dietary outcome changes due to the current economic crisis were mainly reported by lower socioeconomic groups and that subjects perceiving a negative impact of the recession on their diet also showed lower adherence to the Mediterranean diet and reduced quality of grocery products (unpublished). In light of this, a fruitful reasoning on the ways to revitalize the Mediterranean diet should necessarily deal with two key-issues: first, the Mediterranean diet has become socioeconomically patterned, as already established for other quality eating models in non-Mediterranean settings, and the prominent role of financial over cultural resources in determining the adherence to this pattern should be taken into account.. Second, the current economic crisis represents a major health threat for the general population but in particular for the most vulnerable socioeconomic groups, possibly leading to wider gaps in terms of risk/protective factors across SES groups. A recent paper by Yusuf et al. reported that, although the Interheart risk score poses high-income Countries at greater cardiovascular risk, the rates of major events and death are substantially higher in low-income Countries (3). To explain this apparent discrepancy, the Authors did not include any socioeconomic evaluation of the individuals living in different Countries and economical settings. In a letter to the Editor of the New England Journal of Medicine (4) we argued that if these factors had been considered, we would likely have assisted to a greater predicted risk for the less wealthy and consequent reduced inconsistency between prediction and health outcomes. Even small income differences produce indeed a shaped gradient in modifiable risk factors with the more disadvantaged having not only more risk factors but also less protective factors. There is therefore a strong need to include socioeconomic factors in any approach aimed to revitalize the MD especially in population settings with huge social gaps.

FRIDAY, 8 JULY

Feeding the Planet: The Immaterial legacy of Milan EXPO 2015

Claudia Sorlini, President, EXPO Milan 2015 Scientific Committee, Italy

With this theme "Feeding the Planet - Energy for Life", EXPO2015 has been an important opportunity to highlight the problems related to agriculture, nutrition, health and environment and inequality between industrialised and developing countries and also between social classes of each country. Even if the scientific, cultural and social events were less celebrated on the media than the mundane ones, nonetheless thousands of initiatives have been carried out on the themes of the universal exposition, with highly participated debates. Moreover, EXPO messages were luckily presented in the same period in which important international institutions issued various resolutions also based on the sustainability. In fact the United Nations launched the 2030 Agenda for Sustainable Development (with 17 development goals) approaching the problem of sustainability in a holistic and integrated way (Sept 2015). The COP21 Agreement achieved important aims concerning climate change with the commitment of several countries (Dec 2015). Encyclical Letter 'Laudato si' of Pope Francis, caring for our common home (May 2015), deepened the themes of environmental and social ecology, the causes of hunger, the environmental impacts, the decline in the quality of human life and the global inequality. The European Scientific Steering Committee, set up by the EU to support the scientific events of the exposition, identified the seven main issues for the future research policy, the first one being "Improving public health through nutrition". Among

the several initiatives, a particular attention has been devoted to the nutrition and the Mediterranean diet, with the participation of the scientific community, consumers and farmers and other stakeholders of the food supply chain. The Italian government launched the Milan Charter with the incipit: "the right to food ...should be treated as a fundamental human right". This charter has been signed by 1.1 million people, including about 100 presidents of states and prime ministers. It urges citizens, civil society, business, local, national and international institutions to take on individual and social responsibility in order to overcome "undernutrition, malnutrition and waste, promoting equitable access to natural resources, ensuring sustainable management of production processes". After EXPO, Italian government approved some laws (on biodiversity conservation, food waste and soil consumption reduction, organic agriculture etc.), so proving its political will to give effects to the Charter of Milan. The Municipality of Milan dealt with the challenge of EXPO by setting up the Milan Urban Food Policy Pact; written by 45 Cities, 123 Cities (number under constant growth) signed the Pact, involving more than 400.000.000 citizens. This proposal comes from the consideration that cities host more than half of the world population, the urbanization process is increasing, hunger and malnutrition persist in all the cities. The urban, peri-urban and regional agriculture can contribute to supply safe food, promote biodiversity, reduce pollution, fight climate change and create a better relation between producers and consumers. The contents of this Pact are the following: ensuring and enabling environment for effective action (governance), sustainable diets and nutrition, social and economic equity, food production, food supply and distribution, food waste and dietary education. All the above mentioned authorities and many individuals agree on the fundamental importance of the agri-food systems and diet sustainability, based on a strict relation between consumers and the region products. For the Mediterranean countries the sustainability is represented by Mediterranean diet. This theme has been debated under different point of view: health conservation, prevention and cure of pathologies, food system sustainability, local and typical products of the tradition. The growing interest in the recovery of the traditional lifestyle is a proof of the positive effects of the scientific activity carried out in the Exposition. After its closure, an investigation on the nutrition habits of the students in the local universities has shown an increasing interest and attention for the food in about 30% of the subjects. This is a good opportunity to take the younger generations back towards the Mediterranean diets and to stop the dissemination of globalization-induced lifestyles, far from our traditions and very profit oriented in spite of the risks for the public health.

Session 10

A collaborative research project on Mediterranean diet in Spain.

The PREDIMED Study, organized by PREDIMED PLUS and CIBEROBN.

Lluís Serra-Majem, University of Las Palmas de Gran Canaria, CIBERObn, Spain.

The Spanish Biomedical Research Centre Network on the Physiopathology of Obesity and Nutrition (Centro de Investigación Biomédica en Red de Fisiopatología de la Obesidad y Nutrición: **CIBERObn**), is a public research consortium which was founded on November 28, 2006 financed by the Instituto de Salud Carlos III (ISCIII) and the Ministerio de Ciencia e Innovación (MICINN). The **CIBERObn** is structured around six thematic research areas, one of which deals directly with nutrition, as well as a series of transversal areas (education) and shared platforms (Fatbank, Metagenómica, Epigenómica) intended to increase the collaboration between researchers, to strengthen synergies and to boost new research lines. It brings together 31 research groups from different Spanish Hospitals, Universities and Research Centres. Its mission is to promote better knowledge of the mechanisms contributing to obesity development in order to reduce its incidence and prevalence, as well as its complications, in addition to nutrition-related diseases.

The landmark collaborative study PREDIMED, which has done so much to solidify the evidence base linking the Mediterranean diet and health, has involved 11 CIBERObn research groups. It has generated the publication of more than 200 scientific research articles in the highest ranking

international scientific journals. The PREDIMED study (PREvención con Dieta MEDiterránea), a randomized, multicenter, parallel group, single-blinded dietary intervention trial, is the largest randomized primary prevention trial showing that an intervention to promote a Mediterranean diet is beneficial against the incidence of several major chronic diseases in individuals at high cardiovascular risk, especially when improved adherence to the Mediterranean diet includes increased consumption of extra virgin olive oil and mixed tree nuts. This study was conducted in Spain with 7,447 participants and showed a significant (28-30%) reduction in the combined endpoint of heart attack, stroke and cardiovascular death. The areas of investigation derived from the PREDIMED study are conducted by CIBEROBn researchers and will no doubt have a profound impact on the population's lifestyles and cardiovascular health, among others.

Mediterranean diet and cardiovascular diseases: Major findings from the Predimed Study

Miguel Angel Martínez-Gonzalez, University of Navarra, Pamplona, CIBEROBn, Spain

The PREvención con Dieta MEDiterránea (PREDIMED) was a randomized field trial aimed to assess the long-term effects of the Mediterranean diet (MedDiet) for the primary prevention of cardiovascular disease (CVD). The unique characteristic of PREDIMED was the use of hard clinical events of CVD (myocardial infarction, stroke or cardiovascular death) as the primary end-point. We randomized 7447 men and women at high CVD risk into three diets: 1) a MeDiet with free provision of extra-virgin olive oil (EVOO), 2) a MedDiet supplemented with free provision of mixed tree nuts, and 3) a control diet (promotion of a low-fat diet). After a median time of 4.8-y of intervention 288 CVD events were observed; hazard ratios were 0.70 (95% CI, 0.53–0.91) for the MedDiet + EVOO and 0.70 (CI, 0.53–0.94) for the MedDiet + nuts compared to the control group. Hazard ratios for incident atrial fibrillation were 0.62 (0.45-0.85) and 0.89 (0.65-1.20) and hazard ratios for peripheral artery disease were 0.36 (0.21-0.65) and 0.54 (0.32-0.92) always for MedDiet + EVOO and MedDiet + nuts, respectively, versus control. Significant reductions in the risk of breast cancer (only with MedDiet+EVOO), the risk of type 2 diabetes among initially non-diabetic subjects, higher rates of reversion of the metabolic syndrome, lower enlargement of the waist circumference, better cognitive function and improvements in classical and emerging CVD risk factors were also observed with both Mediterranean diets in comparison to the control group.

Mediterranean diet, obesity and diabetes mellitus, Ramon Estruch, Hospital Clinic, University of Barcelona, CIBEROBn and Jordi Salas-Salvadó, University Rovira i Virgili, Reus, CIBEROBn

Obesity and diabetes mellitus are the main epidemics of the XXI century. Because of the high energy of fat, high-fat diets such as Mediterranean diet (MedDiet) are perceived as fattening, hence health care providers are reluctant to recommend them to overweight or obese individuals. On the other hand, interventions promoting weight loss can reduce the incidence of type 2 diabetes mellitus. However, whether dietary changes without calorie restriction also protect from diabetes has not been evaluated.

We assessed the long-term effects of *ad libitum*, high-fat, high-vegetable fat Mediterranean diets on body weight, and anthropometrics in all participants of the PREDIMED trial, and incidence of diabetes mellitus among the participants without diabetes at enrollment. A 5-year parallel-group, multicenter, randomized, controlled clinical trial was performed in primary care centers affiliated to 11 hospitals in Spain. We randomized 7,447 asymptomatic men (aged 55-80 years) and women (aged 60-80 years) who had type-2 diabetes mellitus or three or more cardiovascular risk factors, into three interventions: MedDiet supplemented with extra-virgin olive oil (EVOO) (n=2,532), MedDiet supplemented with nuts (n=2,437) or control diet (n=2,437). Energy restriction was not advised, nor was physical activity promoted. Body weight and waist circumference were measured at baseline and yearly. Incidence of new cases of diabetes among the 3,541 participants without diabetes was also recorded. Participants in MedDiet groups had good adherence to the intervention according to self-reports and biomarker analyses. After 5 years of intervention, median total fat intake represented 37% of energy in the control group and 42% in the two

MedDiet groups ($P < 0.0001$; both). Participants in all three groups marginally reduced body weight and increased waist circumference. Adjusted differences in 5-year changes in body weight in the MedDiet with EVOO and nuts groups were -0.43 (95% confidence interval, -0.86 to -0.01) and -0.08 (-0.50 to $+0.35$) kg, respectively, compared to the control group. Respective differences for the changes in waist circumference were -0.55 (-1.16 to -0.06) and -0.94 (-1.60 to -0.27) cm. In addition, during follow-up, 80, 92, and 101 new-onset cases of diabetes occurred in the MedDiet supplemented with olive oil, MedDiet with nuts, and control diet groups, respectively, corresponding to rates of 16.0, 18.7, and 23.6 cases per 1000 person-years. Multivariate-adjusted hazard ratios were 0.60 (95% CI, 0.43 to 0.85) for the MedDiet with EVOO and 0.82 (CI, 0.61 to 1.10) for the MedDiet with nuts compared with the control diet.

Conclusion: A long-term intervention with an unrestricted-calorie, high-fat, and high-vegetable fat Mediterranean diet was associated with decreases in body weight and less gain in central adiposity compared to a control diet. A Mediterranean diet enriched with EVOO but without energy restrictions reduced diabetes risk among persons with high cardiovascular risk.

Interactions between gens and Mediterranean diet, Dolores Corella, University of Valencia, CIBEROBN, Valencia, Spain

Introduction: There are many studies that show that the response to the same diet is not equal in everyone. There are several factors (i.e., sex, age, diet, physical activity) that may contribute to that differing response. Great importance is placed on genetic variability in relevant genes for each phenotype studied. At the end of 1990s, the study of gene-diet interactions generated great interest and in the 2000s a new discipline, called Nutritional Genomics began. Our research group has been pioneering and heavily involved in the progress of this discipline. We have undertaken several studies focused on specific foods or nutrients showing several gene-diet interactions in determining intermediate cardiovascular risk phenotypes (plasma lipids, body mass index, blood pressure, etc). However, diet is a complex environmental factor as hundreds of macronutrients, micronutrients and other food components are ingested together. Currently, instead of analyzing specific nutrients, more relevance is placed on the study of the whole dietary patterns. On the other hand, numerous meta-analyses of genome-wide association studies have identified new single nucleotide polymorphisms (SNPs) related to cardiovascular risk factors and diseases. However, additional information on how environmental factors modulate the effect of the SNPs on their specific outcomes is scarce. Diet is one of the main environmental factors interacting with genes in determining different genotypes. Therefore our aim was to analyze whether the whole Mediterranean diet (MedDiet) pattern (both observationally measured and intervention with MedDiet) interact with the genetic risk modifying the risk of diseases (both at intermediate and at final phenotype levels). Methods: We have analyzed gene-Mediterranean diet (MedDiet) interactions in more than 7,000 high cardiovascular risk participants (aged 55-80 years, who fulfilled at least one of two criteria: T2D; 3 or more cardiovascular risk factors) in the PREDIMED (PREvención con DIeta MEDiterranea) trial both at baseline and after follow-up. We have focused on intermediate and on final cardiovascular disease phenotypes after 4.8y of median follow-up. Among genetic factors we have selected those SNPs more relevant in determining each analyzed phenotype. Results and Discussion: We have found several gene-diet interactions between the MedDiet intervention on stroke incidence (involving the TCF7L2 and LPL genes) and myocardial infarction (MLXIPL). Likewise, we have detected several gene-MedDiet interactions on plasma lipids and glucose involving several genes: SORT1, TRIB, MYLIP, CITED2, CAPN3, KLF4, TRPS1, PLEC1, PDE3A, CTF1, PGS1 and ERGIC3, among others. Outstanding among the detected interactions is that we showed that MedDiet intervention modulated the effects of the TCF7L2-rs7903146 C>T polymorphism on stroke incidence. Thus, TT subjects had a higher stroke incidence in the control group ($P = 0.006$ compared with CC), whereas dietary intervention with MedDiet reduced stroke incidence in TT homozygotes (adjusted HR 0.96 [95% CI 0.49-1.87]; $P = 0.892$ for TT compared with CC). The importance of these results lies in the fact that they constitute the first report in which it is shown that a dietary intervention, in this case the MedDiet, is capable

of counteracting a genetic risk of disease. A Likewise, although the PREDIMED study reported that intervention with the MedDiet reduced CVD incidence, statistically significant results were not found for isolated myocardial infarction (MI). Nevertheless, in a later gene-diet interaction study, we did show the protective effect of the MedDiet in a group of individuals with a certain MLXIPL (Max-like protein X interacting protein-like) genotype. This gene, also known as ChREBP was described as a new locus associated with TG in a GWAS. We found that the minor allele of the intergenic rs17145738 polymorphism, located downstream of MLXIPL, was associated with significantly lower plasma TG concentrations. Later a functional variant consisting of an amino acid change (rs3812316, C771G, amino acid change Gln241His) in this gene was described. The two variants rs17145738 and rs3812316 are in high linkage disequilibrium. In the PREDIMED study, we observed a strong association between the rs3812316-MLXIPL polymorphism and lower TG concentrations (in carriers of the minor allele) in the whole population. Moreover, we found a statistically significant gene-diet interaction between the MLXIPL-rs3812316 polymorphism and baseline in determining hypertriglyceridemia. When adherence to MedDiet was high the protective effect of the variant allele against hypertriglyceridemia was stronger. However, when adherence to MedDiet was low, the protection did not reach statistical significance. More importantly, when we analyzed the association between this polymorphism and CVD, we observed that the minor allele was associated with protection against MI. However, this protective effect was only significant in subjects of the intervention with MedDiet group. This genetic protection was lost in the control group. These results show that the MedDiet is not only capable of counteracting a greater genetic susceptibility to CVD, but that in those cases where a genetic variant provides protection, that genetic protection may be lost if a MedDiet is not followed. On the other hand we also have reported gene-MedDiet interactions not only on cardiovascular disease incidence but also on diabetes incidence including that involving a polymorphism in the CLOCK gene. **Conclusions:** MedDiet modifies the effect of relevant SNPs on cardiovascular outcomes.

Session 11:

The Challenge of mainstreaming the sustainability of the Mediterranean diet within Mediterranean national dietary guidelines, Jacques Delarue, Chairman of FENS

Task Force on Mediterranean Networking, Department of Nutritional Sciences, Brest University, France
Dietary guidelines usually give advice to the population about the better food choice to maintain good health with reference to the groups of food. Food choice does not only depend on the awareness of the consumer of his own health, but also on cultural traditions of his country or community, availability and quality of foods and, especially when food is fully available, on his individual preferences. Even though food-based guidelines are established on the basis of nutritional science, it should not neglect other aspects, which are also derived from other type scientific knowledge, i.e. environmental and resource aspects of food consumption. Sustainability has becoming a major field of interest since food production has hugely increased especially in developed countries from the forties. The consequences of that increase in food production (use of energy, water, minerals, increase in greenhouse gases, pollution of grounds, use of pesticides ...) are well-known by people in charge of politics and are more recently better understood by populations. However, countries having included sustainability within their food-based dietary guidelines are scarce. Some countries have tried, but failed to concretize for many reasons. Generally, it has been proved that reduction of meat consumption and production, increase of plant-derived foods consumption, local consumption of food produced, and organic farming increase sustainability. Among diet patterns corresponding to many of these criteria, Mediterranean diet has been shown to have a lower environmental impact, mainly due to its consumption of more plant-derived products and less animal products. This environmental beneficial effects of Mediterranean diet have been reported in original studies and as well as during International conferences over the recent years. In spite of its beneficial healthy effects and recommendations, Mediterranean diet adherence is decreasing worldwide because of many factors including changing of lifestyle and multicultural influences. Mediterranean diet pyramid has been revisited

to take this evolution into account. As highlighted by Dernini & Berry, "It must be emphasized that there is not one single Mediterranean diet, but rather a number of variations on a basic theme adapted to individual country cultures. Therefore, the Mediterranean diet is more than just a defined diet, but it represents the plurality of various cultural expressions of different Mediterranean food cultures and lifestyles.". Thus, there are many reasons to defend Mediterranean diet pattern without excluding other food system, which could also have beneficial health effects and environmental advantages. A mean to increase adherence to Mediterranean diet would be to introduce sustainability within food-based recommendations at least in Mediterranean countries. The aim of this session organized by FENS is to try to delineate how to mainstream the sustainability within food-dietary guidelines. With many thanks to colleagues from Spain, France, Italy, Lebanon and Morocco who kindly accepted to meet this friendly challenge.

The Mediterranean Diet in the New SENC Food Guide Pyramid in Spain

Carmen Pérez-Rodrigo, President, Spanish Society of Community Nutrition (SENC), Spain

Dietary Guidelines are very important tools for food and nutrition policy, as well as public health. The Spanish Society of Community Nutrition (SENC) has completed the process of review and updating of Dietary Guidelines for the Spanish population, that lasted for two years. Throughout 2015, the new icon and related content have undergone a process of discussion and qualitative evaluation with the sectors involved and citizen groups. This edition of the Dietary Guidelines promotes the idea of sustainable diets in tune with the territory, based on the following points:

1. Prioritize plant foods. The basis of the daily diet should consist of vegetables, legumes and fruits. Consumption of grains, nuts, seeds, and healthy fats to a lesser extent is recommended.
2. Reduce the consumption of meat. The production of beef is responsible for much of the of greenhouse gas emissions. It also implies increased consumption of feed, water, land use and fossil fuels.
3. Prioritize the consumption of fish obtained under forms of production not abusive or disrespectful with the environment.
4. Eat seasonal and local foods. It is therefore recommended to buy in local markets or check the labeling about the origin of foods.
5. Be more aware of your food choices. Prefer environment friendly products that contribute to sustainability in all its dimensions.
6. Seasonal and local products represent decisive action within the framework of sustainability.
7. Friendly atmosphere. The possibility of eating in company and participatory cooking improves the nutritional profile of food habits and strengthens the emotional ties between people who share food, cooking tasks and living space.
8. The timing and duration of meal times are important. Dedicate adequate space for eating.
9. Comfortable dietary recommendations and advice.
10. Assess nutritional labeling when buying food and making food consumption choices.
11. Hygiene and food safety.
12. Food Solidarity. We recognize food as a right and this was reflected in the Declaration of Cadiz.
13. Prioritize food purchases in nearby stores, local markets and community closeness supplies.
14. Reduce waste. Avoid waste due to lack of systematic planning in buying and / or preparing food.

Mainstreaming the sustainable (Mediterranean??) diet into French dietary guidelines

Monique Romon, President, Société Française de Nutrition

The French official dietary guidelines are published under the National Nutrition and Health program. The most recent version was published in 2002 and relies on 9 benchmarks. A new version will be published at the end of 2016. This version will be developed under the responsibility of the Agency for Food Environmental and occupational Health and Safety (ANSES) created in 2010.

Guidelines do not refer to Mediterranean diet, France being not a Mediterranean country except for the Southern part, so the adequacy of Mediterranean diet as "sustainable" for France should be questioned:

traditional diet in Northern part of France is rather a Nordic diet, furthermore educing milk product source of vitamin D is questionable in the Northern part of the country with a very low sun exposure.

What is more annoying is that both guidelines do not discuss environmental concerns. Fortunately, the INRA-INSERM research teams in Marseille have published interesting studies, which will power the discussion. Sustainable diets are defined as nutritionally adequate safe and healthy, culturally acceptable, financially affordable and with low environmental impact. Using the data of INCA2 cross-sectional dietary survey it was recently shown that 20% of French adults had diets that could be called more sustainable because they combined a higher nutritional quality and lower GHEG with no increase of diet cost. However the main factors identified to result in more sustainable diet were reduced energy intake and reduced energy density. Using the same data, the INRA-INSERM research team assessed by using diet modeling with linear programming the compatibility between the reduction of dietary GHGE and some other dimensions of diet sustainability, namely nutritional adequacy, cultural acceptability (the population mean observed diet was considered as a proxy for a culturally acceptable diet) and affordability. The authors have demonstrated that GHGE may be reduced by 30% without requiring major dietary shift and reaching nutritional adequacy. However reaching nutritional adequacy at higher GHGE reduction would require profound changes that are not culturally acceptable.

These studies underline that the concept of sustainable diet cannot be introduced into dietary guideline without the concept of sustainable agriculture, sustainable food system and moreover, better skilled consumers.

From dietary consumption to dietary guidelines in Italy: a way to declinate Mediterranean diet principle, Laura Rossi, Member Board of Directors, Italian Society of Human Nutrition (SINU), Italy

The Reference Levels of Energy and Nutrients (RDAs) for the Italian population and the Italian Guidelines for Healthy Nutrition are the most modern and effective food policy instruments. Two consensus documents that represent the shared position of the world of science in all its meanings, Academy, Research Institutes, Scientific Societies that operate in the field of food and nutrition. The RDAs refer to the recommended intakes of energy and nutrients, taking into account specific conditions of age, sex, etc. The drafting of the RDAs is based on the concept of nutritional adequacy of the diet. A proper diet should be able to (i) preventing nutritional deficiencies; (ii) allowing adequate body stores of nutrients; (iii) keeping human body functions at optimal levels; (iv) preventing the onset of nutrition-related pathologies. The Guidelines are intended to protect the health in situations where socio-economic factors have determined overabundance of resources and consequent effects on human health. The two instruments are interrelated: the Guidelines that translate into practical instructions how to meet the nutritional requirements set by the RDAs.

The opportunity and the need of a periodic review of the Guidelines could be easily explained. In fact, in line of continuity with previous editions, there is a need of updating the continuous development of scientific knowledge on the role of single nutrients and the minor components of the diet and its needs and mutual relations in the context of a balanced diet. Secondly, there should be take into account, the change of consumption habits and lifestyle behavior, in the context of a society that increasingly shows attention to correlations between diet and health. Thirdly, the increasing interests towards the correlations among nutrition and diseases related to usual diet excessive and/or unbalanced and the confusion and misinformation about the roles and functions of food and nutrients.

Two hot, compelling themes for the next revision of the Italian Guidelines will be the environmental impact of food consumption and the economic cost to the consumer of a healthy diet. These issues will therefore be addressed in dedicated chapters that from 10 of the present version of Guidelines will be increased to 13. In fact, food poverty and new vulnerability of the population sub-groups lead more and more public health workers to give indications that are also commensurate with ability to pay. Some foods may be too

expensive for large sections of the population; on the other hand there are plenty of food choices that are both healthful than be faced without burdening the family budget. The sustainability of food systems is another hot topic that will be addressed in the next revision of the Guidelines. Although currently there is enough food, food production is creating environmental problems in different ways and the long-term sustainability of food production is becoming an increasingly important issue. While these areas are not close nutritional relevance is appropriate to consider them and new guidelines should promote a model not only healthy but also sustainable. The Italian Guidelines for healthy nutrition are built on the basis of Mediterranean diet principles, a model that has gained fame and honour, being the model that combine prevention of NCDs, longevity, health combined with consumers' acceptability. Foods variety vary from country to country, as well as eating habits. The possibility for realization of a healthy diet as part of a healthy lifestyle is a possible challenge. It is now possible to declinate the principles of Mediterranean diet according to local foods and eating habits. The structuring of the Italian Guidelines follows the same methodological approach of the US Guidelines. A special committee of scientists is responsible for the structuring of a scientific dossier representing the cultural basis for the development of the policy document, articulated and addressed to a large audience. The statement of the policy document is then translated into a synthetic leaflet, graphically appealing, to wider dissemination.

Developing sustainable national food-based dietary guidelines based on the Lebanese Mediterranean diet, N. Hwalla¹; S. El Labban¹; R. Bahn¹, American University of Beirut, Lebanon

The global development agenda for 2016-2030 has identified 17 Sustainable Development Goals (SDGs), of which four are related to and can be addressed by sustainable food consumption and sustainable diets. Countries of the Middle East and North Africa (MENA) region need to address the SDGs, to which they have committed through formal voting at the UN General Assembly, by shifting towards more sustainable food consumption and production patterns. Hence, adopting sustainable diets should aim to promote simultaneously food security as well health and well-being of populations, while being protective of the environment and preserving of its resources. For example, a strong association has been reported between low consumption of protective foods and increased risk of cardiometabolic diseases across all MENA countries. These protective foods share many characteristics with the Mediterranean Diet (MD) (fruits, vegetables and beans, nuts and seeds, whole grains, and seafood omega-3 fatty acid). Substantial evidence from prospective studies and meta-analysis has consistently pointed to the protective effect of MD against several non-communicable diseases. In particular, the traditional Lebanese diet has been analyzed in terms of its resemblance to the MD and its protective effect against chronic diseases. Adherence to the LMD was significantly associated with a lower prevalence of metabolic syndrome among Lebanese urban adults. Food-based dietary guidelines (FBDGs) have been traditionally developed and used as a tool to direct healthy eating, however environmental sustainability was not considered. Therefore, countries of the Mediterranean basin are encouraged to provide their populations with FBDGs that preserve their Mediterranean heritage and satisfy both components of health and sustainability within the context of MDs. Consequently, developing national sustainable FBDGs (SFBDGs) based on the traditional MD would constitute an important step towards sustainable food consumption patterns and delivering to the promise made to the international community on SDGs.

The Challenge of mainstreaming the sustainability of the Mediterranean diet within Mediterranean national dietary guidelines, Reikia Belahsen, Federation of African Nutrition Societies (FANUS), Lab. of Biotechnology, Biochemistry and Nutrition. Training and Research Unit on Nutrition & Food Sciences. Chouaib Doukkali University. School of Sciences. El Jadida, Morocco.

Studies that have focused on the Mediterranean diet, have often shown a relationship between the virtues of this dietary model and the different pillars that characterize it in terms of the beneficial effects on the health, nutrition, environment, biodiversity, social and cultural and economic values.

However, the changes that have affected the Mediterranean society in the southern rim as well as that in the northern side imposes reflection on the relevance of this relationship and on these pillars. In this sense, it would be quite legitimate to wonder about the degree of sustainability of this diet and its respect for the environment. This presentation aims in a first step to elucidate a few problematic and underlying issues of the sustainability of this diet in this case the evolution of the food consumption profile. It would also be important to raise few essential perspectives for the implementation of a homogeneous Mediterranean diet pyramid incorporating both the contrasts and specificities of different countries in the Mediterranean area.

Session 12

The Mediterranean diet as a sustainable lever linking production and consumption in the Mediterranean region, within the framework of the 2030 Sustainable Development Agenda. Alexandre Meybeck, FAO; Roberto Capone, CIHEAM-Bari

Sustainable food consumption and production is at the heart of the Sustainable Development Goals (SDGs). It is also an essential way to implement them, to make them real. The Mediterranean diet, thanks to its characteristics, and because it is an essential part of the identity of the region can play a major role in the implementation of the SDGs. Sustainable food consumption and production is obviously linked to SDG2, food security and improved nutrition, and SDG3 good health and well-being. Given the importance of agriculture for economic development, particularly of the poorest countries and populations it has a major role to play for SDG1, eradication of poverty, SDG8, promote economic growth and decent work for all, SDG10, reduce inequalities, SDG5, achieve gender equality. Because of its interaction with ecosystems and use of natural resources, sustainable food consumption and production is also essential to the realization of SDG6, sustainable management of water, SDG13, action to combat climate change and its impacts, SDG14, conserve and sustainably use the oceans, seas and marine resources, SDG15, protect, restore and promote sustainable use of terrestrial ecosystems. Finally, it is also emblematic of SDG12 itself, ensure sustainable consumption and production patterns, because everybody consumes food every day. The Mediterranean diet, can play a major role in the implementation of all these SDGs. It is widely acknowledged as a healthy diet. It is also increasingly recognized as having a relatively lower impact on the environment, because of its sobriety, both in absolute and in animal products which have generally a higher impact, on land, water, and GHG emissions. It valorizes the diversity of foods, particularly plants and fish, thus contributing to the conservation and sustainable management of agrobiodiversity. As it is linked to geography, to territories, it contributes to valorize landscapes and their products, directly and indirectly through tourism and specific recognized qualities, thus contributing to rural development, economic and social. It thus directly links sustainable consumption to sustainable production, integrating health and the three dimensions of sustainability. Within the framework of the 2030 Sustainable Development Agenda, it can act, as a powerful driver towards sustainable food systems, rooted as it is in the very identity of the Mediterranean region.

Sustainable food consumption and production in the Mediterranean region in a resource-constrained world, Gianluca Brunori, University of Pisa, Italy

There is a growing consensus that transition to a sustainable economy needs addressing consumption as well as production. Addressing only production, in fact, would not stop the pressure on resources, even in a context of increased efficiency. For food consumption the principle of 'sufficiency' is more understandable and acceptable than for other consumption items, as there is a clear physical individual limit to consumption and clear implications for health. Education, communication and information are the keys to behavioural change, together with an improved understanding of the 'choice environment' of consumers. The implementation of the principle of sufficiency, however, raises several problems, as it implies interfering

with personal freedom and cultural diversity. For this reason, policies aiming at sustainable consumption should be framed in a 'food democracy' frame, wherein issues related to food consumption are subject to public deliberation involving all interested parties and aimed at creating shared views over the common good.

The current landscape of food production, trade, consumption in Europe and the Mediterranean region, Aida Turrini, CREA, Italy

Production, trade (import-export) and availability for consumption provide the background to synthesize whether the population has the possibility to follow a Mediterranean eating pattern. Sustainable from the nutrition point of view means lower energy, higher diversity, more vegetable than animal components. Sustainable for environment means less import than export. At first a glance to the nutrients sources of daily energy in the food available for human consumption reveals a big difference between Europe and the Northern African countries facing the Mediterranean sea. Carbohydrates represent the 67% energy providers in the daily allowance of Northern African countries vs. the 17% in Europe (20% in Southern Europe). Energy from fats is quite higher in Europe (35%) vs. Northern Africa (19%), but the real big difference is between energy from alcohol in Europe (36%) vs. Northern Africa (2%). Southern Europe shows a little bit higher percentage of energy from fat (39%) and a little bit less of energy from alcohol (28%) but always higher than Northern Africa. Differences occur from one shore to another of the Mediterranean sea. This must be taken into account in planning food chain policy and import-export analysis. When looking at the vegetable and animal contribution to daily energy the percentage provided by vegetables is 88% in Northern Africa vs. 73% in Europe (74% in Southern Europe). 13% (Europe) vs. 7% (Northern Africa) from vegetable oils. Do the most important crops in terms of contribution to daily intakes also represent the highest domestic production? Using the food balance sheet data the contribution of domestic production to the whole food input (before the utilization) and which is the non-human feeding in the utilization phase, which is the amount of waste are indicators of the regional food chain management, influencing the food availability. Differences in percentage of domestic production occur. A way to look at this is synthesised in the table below where the highest and the minimum contribution to the available per-capita daily energy are reported compared to the percentage of domestic production expressed as percentage of the total input (production + import). "Cereals – excluding beer" is the major energy provider in all countries, having the highest importance in Northern Africa countries where the lowest contribution of domestic production occurs. The reverse is for "sugar crops" representing the lowest contribution to the available per-capita daily energy, but covered at 100% by the domestic production in Northern Africa Countries. These crops are not exported but manufactured (84% of the utilization) for the domestic consumption. While Cereals are the indubitable main crops, the minors vary according to the regional food habits. Culture and socio-economic conditions need to be considered, and consumption data provide clues on the overall trends. Finally, part of the foods remains not utilized for human consumption as it is wasted. Vegetal foods are prone to this food chain waste conditioning the environmental sustainability if wastes are not used as compost. Availability does not directly imply "intake" as wastes occur at retail (remainders) and home (kitchen and plate left-overs) but it is a proxy at country level to consider for analysing national trends as people eat what is in shops not else. These aspects are important for countries that need to modify the trade balance for system sustainability, but ultimately also to intervene on the trend in food consumption to modify the quality of diet, manage food safety issues, and environmental impact for the quota determined by food consumption patterns. Overall, several elements provided by national statistical figures synthesizing available goods for food consumption for the entire population. The subsequent step will be verify how much the individual behaviours are reflected in those statistics. In this way policies will gain a validated information basis almost worldwide and all the years delivered.

Promoting sustainable Mediterranean food systems for good nutrition and health. The MEDINA project, Marie Josephe Amiot-Carlin, coordinator Medina Project, and the Medina-Study Group, Nort, Aix-Marseille Université, INRA, INSERM, Campus Santé La Timone, 27 boulevard Jean Moulin, 13385

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Context: In most Mediterranean countries, food security seems to be assured in quantitative supply. However, most diets are unbalanced, with the co-existence of micronutrient deficiencies and the massive emergence of diet- and lifestyle-related chronic diseases. A major determinant of the actual situation relies on food choices, increasingly driven by the worldwide dominant agro-industrial sector. In contrast, there is a progressive erosion of the local cultural heritage. To ensure regional food security, ambitious agricultural, food and health policies need to be designed based on local resources, taking advantage of the diversity and complementarities of the territories and incorporating qualitative aspects. **Objectives:** The Medina project aims to (i) show how diets in Southern France and Tunisia could be optimized in terms of nutrient adequacy in a sustainable way and (ii) propose scenarios for improvement to policy makers. The specific objectives of the project are to (i) evaluate the nutritional potential of the current food systems in Mediterranean areas, with a focus on food diversity (local agro-biodiversity and traditional know-how) as a source of dietary diversity and quality (ii) identify the changes needed towards better nutrition in respect of a friendly environmental production (iii) build viable and acceptable scenarios to promote these changes and maximise agro-food chain contribution to human health and nutrition in a sustainable way.

Results: In the first step, the Medina-study group has implemented methods to study food and nutritional security at both national and local levels to compare the supply and the consumption. Dietary data from French (INCA2, n=1899) and Tunisian (TAHINA, n=7209) national studies on food consumption were used to evaluate the percentage of compliance to the food-group intake recommendation of the Mediterranean Diet Pyramid (MDP). Clearly, a better adherence to MDP (expressed as servings and translated in quantities) favoured the adequacy of intakes of 29 macro- and micronutrient intakes. Only a small proportion of Mediterranean population complied with the recommended intakes especially for some critical food groups by excess (sweets, fat), or by under-consumption of specific food-groups (nuts, legumes). Nutritional adequacy depends not only on nutrient intakes but also on the bioavailability, which strongly varies with nutrients source (plant- or animal-origin). The animal-to-plant ratio of diets is challenging since animal-sourced foods provide key nutrients (proteins, iron) with higher bioavailability but less friendly environmentally. Our results showed that bioavailability may be compromised but is not necessarily low when plant foods are predominant in the diet such as proposed in the MDP. Food balance sheet from FAO revealed that food security was insured in terms of nutrient adequacy supply, except for calcium and vitamin D. However direct subventions to Tunisian families and indirect ones by lowering the prices of basic food products (wheat, milk, seed oils, sugar and tomato paste) failed in delivering healthy diets. At local level, an agricultural and food security survey interviewed a sample of rural 577 women living in the Sidi-Bouzyd governorate (Centre west region of Tunisia). Our preliminary results questioned the idea that family farming has a positive impact on food security, and emphasize the role of women in household decision-making and income generation. In this population, the contribution of Wild Edible Plants (WEPs) to building sustainable food systems is currently explored. **Conclusions:** Territorial strategies combining health-socioeconomic-environment goals should be explored to improve the compliance with the MDP.

The Mediterranean diet as a leverage linking production and consumption in a sustainable manner, Fatima Hachem and Sandro Dernini, FAO, Cairo

Food security, nutrition and sustainability are at the heart of the strategic framework of FAO and CIHEAM. In 2011, the Mediterranean diet has been identified by CIHEAM and FAO as a joint case study for characterization and assessment of the sustainability of food consumption patterns and diets in the Mediterranean area. An approach that promotes sustainable food systems (from production to processing, distributing, marketing and consumption of food) can contribute to food security and nutrition in a sustainable manner. The sustainability of food systems is a prerequisite condition for the realization not only of food and nutrition security, but also to environmental, economic and social sustainability in the Mediterranean region. **Objective:** To continue the discussion on the critical need, in the countries of the

Mediterranean area, to develop multidisciplinary studies and researches on the adherence and assessment of the sustainability of the Mediterranean diet at the country level, by fostering the development of a network among academic and research institutions, to facilitate synergies in their efforts towards more Mediterranean sustainable food systems, from production to consumption.

The International Foundation of the Mediterranean Diet (IFMED)

The International Foundation of the Mediterranean Diet (IFMED) was founded in 2014 with the following objectives:

- To **enhance and advance Mediterranean Diet** as an healthy and sustainable lifestyle model, while at the same time protecting and safeguarding the traditional Mediterranean Diet as an intangible cultural heritage;
- To **act as an international pole** of multi-disciplinary knowledge and expertise on the Mediterranean Diet;
- To **operate internationally** as an **independent guarantor** for scientific, economic and institutional actors interested in supporting and pursuing the Mediterranean Diet, for its cross-cutting nutrition/health, environment, economic and sociocultural values and benefits;
- To **be** internationally a well-recognized **scientific and inspiring professional benchmark** on the Mediterranean Diet promoting and developing events, research projects, policies, training and initiatives of scientific divulgation and technical cooperation, both on a national and global scale;
- To **valorize the Mediterranean healthy foods** and the variety of the Mediterranean food cultures, expressed by the Mediterranean Diet;
- To **encourage intercultural dialogues and exchanges** between the Mediterranean Diet heritage and other food cultural heritages, in different parts of the world, to increase mutual understanding with the underpinning goal to contribute to the improvement of the well-being of humankind.

After two years of endeavours this First Congress on the revitalization of the Mediterranean diet represents a first IFMED milestone and the beginning of a roadmap that will drive us towards the consecution of its objectives.

POSTER SESSION

MEDITERRANEAN DIETARY PATTERN AND INCIDENCE OF NEPHROLITHIASIS: THE SUN PROJECT, A. Leone¹, A. Fernández-Montero^{2,3,4}, C. de la Fuente^{2,3,4}, M. A. Martínez-González², S. Bertoli¹, A. Battezzati¹, M. Bes-Rastrollo^{2,3,4}

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Topic: 4. Promoting the Mediterranean Diet lifestyle pattern

Introduction: Dietary habits play an important role in the pathogenesis of nephrolithiasis. However, no study has investigated the impact of Mediterranean dietary pattern (MDP) on the risk of nephrolithiasis.

Material & Methods: A prospective study on 15824 Spanish men and women from the SUN Project (Seguimiento Universidad de Navarra/University of Navarra Follow-up [SUN] Project) was conducted. Recruitment began in 1999, and is ongoing. Participants were classified as having incident nephrolithiasis if they were free of nephrolithiasis at baseline and reported a physician-made diagnosis of nephrolithiasis during follow-up. A validated 136-item food frequency questionnaire was used to assess adherence to the MDP at baseline. The MDP score positively weighted the consumption of vegetables, fruit and nuts, cereal, legumes, fish, the monounsaturated- to saturated-fatty-acids ratio and moderate alcohol consumption, whereas meat or meat products and whole-fat dairy were negatively weighted. The score, which ranges from 0 (minimal adherence) to 9 (maximal adherence), was categorized into 3 groups (0-3, 4-6, and 7-9 points). Cox hazards regression, adjusted for sex, age, BMI, lifestyle, water intake and hypertension, was used to assess the relationship between the adherence to the MDP and the risk of nephrolithiasis.

Results: After a median follow-up of 9.6 years, 723 new cases of nephrolithiasis were recorded. The multiple adjusted HRs (95%CI) of nephrolithiasis for the 2 upper categories of adherence to the MDP, using the lowest one as reference, were 0.92 (0.78-1.08) and 0.63 (0.47-0.86) (P for trend=0.007). The risk of nephrolithiasis decreased with increasing consumption of dairy products, vegetables, fruit and cereals and increased with increasing MUFA/SFA ratio.

Conclusion: MDP was independently associated with a decrease in the risk of incident nephrolithiasis. This potential protection has been scarcely assessed so far. Additional longitudinal studies are needed.

ADHERENCE TO MEDITERRANEAN DIET OF PEOPLE ATTENDING TO AN EVENT PROMOTING TRADITIONAL AND LOCAL TUSCANY FOOD, S.Corradini¹, P. Marchetti², M.Azadegan², K.Nardi²

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Introduction: A traditional Mediterranean diet consisting of large quantities of fresh fruits and vegetables, nuts, fish and olive oil—coupled with physical activity—reduces the risk of heart disease, certain cancers, diabetes, Parkinson's and Alzheimer's diseases. The aim of our study is to evaluate eating habits of a group of subjects who participated in an event dedicated to local food comparing with ISTAT (Statistic Italian National Institute) data of the same year and verifying their adherence to the Mediterranean diet.

Material and Methods: 238 subjects, 140 women and 98 men, were interviewed with questionnaire of adherence to Mediterranean diet developed by Sofi et al.. This questionnaire has nine items on food groups. At the end, score says grade of adherence to Mediterranean Diet (1-6 low, 7-12 moderate, 13-18 high adherence). We use Student's T-test and Chi-squared test with statistically significance $p < 0.005$.

Results and Discussion: 61% interviewees have medium adherence to Mediterranean diet, 33% high adherence and 6% poor adherence. The study of eating habits showed that our sample shows significant differences comparing with the average of the Italian population (ISTAT) regarding vegetables, cereals, alcohol consumption and BMI (Body Mass Index). It wasn't possible to compare other food groups for different division of food and consumption frequencies.

Conclusion: Most of the interviewees has a medium-high adherence to Mediterranean diet; it can be assumed that people who participate in events dedicated to valorize the traditional and local food with activities aimed at informing and promoting a healthy diet are generally more aware and sensitive to their eating habits than the Italian average.

ADHERENCE TO MEDITERRANEAN DIET AND BODY COMPOSITION IN A SAMPLE OF NONAGENARIANS, G. Bonaccorsi¹, F. Santomauro², C. Lorini², F. Sofi^{1,3}, R. Molino-Lova³, F. Vannetti³, C. Macchi^{1,3}

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Introduction. Nonagenarians represent a peculiar age group, different from people of lower decades. Few epidemiologic studies have specifically focused on it, and only some of them investigated body composition and dietetic pattern. The aim of this study was to analyse the correlation between the adherence to Mediterranean Diet, body mass index (BMI) and body composition in a sample of nonagenarians.

Material & Methods. In the Mugello area (Florence, Italy), a representative sample of nonagenarians was enrolled in a survey aimed at investigating different health issues. In this study, we have examined their nutritional status (BMI), body composition (through specific bioelectrical impedance vector analysis – BIVAsp - which implies standardizing the resistance and reactance values based on the cross sections of the body together with the height), and the adherence to Mediterranean Diet (through MedDietScore).

Results. All the measurements were obtained in 298 nonagenarians (87 males and 211 females; mean age: 92.8 ± 3.0 years). For each examined variables, no statistically significant differences were observed by gender and age. BMI mean value was 23.5 ± 4.4 kg/m². The mean values of BIVAsp parameters were: 337.2 ± 96.8 ohm cm for specific resistance (Rsp), 32.2 ± 11.7 ohm cm for specific reactance (Xcsp), 338.9 ± 96.9 ohm cm for specific impedance (Zsp), and 5.6 ± 1.8 degrees for phase angle (PA). The mean value of the MedDietScore were 34.3 ± 3.6 .

The MedDietScore was significantly correlated with BMI ($r=0.138$; $p=0.02$), Rsp ($r=0.144$; $p=0.01$), Zsp ($r=0.144$; $p=0.01$). Rsp and Zsp mean values significantly increased by quartiles of MedDietScore, as follow: from 315.4 ± 94.1 ohm cm in the first quartile to 357.3 ± 99.0 ohm cm for Rsp and from 317.2 ± 94.3 ohm cm to 358.9 ± 99.1 ohm cm for Zsp.

Conclusions Our study produced findings relevant to specific nutritional aspects of the eldest part of the population, that are not been investigated yet.

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HOW TO PROMOTE THE MEDITERRANEAN DIET IN A WORKSITE CANTEEN: BARILLA'S "SI.MEDITERRANEO" PROJECT, Marilena Vitale¹; Marta Angela Bianchi²; Rosalba Giacco³; Angela Giacco¹; Gabriele Riccardi¹.

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Introduction: Workplaces are considered a suitable setting to improve dietary habits, by increasing the availability of foods characteristic of the Mediterranean Diet (MD) and promoting their selection. The aim of this study was to evaluate the effectiveness of a nutritional education

program, based on a low-cost intervention promoting food choices typical of the MD, on the eating habits of the employees in a work-site canteen.

Material & Methods: A pilot intervention was performed on 750 employees of the Barilla Company (Italy), who consumed their lunch at worksite-canteen daily. The Mediterranean Diet was proposed as a model of healthy dietary pattern. An educational campaign on the beneficial effects of wholegrain, legumes and fish consumption and the detrimental effects of excessive red meat and animal fat intake was developed and actively promoted with panels, totems, table mats and handout leaflets. To encourage people's consumption of the healthier Mediterranean dishes, nutritional information was provided on the menu and a specific logo was applied to the healthy choices. Habitual dietary habits were evaluated by a self-administered 24-h-recall at baseline, at the end of intervention and after 6 months.

Results: The analysis of the food-items selected day-by-day by the employees showed that the intake of wholegrain-cereals, legumes and white-meat increased at the end of intervention (+58%, +135%, +35%, respectively), while the intake of refined-cereals and red-meat decreased (-10%, -16%, respectively). The analysis of 24-h-recalls showed several beneficial dietary changes, including an increase in dietary fiber (+5%) and polyunsaturated fatty acids intake (+6%), and a decrease in saturated fatty acids (-4%) and added sugar consumption (-7%). These findings were confirmed after 6 months from the intervention ($p < 0.05$). No difference was observed for vegetables and fruit consumption.

Conclusions: The increased availability and promotion of foods characteristic of the Mediterranean Diet (MD) at the worksite is able to improve the eating habits of the employees in the long term.

A PHASED, INTEGRATED APPROACH IN SUPPORT OF THE MEDITERRANEAN AGROFOOD TRADITION: RECHARGING YOUTH TO REVITALIZE THE AGROFOOD SECTOR IN GREECE, Maria Kapsokefalou, Alexandros Koutsouris, Epameinondas Paplomatas
Recharging the Youth Leadership Team, Agricultural University of Athens, Greece

Rethinking on the revitalization of the Mediterranean Diet requires interdisciplinary and intercultural approaches that involve the sustainable growth of the agrofood sector in the Mediterranean region. In Greece pressures of the economic crisis have generated the momentum to create new opportunities for the unemployed youth. Targeting the new generation of educated, ambitious, yet untrained entrepreneurial talents we launched a phased, comprehensive approach to study and implement programs that support youth using as primary metric for success youth employment in the agrofood sector.

At the Agricultural University of Athens we explored ten sectors of the agrofood for their existing and future capacities. In aquaculture is difficult to establish production branches due to high initial capital investment and lack of credit opportunities; alternative small scale units must be investigated. For table olives and organic farming lack of marketing strategies is an obstacle; collective schemes and new marketing channels are needed. Propagation materials is a sector with limited opportunities in terms of the numbers of units that can be established. Apiculture may begin as a part-time job to be developed as a full time occupation on a later stage. Open-air vegetable production seems more attractive than green-house vegetables due to requirements of initial capital investment. Within dairy, the establishment of units for the production of yogurt, in comparison of other dairy products, seems to be preferable in terms of initial capital investment. Overall, opportunities for youth engagement in the agrofood sector exist; strong networks of intellectual

and practical support will allow the revitalization of the agrofood production and of the Mediterranean lifestyle and diet.

1Research was conducted with support from the Stavros Niarchos Foundation under the "Recharging the Youth" initiative, in a partnership of the Agricultural University of Athens, the American Farm School, and Rutgers, The State University of New Jersey.

THE RELATION BETWEEN ADHERENCE TO THE MEDITERRANEAN DIETARY PATTERN AND DEPRESSION: A SYSTEMATIC REVIEW, M. Haji Mohammad-Ebrahim Ketabforoush¹; A. Rezazadeh².

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Introduction: Depression is a common mental disorder that lack of attention to this disease may have consequences that it not only decreases the patients' quality of life but it can also lead to suicide. Due to many side effects resulting from anti-depressants, recently the main focus of researchers has been focused on diet as a modifiable lifestyle factor in order to prevent depression, as well as improving its symptoms. The aim of present study is to systematically review the relationship between adherence to the Mediterranean dietary pattern, as a healthy and preventive diet, and depression.

Material & Methods: The electronic databases PubMed, Scopus, Google scholar, Science direct, Genesis Library were searched for relevant articles, using combinations of the following search terms: Mediterranean diet, Mediterranean pattern, Med Diet Score, Depression, Depressive disorder, Depressive symptoms, Psychological distress, Mood. English articles were selected through the years 2009-2016.

Results: Overall, a total of 323 articles were found, however with the removal of repeated and irrelevant articles, only 20 were remained based on the inclusion criteria.

Studies have shown that adherence to the Mediterranean diet inversely associated with incidence of depression ($P_{trend} < 0.05$). A study has shown that there is a decline of one percent in annual incidence rate of depression for every 5 units of increase in the score of adherence to Mediterranean diet ($P < 0.05$). Another study has shown that moderate adherence to Mediterranean diet can lead to a decline of 25-30% in the risk of depression ($P_{trend} < 0.05$). Some studies have shown that adherence to the Modified Mediterranean diet directly associated with improvement and reduction in depressive symptoms in patients with depression ($P < 0.05$).

Discussion and Conclusion: With regards to the results of studies, the Mediterranean diet can potentially have anti-inflammatory and anti-oxidant effects. Therefore, it can prevent decline of B

DNF (Brain-derived neurotrophic factor) gene expression by pre-inflammatory cytokines, $TNF-\alpha$ (Tumor Necrosis Factor- α) as well as other inflammatory factors and it seems Mediterranean diet with this mechanism could prevent depression development and show modifying effects on the intensity of depressive symptoms.

IS FISH CONSUMPTION A KEY COMPONENT OF THE MEDITERRANEAN DIETARY HABITS IN GREECE TODAY?, A. Kandyliari¹, A. Athanasatou¹, O. Malisova¹, M. Kapsokefalou¹ ¹ Unit of Human Nutrition, Department of Food Science and Human Nutrition, Agricultural University of Athens, Athens, Greece

Introduction: Fish is one of the main components of the Mediterranean diet. Frequent consumption is related with reduced risk of cardiovascular diseases and hypertension, iron deficiency, various types of cancer, depression and Alzheimer's disease.

Methods: We exploited an existing database on drink and food intake consisting of data collected using the Water Balance Questionnaire (WBQ) tool from 1435 adults (ages 18-85y, 874 women (age 44±22 y) and 561 men (age 50±22 y)) living in Athens, Greece. Foods consumed were allocated to ten categories: vegetables, fruits, nuts & oils, grains, legumes, dairy products, sweets, red meat, poultry and fish according to the Mediterranean pyramid.

Results and Discussions: Fish, including seafood, was consumed rarely from 43.1% (N=618) of study population, while only 25.3% consumed fish 1-2 times per week. Differences were observed in fish consumption among age groups, sex, educational level, family status and profession (P<0.001 in all cases). Fish consumption frequency was higher in subjects under 60y, men, employed, married or divorced and graduates from high school or university.

Rare (or never) fish consumption was negatively correlated with the 9 other food categories (P<0.001 in all cases). Daily fish consumption was positively correlated with red meat (P<0.05), grains, nuts and oils, vegetables, dairy products and poultry (P<0.001 in all cases).

Conclusion: Fish consumption in a sample of healthy Greek subjects does not agree with the Mediterranean dietary pattern. Education and marketing strategies should encourage consumers to integrate fish products in their diet, in a weekly basis.

a Willett WC et al., Am J Clin Nutr 1995; 61(6):1402-1406

WHO'S CALL FOR ACTION AGAINST NCDS AND CHILDHOOD OBESITY: RED BELT FOR HEALTH, TO PREVENT CARDIOMETABOLIC RISK“TOMMY & OLLIE FOR HEALTH” Project, Luisa Monini, Health Committee Chairperson, BPW International

The Mediterranean Diet is universally acknowledged as the best there is. To promote a healthy diet among the children all over the world, we have selected two kinds of foods which better represent the Mediterranean Diet: TOMATO and OLIVE OIL.

“TOMMY & OLLIE for HEALTH” Project was set up in compliance with the limited resources of the Planet and with the Ethics in Food to have Access to Healthy Food as one of the Fundamental Rights of Mankind. The BPW International Committee for Health, campaigned hard in these last years against overweight and obesity, promoting cardiometabolic risk awareness in women and in children. The last WHO's call is for action against childhood obesity, almost a pandemic, with 42 million children under the age of 5 overweight or obese. Overweight and obese children are likely to stay obese into adulthood and more likely to develop NonCommunicable Diseases like diabetes and cardiovascular diseases at a younger age. Overweight and obesity, as well as their related diseases, are largely preventable. Through the BPW International members, Tommy & Ollie for Health project will be distributed in primary and secondary schools of the 5 continents promoting knowledge of the Mediterranean Diet and its main foods and nutrients, involving young people and their families in educational activities and sports. The project also aims to spread an anthropometric indicator (waist / stature ratio) easily detectable by parents to control the waistband of their children and then the cardio metabolic risk of their children. Several epidemiological

studies have confirmed the importance of abdominal circumference with the height as an indicator of abdominal fat and cardiometabolic risk, more effective and trusted than body mass index, which describes the relations between weight and height without considering the distribution of body fat, in particular the differences between the visceral fat and subcutaneous fat.

MEDITERRANEAN DIET SCORE AMONG WOMEN OF CHILDBEARING AGE: IZMIR PROVINCE FROM TURKEY, G.Kaner¹; G.Pekcan²; N. Seremet Kürklü³; E. Bellikci Koyu¹
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Introduction: The aim of this study is to calculate Mediterranean diet score (MDS) and determine the relationship between MDS and anthropometric measurements, biochemical status and dietary components among overweight and obese women of childbearing age.

Methods: A total of 619 women, 20-49 years age, normal weight (27.6%), overweight (28.8%) and obese (43.6%) were recruited. Anthropometric measurements, biochemical variables and 3 consecutive days 24 h-recalls were assessed. To calculate MDS (proposed by Panagiotakos DB et al. Nutr Metab Cardiovasc Dis 2006; 16(8):559-68) food frequency questionnaire was used. Questionnaire includes 11 main components of the Mediterranean diet (non-refined cereals, fruits, vegetables, potatoes, legumes, olive oil, fish, red meat, poultry, full fat dairy products and alcohol). According to the consumption frequency (no consumption, rare, frequent, very frequent, weekly and daily) items were scored between 0-5. Total score was ranging from 0 to 55. Scores between 0 and 20 were considered as low, 21 to 35 as average and 36 to 55 as high. Daily intake of energy, fat, saturated fatty acids, monounsaturated fatty acids, vitamins and minerals were calculated from 3 day dietary records. Fasting blood glucose, fasting plasma insulin, triglyceride, LDL-cholesterol, HDL-cholesterol, CRP and fibrinogen analyses were measured in fasting blood sample.

Results: Mean age, body mass index (BMI), body fat percentage, waist circumference and waist/height ratio were 32.8±8.15 years, 29.7±6.36 kg/m², 34.9±7.41, 93.3±13.32 cm and 1.0±0.93, respectively. The mean MDS was 30.1±4.54 and majority of women (85.1%) had a score between 21 and 35. There were no statistically significant relation in anthropometric measurements, biochemical status and dietary components among three MDS groups (low, average, high) (Table 1). In addition, multiple regression analysis showed that there were no statistically significant relation in MDS and cardio metabolic risk parameters (R²=0.004, p>0.05) (Table 2).

Conclusions: Although Izmir is a city located in Aegean Region of Turkey and majority of the population is practicing a Mediterranean type diet, no relation between cardio metabolic risk parameters and MDS was found. This could be related with the majority of participants were overweight and obese.

Table 1. Biochemical Status and Anthropometric Measurements of Female Subjects According to Mediterranean Diet Score

	Total	Mediterranean Diet Score			p
		1. Group 0 -20	2.Group 21-35	3.Group 36-55	
		X±SD	X±SD	X±SD	
Anthropometric Measurements					
Weight (kg)	77.3±16.6	73.4±14.93	77.5±16.80	76.8±15.30	0.666
Body Mass Index (kg/m ²)	29.7±6.36	27.6±5.29	29.7±6.50	29.5±5.55	0.509
Waist Circumference (cm)	93.3±13.32	88.3±11.91	93.4±13.62	93.2±11.31	0.395
Hip Circumference (cm)	111.5±10.79	109.1±6.07	111.8±11.22	110.2±8.14	0.346
Waist/Hip Ratio	1.0±0.93	0.80±0.08	0.80±0.07	0.8±0.07	0.221
Body Fat (%)	34.9±7.41	32.3±8.18	35.0±7.55	35.0±6.21	0.434
Body Fat Mass (kg)	28.1±11.67	24.8±11.09	28.3±11.90	27.7±9.84	0.537
Fat Free Mass (kg)	49.1±5.54	48.6±4.41	49.2±5.48	49.1±6.17	0.935
Biochemical Status					
Fasting Blood Glucose (mg/dl)	89.2±11.44	84.0±8.34	89.6±11.82	86.6±12.80	0.044*
Fasting Plasma Insulin (μU/ml)	9.9±6.50	9.7±6.48	9.8±6.10	9.2±4.94	0.808
HOMA-IR	2.2±1.59	2.0±1.39	2.22±1.66	1.9±0.07	0.425
Triglycerides (mg/dl)	110.9±60.79	135.6±29.45	110.6±2.81	110.5±8.50	0.362
LDL-C (mg/dl)	117.2±35.82	120.9±47.82	115.6±33.04	124.7±51.30	0.145
HDL-C (mg/dl)	117.2±35.82	52.3±11.40	53.6±13.30	53.0±12.47	0.886
Fibrinogen (mg/dl)	344.7±81.02	316.7±105.86	341.2±85.25	356.0±83.39	0.275
CRP (mg/dl)	0.5±0.45	0.3±0.17	0.5±0.45	0.5±0.50	0.333

*ANOVA (p<0.05) **Kruskal-Wallis (p<0.05)

Table 2. The Correlation Between Cardio-Metabolic Risk Parameters and Mediterranean Diet Score of Female Subjects

Cardio-Metabolic Parameters	Risk	Mediterranean Diet Score	
		r	p
Body Mass Index (kg/m ²)		0.005	0.903
Waist Circumference (cm)		-0.008	0.842
Fasting Plasma Insulin (μU/ml)		0.006	0.902
HOMA-IR		0.007	0.876
Triglycerides (mg/dl)		-0.003	0.940
LDL-C (mg/dl)		0.017	0.700
HDL-C (mg/dl)		-0.006	0.897
CRP (mg/dl)		0.021	0.609
Fibrinogen (mg/dl)		0.018	0.704

(R² =0.004) (p>0.05)

VARIATIONS IN THE STATES OF PREDIABETES IN ADOLESCENTS AFTER AN SCHOOL MEDITERRANEAN DIET PROGRAM, MD Serrano Pardo²; MM Campos Pastor¹; F Escobar Gómez- Villalba¹; JD Luna del Catillo³; F Escobar Jiménez¹, ¹ Endocrinology Service Hospital Clínico San Cecilio. ² CS Barrio Monachil. ³ S Bioestadística . Facultad Medicina de Granada. Spain.

Introduction: Prediabetes states represents a frequent complication associated with obesity in adolescent population.

Objectives: To study the prevalence of prediabetes, diabetes and metabolic syndrome (MS) in a representative sample of adolescents with obesity before and after developing a school Program for Nutritional Mediterranean diet and Behavioral intervention (PNMDBI)

Subjects and methods: 263 high school students (127 males) aged 12-16 yrs from Granada (Spain) were randomly selected to participate in PNMDBI during the school year. At the beginning and end of the school year their body mass index (BMI) and waist perimeter were determined. In addition, we determined their body composition by impedance measurement, their blood pressure and serum determinations of fasting plasma glucose (FPG), cholesterol (LDL and HDL) and triglycerides. They were also surveyed to determine their dietary habits by using a frequency test for the food consumption and exercise habits. Overweight and obesity were defined according to the criteria of Cole et al, and MS according to IDF criteria for the 10-16 yr age group. If glucose levels exceeded 100 mg/dl in the second determination, a standard oral glucose tolerance test (OGTT) was performed. The PNMDBI comprised fortnightly classes of 45 minutes duration on Mediterranean diet and lifestyle recommendations for adolescents, in addition, each day, they had a Mediterranean breakfast at school (275-350Kcal).

Results: After intervention, the prevalence of overweight decreased among male (31.5% vs 21.3%; $p < 0.001$) and female (21.7% vs 14%; $p < 0.001$) students. The prevalence of obesity decreased in both males (7.9 vs 5.5%; $p < 0.001$) and females (4.7% vs 3.9%; $p < 0.001$). The PNMDBI reduced the prevalence of MS from 32% to 19.7% ($p < 0.001$). Pre-intervention, 10.5% of adolescents had impaired glucose levels, 6.3% had basal glucose intolerance and 3.83% carbohydrate intolerance. No diabetes mellitus was diagnosed in any case. Post-intervention states of prediabetes decreased to 1.42%.

Conclusions: The PNMDBI decreases significantly the prevalence of overweight and obesity in adolescents of both sexes, and decreasing the prevalence of MS and prediabetes.

MEDITERRANEAN DIET AND COGNITIVE FUNCTION IN AN ITALIAN ELDERLY POPULATION, R. De Amicis¹, A. Leone², V. Giustizieri², L. Lewandowski², D. Osio², S. Fusari¹, P. Cornelio¹, S. Cappa¹, F. Cornelio¹, A. Battezzati², S. Bertoli², ¹ Foundation IRCCS Carlo Besta Neurological Institute, Milan, Italy, ² International Center for the Assessment of Nutritional Status (ICANS), University of Milan, Milan, Italy

Introduction: Recent evidence suggests that closer adherence to Mediterranean diet (MD) may delay cognitive decline, thanks to the combination of protective antioxidant-rich foods typical of this dietary pattern. Few data are available on Italian elderly population: to this purpose we investigated adherence to MD and its association with cognitive function in an Italian sample.

Materials and Methods: A cross-sectional study was carried out on 163 elderly people (70% females; 71.05 ± 4.83 years) followed as outpatients at the Nutritional Research Centre of Milan. The adherence to MD was evaluated using a Mediterranean dietary score (MEDscore) obtained from a validated 14-item questionnaire. Cognitive function was assessed with Mini Mental State

Examination (MMSE) performed by trained professionals. Anthropometric measures and BMI were also collected (31.2 ± 5.2 kg/m²; 38% overweight; 53% obese).

Results: 20 patients (12%) showed a clinical impairment (MMSE<24) and low adherence to MD (5%). On the other hand, 143 patients (88%) with normal cognitive performance showed a high adherence to MD (29%). At multiple linear regression adjusted for sex, age, smoking and physical activity, a 1-unit increase in MEDscore was associated with a 0.180 increase in MMSE ($p=0.050$). The adherence to MD seemed to be a protective factor for cognitive decline (OR=0.154, 95%CI: 0.194-1.226), although it didn't reach statistical significance ($p=0.077$). Among the MD components, a daily consumption of 30 g of nuts exhibited a significant inverse association with cognitive decline ($p=0.041$), and a trend of a protective role of moderate consumption of red wine and use of sofrito in food recipes was found ($p=0.059$ and $p=0.078$, respectively).

Conclusions: These results confirm that a closer adherence to MD could preserve against cognitive decline thanks to the synergic consumption of protective key-foods. However, further prospective studies in a larger sample are recommended.

LA ISLA EN TU PLATO (THE ISLAND ON YOUR PLATE), E. González-Padilla¹, C. Ruano-Rodríguez¹, A.L. Álvarez-Falcón^{1,2}, Ll. Serra-Majem^{1,3}, ¹ Nutrition Research Group of the Research Institute of Biomedical and Health Sciences, University of Las Palmas de Gran Canaria (ULPGC), Canary Islands, Spain, ² University Hospital of Gran Canaria "Doctor Negrín", Canary Islands, Spain, ³ UNESCO Chair of Local Health Systems and Food Systems, Research Institute of Biomedical and Health Sciences, University of Las Palmas de Gran Canaria (ULPGC), Canary Islands, Spain.

Introduction: The Mediterranean Diet is considered to be the epitome what a Sustainable Diet means. "The Island on Your Plate" is a project that intends to draw attention towards the gastronomic diversity of the island of Gran Canaria (Canary Islands, Spain). Doing so through a proactive intervention on the dietary pattern of the island of Gran Canaria to encourage a more sustainable diet by adapting the local habits to a Mediterranean-like Diet. The main goals of this initiative include the revitalization of the concept of a traditional proximity diet; the promotion of the consumption of local products that meet the standards of freshness, sustainability and diversity; as well as the empowerment and diffusion of the traditional food system of Gran Canaria and the benefits of the Mediterranean Diet style. As a secondary goal, it aims to open the dialogue for the creation of a Museum of Mediterranean Diet in Gran Canaria.

Material and methods: A study was conducted regarding the various food groups integrated in the local and traditional production in Gran Canaria, taking the basic elements of the Mediterranean Diet. Afterwards, a thorough analysis took place collecting the details related to the production and elaboration process, popular culture and an assortment of traditional recipes that shape a sustainable diet on the island.

Results and discussion: As a result, a document on ebook format was elaborated to bring attention to the richness of Gran Canaria's gastronomy and the importance that it has over the health status, the environment, the culture and the local economy. Alongside, this project has manifested the possibility to make a significant change on Gran Canaria's dietary pattern to promote and encourage a sustainable diet of proximity that is balanced, varied, and healthy and to bring it closer to the Mediterranean Diet pattern. Moreover, an Expert Meeting took place, in collaboration with other National and International Institutions, that culminated on the elaboration of the Decalogue of a Healthy Diet in the Community: Gran Canaria Declaration. In addition, an online platform was created to divulge information regarding other initiatives -both public and private- that

promote the ideology behind food sustainability. This platform invites citizens and professionals alike to interact with other departments and institutions with a similar interest for the creation of future sustainability plans and policies.

ADHERENCE TO THE MEDITERRANEAN DIET IN A FREE LIVING POPULATION OF SOUTHERN ITALY: THE SCORING APPROCH, Claudia Vetrani¹; Marilena Vitale¹; Angela Giacco¹; Rosalba Giacco²; Angela Albarosa Rivelles¹; Gabriele Riccardi¹, ¹Department of Clinical Medicine and Surgery, Federico II University, Naples, Italy; ²Institute of Food Science, National Research Centre, Avellino, Italy.

Introduction: Several scores have been proposed to assess the adherence to the traditional Mediterranean diet (MD). However, they are very expensive, require a good collaboration from the participants and are not designed for the educational purpose. The aim of this study was to develop and validate a short, valid and easy questionnaire that may provide a feasible and efficient way to assess the adherence to the traditional MD and to improve eating habits.

Material & Methods: 138 healthy individuals of both genders, aged 18-60 years, participated in the study. An easy food frequency questionnaire (MediQuest) was developed using nine questions on whole-grain cereal products, legumes and/or nuts, fish, olive oil, fruit, vegetables, meat (including processed meat), foods rich in animal fats and wine consumption. Each question had three answers with three scores. The MD score ranged from 0 (minimal adherence) to 9 (maximal adherence). Four categories of adherence were identified and the participants received some short advices to improve their eating habits following the traditional MD. The validation was performed using a semi-quantitative food frequency questionnaire (EPIC) according to Trichopoulos.

Results: A good correlation between MediQuest and the score calculated according to Trichopoulos was obtained (Spearman's correlation coefficient 0.638). There was also a good correlation in the percentage of individuals having identical scores with both methods for each food group. Agreement between the two methods, calculated with the interclass correlation coefficient (ICC) and showed by the Bland-Altman method, was 88% (CI 83.9, 92.0). No sex-specific differences were observed in the MD scores calculated with both methods.

Conclusions: The MediQuest is a valid tool for a rapid assessment of the adherence to the traditional MD in the every-day practice. Moreover, it allows a rapid calculation of the score (self-obtained) and represents an useful tool for educational purposes.

MEDITERRANEAN LIFESTYLE PROMOTION WITHIN A EUROPEAN PROGRAMME,

Authors: G. Masanotti¹, N. Bertrand², ¹University of Perugia, Italy, ²Edenred SA, France

The European FOOD (Fighting Obesity through Offer and Demand) programme was launched as a pilot in 2009 thanks to EU funds in 6 countries (BE, CZ, ES, FR, IT, SE).

Edenred, as coordinator, proposed to Health Authorities, Nutritionists and Universities to form a Consortium of partners and to focus on two main objectives:

1. to improve nutritional habits of employees by raising their awareness on balanced nutrition
2. to improve nutritional quality of the food offer in restaurants

In Italy the partners are the University of Perugia and the national unit of Edenred. In 2015, the Ministry of Health joined locally the programme to disseminate public health messages. The partnership increased also thanks to Slovak, Portuguese and Austrian Public Health Authorities joining the programme.

After a phase of analysis of the needs, a set of tools was created to provide practical advice and encourage healthy choices.

Edenred used its network of meal voucher as a channel of communication and partners could thus create a network of dedicated restaurants adhering to the national FOOD recommendations.

Partners in Italy decided to focus their communication and recommendations on the Mediterranean lifestyle: “Pausa Mediterranea” that takes into account the specific regional diet and way of living. As part of the annual evaluation, European barometers have been launched every year since 2012 in order follow societal changes and needs of employees and restaurants. In 2015, 8587 employees from 7 countries (BE, CZ, ES, FR, IT, PT, SK) and 1278 restaurants from 6 countries (CZ, ES, FR, IT, PT, SK) answered the FOOD questionnaires.

Italy is one of the most active countries involved in the programme, providing in 2015, first in Europe, about 60% of data from restaurants (42% on average since 2009) and 12,4% data from employees (14% on average since 2009). Its network of restaurants is also the largest with 1942 establishments out of 4880 in the 9 participating countries.

SKIN WALNUT CONSUMPTION IN A HEALTHY PATTERN DELAYS PROGRESSION OF ATHEROSCLEROSIS LESION IN APOE-DEFICIENT MICE, S. Gascón¹; L.V. Herrera ²; C.

Barranquero ²; R. Martínez-Beamonte ²; J. Surra^{2,4} ; C. Arnal^{3,4}; J. de la Osada García ^{2,4}; M. A. Navarro^{2,4}, ¹Departamento de Farmacología y Fisiología. Facultad de Veterinaria, CiberObn, Zaragoza ES. ²Departamento de Bioquímica y Biología Molecular y Celular. Facultad de Veterinaria. Universidad de Zaragoza- CiberObn, Zaragoza, ES. ³Departamento de Patología Animal. Facultad de Veterinaria. Universidad de Zaragoza, CiberObn, Zaragoza, ES. ⁴ Instituto de investigación sanitaria de Aragón. IIS, Zaragoza, ES.

Background and objective: Nut consumption in a healthy dietary pattern is associated with a low incidence of cardiovascular disease and prevents the atherosclerosis. These benefits are attributed to their fatty acid profile, rich in unsaturated fatty acids, and also to other nutrients. This project aims to advance in the knowledge of the mechanisms of action underlying the relationship between nut consumption and atherosclerotic lesion development.

Design and Methods: The effect of walnuts on the atherosclerotic lesion was studied and compared in female and male Apoe-knockout mice fed: 1) a diet supplemented with 3% (w/w) walnut 2) an isocaloric diet of similar fat content provided as palm oil and 3) only the walnut skin to evaluate its antioxidants. After 11 weeks, plasma lipid parameters, Pon1, Pon2, Pon3 and Pcyox1 hepatic mRNA and aortic en face lesions were measured.

Results: No changes were observed in plasma cholesterol levels in both sexes and diets. Males receiving walnut diet had lower plasma triglycerides than palm oil group, and both sex groups receiving walnut diet had lower plasma HDL cholesterol than mice receiving the palm oil diet. A decrease of hepatic Pon1 mRNA was observed in males supplemented with skin walnut compared with palm oil group. Hepatic Pon2 mRNA increased in skin walnut containing diet compared with palm oil group in both sexes. Females consuming the walnut and skin walnut diets showed lower hepatic Pon3 mRNA than females consuming palm oil and no changes were observed in Pcyox1 expression. Males and females consuming the skin walnut diet showed smaller aortic lesion areas than those consuming palm oil.

Conclusions: Our results suggest that the antiatherosclerotic effect of skin walnut intake in Apoe-deficient mice may be attributed to higher hepatic mRNA Pon2 expression

Key words: Walnuts, Apo E-deficient mice, Atherosclerosis, Lipoproteins

Abstract Topic: Promoting the Mediterranean diet lifestyle pattern.

Mainstreaming the Mediterranean diet lifestyle into Mediterranean National dietary guidelines

MEDITERRANEAN DIET IN ITALIAN RURAL AREAS: THE PAST AND THE PRESENT, F. Intorre; M.S. Foddai; E. Venneria; L. Barnaba; D. Ciarapica; L. Palomba; M. Zaccaria; E. Azzini; G. Maiani; A. Polito

Council for Agricultural Research and Economics - Research Centre for Food and Nutrition, Italy

Introduction The main features of the Mediterranean Diet have been initially identified in 1954 in the small rural area of Rofrano (National Park of Cilento, Vallo di Diano e Alburni), but they are now gradually being lost due to the spread of the western-type economy and technological society as well as the globalisation of food production and consumption, even in rural settings. The aim of this work is to compare the current food consumption of an Italian rural area with the dietary pattern of Rofrano described in the 1950s, as representative of the Italian rural areas.

Material & Methods This work shows the results obtained on 129 adult and elderly volunteers recruited in 3 different rural centres of the Majella National Park (Montenerodomo, Gamberale, Pizzoferrato). Food consumption was recorded by a validated food diary on 4 consecutive days, including 2 weekend days. Food intake was converted into nutrient intake using the Italian food composition tables. Anthropometric measurements were performed according to the standardized procedure (Lohman, 1988).

Results and Discussion The energy intake of Rofrano population was 2148 kcal, 20.6% of which provided by fats (Cresta et al, 1998). In our sample, the BMI of volunteers is 28.6 ± 5.0 kg/m², indicative of a mean condition of overweight; the total energy intake is 1802 ± 476 kcal and the percentage of energy provided by fats is 37.1%. The food consumption is different from that reported in Rofrano, where more than 40% of the active population was engaged in agriculture, which required considerable physical effort and adequate caloric intake guaranteed by cereals.

Conclusions Our preliminary results show a change in food consumption with regard to the energy deriving from products of vegetable and animal origin, maybe due to changes in food production system and globalization. The high prevalence of overweight and obesity confirms literature data on the increase of this phenomenon also in rural areas, maybe due to the modern lifestyle.

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Sponsorship This study was supported by the Italian Ministry of Agricultural, Food and Forestry Policies, in the framework of the TERRAVITA project.

THE PROPHYLACTIC POTENTIAL OF A MEDITERRANEAN DIETARY PATTERN ENRICHED WITH FATTY FISH IN IMPROVING RESPIRATORY FUNCTION IN ASTHMATIC CHILDREN: A RANDOMIZED CONTROLLED TRIAL, M. M. Papamichael¹ Phd.cand; Assoc. Prof. C. Itsiopoulos¹ PhD, ¹La Trobe University, Department of Rehabilitation, Nutrition & Sport, Melbourne, Australia.

Background and Aims: Asthma has rapidly become the most frequent chronic disease in children globally, placing significant disease burden as the most common reasons for hospitalisation, absence from school and work for sufferers and their parents/carers, respectively. Managed primarily symptomatically with medications as there is no known cure. Emerging evidence indicates that diet and lifestyle play a role in the aetiology and management, with potential for a protective effect of a Mediterranean diet. Dietary clinical trials are lacking. We aim to investigate whether fatty fish consumption as part of a Mediterranean dietary pattern improves pulmonary function in asthmatic children.

Methods: A parallel 6 month randomized controlled dietary intervention study will be conducted in asthmatic children, aged 5-12 years attending a paediatric respiratory clinic in Athens, Greece. The intervention will include two fatty fish meals (150g cooked) per week within the context of a Greek Mediterranean dietary pattern. The control group will consume their usual diet. Assessments at baseline and 6 month follow-up will include pulmonary function using spirometry (FEV1), asthma symptoms using the Child Asthma Control test (CACT), quality of life using the Paediatric Asthma Quality of life (PAQOL), medication use, days hospitalized and absent from school. A food frequency questionnaire will be used to assess dietary intake and adherence to the Mediterranean dietary pattern using the KIDMED index.

Applications: This study will identify the potential of a Mediterranean diet supplemented with fatty fish in ameliorating asthma symptoms and improving pulmonary function in children with asthma.

Trial Registration: ANZCTR.org.au: ACTRN12616000492459p

PLASMATIC ANTIOXIDANT STATE AND THE CONSUMPTION OF ANTIOXIDANT FOOD IN ELDERLY ADULTS FROM CATAMARCA – ARGENTINA, □ O.T.Barrionuevo¹; M.A Cornatosky¹; A.M.Barrionuevo¹, ¹ Facultad de Ciencias de la Salud Universidad Nacional de Catamarca, Argentina

Introduction: Eating habits are part of the culture of a society; they show deep roots that link man with his land and his customs and traditions. These eating habits are expressed in terms of consumption patterns and are acquired at childhood and remain present in adulthood. The purpose of this work was to calculate the association between Total Antioxidant State (TAS) in plasma of a group of Elderly Adults (EA) from Catamarca – Argentina and Eating Profile (EP), expressed as the adherence to habitual consumption of food rich in natural antioxidants characteristic of this part of the country. **Materials and Methods:** It is an epidemiological cross-section and descriptive study carried out in the Western Region (WR) of Catamarca. 66 EA (74.3±2.8 years old) from both sexes took part in the study. The anthropometric and biochemical parameters are compatible with high risk of Cardiovascular Disease (CD). The TAS value was determined by the colorimetric method used by ABTS®. To describe the antioxidant EP a questionnaire was designed to show the frequency of reliable consumption of a closed list of items of food rich in natural antioxidants and characteristic of the WR. Percentages of consumption (from 2 to 3 times a week) were calculated and a cluster analysis was carried out. The data obtained were analyzed with the SPSS 18 software. **Results and Discussion:** The TAS value was 1.45±0.13 mmol/L. Besides, 12.1% of the sample showed values of <1.31 mmol/L. The frequencies of consumption were: legumes (33%), walnuts (32%), raisins (26%) and olive oil (12%). They formed a low consumption cluster and their association with TAS was lineal, direct and weak (Eta=0.019). As regards olive oil, it is worth wondering the reasons behind its low consumption and to what extent the population is aware of the guidance and recommendations about its intake. **Conclusions:** The work gives epidemiological tools for the design of appropriate actions to encourage the combined consumption of these products. It could also, together with further studies, help to validate a healthy diet.

IS THERE SUCH A MEDITERRANEAN DIETARY PATTERN AMONG SPANISH CHILDREN AND ADOLESCENTS? ABOUT A FACTOR ANALYSIS IN THE ANIBES STUDY*, Pérez-Rodrigo C1, Gil A2, González-Gross M3, Ortega RM4, Serra-Majem L5, Varela-Moreiras G6,7, Aranceta-Bartrina J8

1FIDEC Foundation, University of the Basque Country 2Department of Biochemistry and Molecular Biology II, Institute of Nutrition and Food Sciences, Centre of Biomedical Research, University of Granada, 3ImFINE Research Group, Department of Health and Human Performance, Technical University of Madrid, 4Department of Nutrition, Faculty of Pharmacy, Complutense University of Madrid, 5Research Institute of Biomedical and Health Sciences, Universidad de Las Palmas de Gran Canaria, Facultad de Ciencias de la Salud, 6Department of Pharmaceutical and Health Sciences, Faculty of Pharmacy, CEU San Pablo University, 7Spanish Nutrition Foundation (FEN), 8Department of Preventive Medicine and Public Health, University of Navarra.

Objectives Dietary pattern (DP) analysis provides a better understanding of how people usually combine different foods and beverages. In this paper, we analyze dietary patterns in Spanish children and adolescents and agreement with recommendations of the Mediterranean Diet Pyramid.

Methods Analysis was based on a subsample (n = 415) of the cross-sectional ANIBES study in Spain. Dietary intake was assessed by means of a face-to-face 24-h recall of the one-day intake, as well as with a three-day record kept by means of a tablet device on 2 consecutive weekdays and 1 weekend day, which included all foods and beverages consumed at home and away from home. Children were assisted by their parents or guardians to complete the food records and face-to-face interview. We performed exploratory factor analysis and subsequent cluster analysis of dietary patterns and lifestyles.

Results Four major factors were extracted through factor analysis using 38 food groups, which explained 41% of the variance in the model. A so-called Mediterranean like Dietary Pattern was identified, with high positive loadings on vegetables (0,642), olive oil (0,589), fish (0,512), fruits (0,484), yogurt, and fermented milk products (0,464), and water (0,385) and negative loading on sugar-sweetened soft drinks. Mean vegetable, fruit, fish, olive oil and yogurt intake was significantly higher in children and adolescents in the healthier lifestyle pattern. However, mean intake among those closer to the Mediterranean DP was below recommendations for fruit, vegetables, fish and pulses, but higher in red and processed meats

Conclusions A Mediterranean like Dietary Pattern was identified in Spanish children and adolescents. However, intakes of children and adolescents closer to that pattern were below recommendations for fruit, vegetables, fish and pulses

Reference: Pérez-Rodrigo C, Gil A, González-Gross M, Ortega RM, Serra-Majem L, Varela-Moreiras G, Aranceta-Bartrina J. Clustering of Dietary Patterns, Lifestyles, and Overweight among Spanish Children and Adolescents in the ANIBES Study. *Nutrients*. 2016 Jan; 8(1): 11. Published online 2015 Dec 28. doi: 10.3390/nu8010011

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FREQUENCY OF CONSUMPTION AND INTAKE OF LEGUMES IN THE AVERAGE SPANISH DIET: THE ENPE STUDY* Pérez Rodrigo C1, Pedrós Merino C1, Peña Miranda M1, Ramos Carrera N2, Lázaro Masedo S2, Aranceta Bartrina J1,3,4

1Sociedad Española de Nutrición Comunitaria (SENC); 2SPRIM; 3Universidad de Navarra; 4CiberOBN, Instituto de Salud Carlos III, Madrid. *Proyecto financiado por la Fundación Eroski en colaboración con la SENC

Background and objectives: Legumes are an essential element in the Mediterranean diet. In this paper we describe the frequency of consumption and average intake of legumes estimated in the ENPE study for the Spanish population.

Methods Data drawn from a cross-sectional study conducted on a representative random sample of the Spanish population > 3 years (n = 6,800). In this analysis we considered people aged 15 years and older (n=6.031). The protocol included socio-demographic data, diet assessment by means of 24 hours-recall (2 days), food frequency questionnaire and questionnaire on food habits and food preferences. Information was collected in household face-to-face interviews and self-administered questionnaire. The protocol was in accordance with the Declaration of Helsinki for human studies of the World Medical Association and was approved by the ethics committee of clinical research of the Basque Country. Fieldwork: May 2014- May 2015, four seasonal waves.

Results Some 93% usually consume pulses on average 2.2 ± 0.01 (Mean \pm SEM) portions per week. There are no significant differences in the proportion of usual consumers between men and women; however, frequency of consumption is higher in males ($p < 0.01$). The proportion of consumers is significantly higher in schoolchildren and in people aged 65yr. and over (95%) than in adolescents and young adults (90%). People aged 65yr al over consume significantly more often pulses 2.5 ± 0.02 times / week than other age groups ($p < 0.01$). Adolescents and young adults are the age group with the lowest consumption (2.1 ± 0.02). Lentils are the variety most commonly consumed.

Conclusion Consumption of legumes in adolescents and young adults is significantly lower than in other age groups, especially in girls. Interventions aimed to maintain the traditional Mediterranean Diet in Spain need to consider this fact.

DO SPANISH PEOPLE'S FOOD PREFERENCES ALIGN WITH THE MEDITERRANEAN DIET? ANALYSIS IN THE ENPE STUDY* Pérez Rodrigo C1, Bernal J2, Pedrós Merino C1, Ramos Carrera N3, Lázaro Masedo S3, Aranceta Bartrina J1,4,5

1Sociedad Española de Nutrición Comunitaria (SENC); 2 Universidad Simón Bolívar, Venezuela; 3SPRIM; 4Universidad de Navarra; 5CiberOBN, Instituto de Salud Carlos III, Madrid. *Proyecto financiado por la Fundación Eroski en colaboración con la SENC

Background and objectives: Food preferences are associated with food consumption patterns. A wider range of preferences favors the consumption of a varied diet. In this paper we analyze the food preferences profile estimated in ENPE study and how reflect the Mediterranean Diet

Methods Data drawn from a cross-sectional study conducted on a representative random sample of the Spanish population > 3 years (n = 6,800). In this analysis we considered people aged 15 years and older (n=6.031). The protocol included socio-demographic data, diet assessment by means of 24 hours-recall (2 days), food frequency questionnaire and questionnaire on food habits and food preferences. Information was collected in household face-to-face interviews and self-

administered questionnaire. The protocol was in accordance with the Declaration of Helsinki for human studies of the World Medical Association and was approved by the ethics committee of clinical research of the Basque Country. Fieldwork: May 2014- May 2015, four seasonal waves. A preference score was computed and compared with the recommendations of the Mediterranean Diet Pyramid.

Results The fruit group (2.87 ± 0.5) and cereals (2.83 ± 0.5) scored highest on average rating preference. Among fruits, apple, orange and banana were the favorites and apricot, plum and figs the most rejected. In the cereals group rice and pasta were favorites, while brown rice and whole wheat bread were most rejected. Nuts (2.62 ± 0.8), vegetables (2.71 ± 0.7), fish (2.74 ± 0.7) and legumes (2.74 ± 0.6) scored the lowest on food preferences.

Conclusion Food preferences of Spanish people align in some respects with the recommendations of the Pyramid of the Mediterranean Diet, but not in others. Interventions are needed to improve acceptance of whole grain cereals, nuts, vegetables, fish and vegetables.

INFLUENCE OF SINGLE NUCLEOTIDE POLYMORPHISM IN GENES THAT ENCODE microRNAs AND ADHERENCE TO THE MEDITERRANEAN DIET AND FOOD INTAKE IN THE PREDIMED-VALENCIA PARTICIPANTS, O. Coltell^{1,2}; R. Barragán-Arnal^{2,3}; E.M. Asensio^{2,3}; J.V. Sorlí^{2,3}; R. Fernández-Carrión^{2,3}; O. Portolés^{2,3}; J.M. Ordovás⁴; D. Corella^{2,3}, ¹Universitat Jaume I, Castellon, Spain; ²CIBEROBN, Madrid, Spain; ³University of Valencia, Valencia, Spain; ⁴Human Nutrition Research Center, Boston, MA, USA.

Introduction: microRNAs (miRNAs) are small noncoding single-stranded RNAs (~22 nucleotides) that negatively regulate target gene expression and have important roles in disease processes. There are several studies in humans analyzing the influence of food intake on miRNA expression. However the association between miRNAs and food intake has been fairly analyzed in humans. In animal models there are some studies showing that blocking miRNA biogenesis enhances food intake. Likewise in animal models, single nucleotide polymorphisms (SNPs) in miRNAs genes have been associated with the amount of food consumed. However, in human there are no studies on the association between miRNAs SNPs and dietary patterns. Our aim is to analyze the association between relevant SNPs in selected miRNA and adherence to Mediterranean diet (MedDiet) and food intake in a Mediterranean population. **Methods:** We have analyzed 1035 participants in the PREDIMED-Valencia study (aged 67+/-7 y). Adherence to MedDiet was measured by the 14-items PREDIMED questionnaire and food intake by a validated food frequency questionnaire. SNP genotyping was carried out using the HumanOmniExpress Illumina BeadChip. Multivariable adjusted regression models were fitted. **Results:** We selected the following SNPs: rs11614913 in miRNA-196a2; rs3820455 in miRNA-194a; rs895819 in miRNA-27a; rs2292832 in miRNA-149 and rs3746444 in miRNA499. None of the SNPs was significantly associated with adherence to MedDiet. However, we found some relevant associations with particular foods. Thus, rs895819(A>G) in miRNA-27a was consistently associated (after multivariate adjustment) with higher alcohol intake in carriers of the variant allele ($P<0.01$). In addition it was associated with higher vegetable and fiber intake ($P<0.05$ all). On the other hand, rs11614913 in miRNA196a2 was significantly associated with saturated fat and cholesterol intake ($P<0.05$ all); and rs2292832 in miRNA-149 significantly associates with polyunsaturated fatty acids. **Conclusions:** These results add new evidence supporting a role of miRNA on regulating food intake. In addition to the separate miRNA analysis a combined analysis of miRNA scores may increase the association with the MedDiet pattern.

NUTRIENT COMPOSITION OF SOME MOROCCAN WILD LEAFY VEGETABLES OF DIETARY INTEREST, M. Tbatoul^{1*}, M. Kabil², A. Belahyan², R. Belahsen¹

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Introduction: Morocco's vascular flora is one of the richest in the Mediterranean region. Wild edible plants we used to make many popular traditional dishes. However there are no data on nutritional composition of these plants in Morocco.

Objectives: The aim of the present study is to contribute filling this gap by the determination of the proximate and mineral composition of some wild edible plants traditionally used as vegetables in El Jadida's rural area in Morocco.

Materials and methods: Six species, belonging to five botanical families, were selected: *Chenopodium murale* L., *Foeniculum vulgare* Mill., *Lavatera cretica* L., *Ridolfia segetum* Moris, *Scolymus hispanicus* L. and *Portulaca oleraceae* L. The proximate composition was analyzed using AOAC official methods and that of minerals was carried out by Inductively Coupled Plasma-Atomic Emission Spectrometry.

Results: The preliminary finding of this study showed that the average levels of macronutrients (g/100g) in the edible parts were 87.59 ± 3.16 for moisture, 2.85 ± 1.05 for proteins and 0.18 ± 0.08 for lipids. Most of the wild vegetables analyzed are a rich source of minerals. Yet, high variations were observed between the six species including their content in Zn (0.04-0.76 mg/100g) and Na (38.6-523.6 mg/100g).

Conclusions: Based on these primary results, the wild vegetables studied could be considered of good nutritive potential. The promotion of these under-exploited products could contribute to diversify consumed vegetables and to the improvement of the local population's nutritional status.

Keywords: Food composition, Morocco, Nutritional composition, Traditional Mediterranean diet, Wild food plants

UTILIZATION OF WILD EDIBLE PLANTS IN EL JADIDA RURAL AREA (CENTER OF MOROCCO): SUSTAINING TRADITIONAL RECIPES, M. Tbatoul^{1*}, A. Belahyan², R. Belahsen¹

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Background: Wild edible plants (WEPs) traditional knowledge is largely declining in the Mediterranean countries diet. Even there are some inventories of wild edible taxa consumed around the region; data on traditional recipes are scarce.

Objectives: The present study is a contribution to a better understanding of how WEPs are consumed in Morocco. It aimed to investigate the knowledge related to their utilization in traditional recipes by the population of four rural communes in El Jadida province.

Materials and methods: An ethnobotanical survey was carried out among 80 women native or long-time residents in the study area using a semi-structured questionnaire. All informants were 45 years and older. The data collected for each plant focused on the local name, the consumed part, the preparation method and the collecting season.

Results: A total of 71 WEPs distributed into 30 families have been identified as being used, presently or in the past, in the study area. Ten different traditional recipes, prepared mainly in winter, from leaves, stems, flowers or roots were identified. "Beqoula" was found to be the most common traditional WEPs-based dish among the local population.

Conclusion: We suggest extending this type of studies to other parts of the country in the aim to safeguard this heritage before its erosion. Also, it would be interesting to investigate the nutritional potential of WEPs to promote and revive the interest for these underutilized traditional food products.

Keywords: Beqoula, Mediterranean diet, Morocco, Traditional food, Wild food plants

ADHERENCE TO THE MEDITERRANEAN DIET IN A RURAL AND URBAN ITALIAN POPULATION, L.Barnaba; F. Intorre; E. Venneria; D. Ciarapica; M.S. Foddai; E. Azzini; M. Zaccaria; A. Polito, Council for Agricultural Research and Economics - Research Centre for Food and Nutrition, Italy

Introduction Since the Mediterranean diet has long been associated with better health status, several indexes for evaluating the level of adherence to this dietary pattern have been proposed. The purpose of this study was to evaluate the overall diet quality of two population groups living in Italian urban and rural areas.

Material & Methods An observational study was conducted on 227 adult and elderly free-living subjects in rural and urban areas of the central regions of Italy, respectively 128 and 99 subjects. Adherence to the Mediterranean food pattern was evaluated by a semi-quantitative food frequency, using the Mediterranean Dietary Serving Score (MDSS). The MDSS is based on the latest update of the Mediterranean Diet Pyramid, according to the recommended consumption frequency of foods and food groups; the MDSS ranges from 0 to 24 (Monteagudo et al, 2015). Anthropometric measurements were performed according to the standardized procedure (Lohman, 1988). Physical activity was measured by using the International Physical Activity Questionnaire (IPAQ, 2005).

Results and Discussion The average Body Mass Index (BMI) of the rural population was 28.62 ± 5.04 kg/m², while the urban sample had a BMI of 26.61 ± 3.84 kg/m², highlighting a higher state of overweight in rural residents ($p < 0.05$). The 34% of the rural sample was sedentary, the 40% moderately active and the 54% active while these percentages were respectively 20%, 43%, 36% in the urban area. Mean MDSS of the rural sample was 15 ± 3.2 while in the urban sample this index was 17.5 ± 2.9 , highlighting a greater adherence to the Mediterranean Diet Pyramid ($p < 0.000$).

Conclusions Results show an overweight status in both samples, with a higher prevalence in rural area ($p < 0.05$). These data are supported by a higher sedentary status and a lower adherence to the Mediterranean Diet Pyramid, underlining the importance to develop and apply nutritional education programs even in rural settings.

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IPAQ - International Physical Activity Questionnaire (2005) IPAQ Research Committee. <http://www.ipaq.ki.se>.

Monteagudo C, et al. PLoS One. 2015; 10(6):e0128594.

Sponsorship This study was supported by the Italian Ministry of Agricultural, Food and Forestry Policies, in the framework of the TERRAVITA project

HEALTHY-EATING ATTITUDES AND THE INCIDENCE OF CARDIOVASCULAR DISEASE: THE SUN COHORT, M. Ruiz-Canela¹⁻³; S. Santiago¹; I. Zazpe ¹⁻³; A. Gea ¹⁻³, P.A. De la Rosa ¹; M.A. Martínez-González¹⁻³, ¹University of Navarra, Spain; ²CIBERobn, ISCIII, Spain; ³IdiSNA, Spain

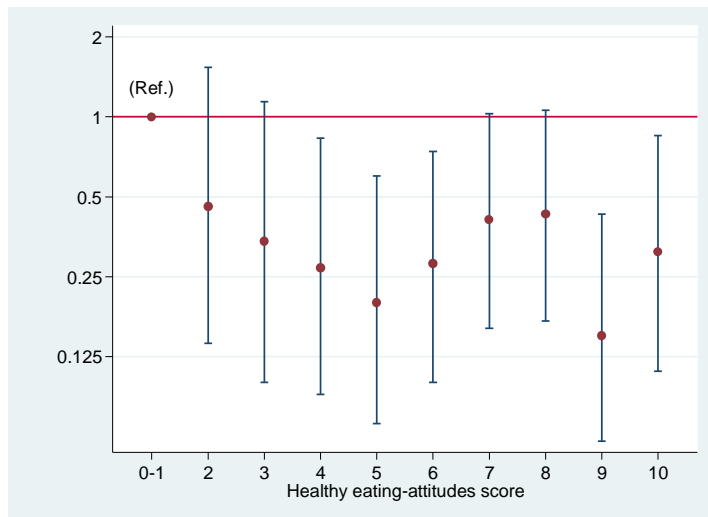
Introduction: The assessment of eating habits through qualitative questions on key attitudes towards healthy-eating could be an alternative and convenient tool to identify high-risk patients and to intervene in order to improve their dietary habits.

Aims: To prospectively assess the association between eating attitudes and incident cardiovascular disease (CVD) in a cohort of 19 138 middle-aged adults followed-up for a mean period of 9.2 years.

Material & Methods: We asked 10 questions about attitudes and habits related to the consumption of fruit, vegetables, fish, meat, sweets/pastries, butter, fiber and fat, and whether or not subjects removed fat from meat or added sugar to beverages. Then we summed up the number of healthy answers, resulting in a score ranging from 0 to 10.

Results: We observed 139 incident cases of CVD (myocardial infarction, stroke or cardiovascular death) among 19138 participants followed-up for a mean time of 9.2 years. A higher score was associated with a lower risk of CVD [3-5 points: fully-adjusted Hazard Ratio (HR) 0.38 (95% confidence interval: 0.18-0.81); 6-8 points: 0.57 (0.29-1.12); 9-10 points: 0.31 (0.15-0.67), compared to 0-2 points]. The most important contributors to these associations were the attitudes to increase fruit [HR: 0.59 (0.40-0.87)], vegetables [HR: 0.57 (0.29-1.12)] and fiber intake [HR: 0.69 (0.48-0.98)].

Conclusion: Qualitative questions on attitudes towards healthy-eating may be a useful tool for the primary prevention of CVD.



MEDITERRANEAN DIET AND CARDIOVASCULAR DISEASE PREVENTION: MECHANISMS AND METABOLOMICS, M. Ruiz-Canela¹⁻³; E. Toledo¹⁻³; C. Razquin¹⁻³; M.A. Martínez-González¹⁻³ ¹University of Navarra, Spain; ²CIBERObn, ISCIII, Spain; IdiSNA, Spain

Introduction: The traditional Mediterranean Diet (MedDiet) has been repeatedly associated with decreased risk cardiovascular disease (CVD). A number of mechanisms are postulated to mediate these benefits such as the reduction in low-grade inflammation or lower oxidative stress. However, the metabolic pathways through which the MedDiet influences CVD risk remain largely unknown. The study of specific candidate plasma metabolites or the quantification of large number of metabolites across multiple pathways are two complementary approaches in metabolomics.

Aims: We systematically reviewed existing literature on comprehensive metabolomics profiling and the risk of CVD. We included a previous assessment on whether the effect of the MedDiet was related to the deleterious association between branched-chain amino acids (BCAAs) and CVD.

Material & Methods: We conducted a systematic review of studies using the following inclusion criteria: a) assessment of metabolites related to more than one specific biological pathway and from different chemical classes, b) use of serum or plasma biospecimens, c) metabolite profiling at baseline, d) prospective design and e) CVD as main composite outcome.

Results: Ten studies, published between 2010 and 2015 met the inclusion criteria of our systematic review. Follow-up time ranged from 2.7 to 23 years and the number of participants from 67 to 2023. Six studies followed a targeted approach with a minimum number of 31 metabolites initially assessed and 4 studies used an untargeted approach. In a previous study nested within the PREDIMED trial, higher Hazard Ratios of CVD were reported across successive quartiles of BCAAs in the control group than in the MedDiet groups. When stroke was used as the outcome, a significant interaction ($P=0.009$) between baseline BCAA score and intervention with MedDiet was reported. No significant effect of the intervention on 1-year changes in BCAAs or any association between 1-year changes in BCAAs and CVD were reported.

Conclusion: A great heterogeneity was found in terms of analytical methods, metabolites associated with CVD risk and the predictive value of metabolites in the studies following a comprehensive metabolomics approach. A MedDiet may counteract the harmful effects of BCAAs on stroke but it had a negligible effect on 1-year changes in BCAAs. Other metabolic pathways should be explored to better understand the protection by the MedDiet against CVD in relationship with metabolic processes.

CREDITS4HEALTH (C4H): A CREDIT-BASED, PEOPLE-CENTRIC APPROACH FOR THE ADOPTION OF HEALTHY LIFE-STYLES AND BALANCED MEDITERRANEAN DIET IN THE FRAME OF SOCIAL PARTICIPATION AND INNOVATION FOR HEALTH PROMOTION (EC #602386), Pampaloni B1, Cianferotti L1, Quattrini S1, Guasti L1, Fratoni V1, Fossi C1, Satta P1, De Stefanis P1, Ngo J2, Vasilopoulou E3, Serra-Majem L2, Trichopoulou A3, and Brandi ML1, on behalf of C4H Consortium.

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²Nutrition Research Foundation (FIN) – Barcellona, Spain

³Hellenic Health Foundation – Athens, Greece

The world's health is undergoing an unprecedented transition on several fronts, particularly concerning epidemiological, nutritional and demographic issues. Many researches confirm the looming pandemic of Non Communicable and Chronic Diseases, which represent the worldwide major cause of death. Inspired to the Nudge concept, (Improving Decisions about Health, Wealth and Happiness) C4H is a project funded by the EC (#602386), aimed at finding out and testing a preventive health care system that encourages people living in Euro-Mediterranean Countries to enhance their level of physical activity and adopt healthy eating habits, keeping them committed in the adoption of personalized wellness paths. The C4H approach is grounded on evidence-based interventions aimed at stimulating people to become more physically active and follow a Mediterranean Diet. These interventions are delivered through an ICT platform which enhances people engagement, motivation, planning and self-monitoring, and further reinforces their motivation through an incentive system, consisting of discounts on goods and services (related to health, nutrition, social and leisure activities).

The model have been tested in three Countries (Greece, Italy, and Spain), on about 2700 healthy subjects. C4H was designed in a phased approach to gradually test each component: two pilot studies with the purpose of testing the proposed system, the interventions and the evaluation parameters have preceded the Randomized Controlled Trial, aiming at assessing the effectiveness of the intervention (platform + credits) with respect to the objectives of the research study.

NUTRITION EDUCATOR COMPETENCIES FOR PROMOTING HEALTHY INDIVIDUALS, COMMUNITIES AND FOOD SYSTEMS, S. Piscopo¹; M. Olfert²; on behalf of SNEB ¹ University of Malta, Malta; ² West Virginia University, USA

Introduction: The value of quality nutrition education for societal wellbeing has regained the attention of policymakers in recent years. Simultaneously, there has been an increased demand for nutrition education globally, nationally and locally. To date there is no international standard definition of nutrition education, yet the need for qualified nutrition educators who can promote healthy individuals, communities and food systems is widely acknowledged. The Society for Nutrition Education and Behavior (SNEB) has been a leader in developing effective nutrition education and nutrition educators as far back as 1987 when the first competencies were issued by the society.

Methods: Recognising the need for updated nutrition education competencies which reflect current research and professional opportunities, in 2013 SNEB set up a special Task Force to draft a first set of competencies. These were presented to members at the 2015 SNEB Annual Conference and later through listservs for feedback. They were also reviewed by a number of organisations with an interest in public health. Comments were discussed and incorporated as appropriate into the final document. The SNEB Board formally adopted the competencies in January 2016 and they were also published in the Journal of Nutrition Education and Behavior in March 2016.

Results: The competencies are categorised within ten focus areas and outline the foundational knowledge and performance skills nutrition educators need for the development, implementation and evaluation of effective nutrition education. They are pitched at an undergraduate level, but can be interpreted, adapted and elaborated according to the context where they will be applied.

Conclusions: The SNEB competencies can be seen as providing a practice guide for a well-rounded nutrition educator. Keeping in mind the potential of the Mediterranean Diet revised pyramid, these competencies may be used for individual professional development, curriculum

and programme planning by formal and non-formal educational institutions, or preparation for human capacity development at the country level.

ITALIAN FOOD IS LESS AND LESS MEDITERRANEAN: WHAT IS THE EFFECT OF PRODUCTION AND DEMOGRAPHY? Valerio De Paolis(1), Laura Rossi (2), Elisabetta Lupotto (2) (1)Council for Agricultural Research and Economics, Rome (2) Food and Nutrition Research Center - Council for Agricultural Research and Economics, Rome

The increasing availability of highly processed foods with high energy value is one major cause of gradual loss of adherence to the model typical of the Mediterranean diet in South European countries. These areas are involved in the so-called Westernization of lifestyle and diet, characterised by consumption of large quantity of processed foods rich in fat.

The aim of this work is to analyse the change of the Italian population's diet in early 2000s, having as reference the data available from the Food Balance Sheets (http://faostat3.fao.org/browse/FB/*/E). Analysis of these data provided a picture of the burden of food availability of the population, a proxy of population food consumption, focusing on some foods of the typical Mediterranean diet.

In Italy in 2011 the population registered a number of individuals accounting to 61 million, compared to 2000 the figure increased of about 6.5% (about 59 million in 2000). Italy has a national area of almost 302,000 km² of which only about 130,000 represents the UAA (Agricultural Land Used) (ISTAT, 2007); urbanization and infrastructures tend to decrease significantly this area. These factors pose the question of food availability and provision of fresh foods with specific nutritional characteristics. This is an important issue for fruits and vegetables but also for other foods such as fresh fish and legumes, being all these products typical of the Mediterranean diet.

Analyzing the various food supply chains in the examined period, it can be seen that primary products such as grains, vegetables and fruits, have suffered a decline in domestic production (Figure 1). Among these, fruits suffered a contraction in production with a parallel reduction of the import as well. This might suggest that there has been a decrease in demand from consumers, oriented towards foods such as meat, animal fats and sugars, all these far from the Mediterranean model (Figure 2).

This food supply trend is clear analyzing the load of imports increased to stabilize the request of the internal market.

The progressive derive of the Mediterranean diet pattern in Italy could be detected not only at the level of food consumption, but also at the farm level. In fact, agriculture in Italy has changed over the years with the farming system focusing on productions of higher incomes (as fodder production) and to processed products, respect to the productions of fruits and vegetables, but also legumes, typical of the Mediterranean model. There is not a unique reason that could explain these issues. In general, the increase of the load of imports from the large distribution organization, national and international, in a foreign market more and more globalized and homologated, tends to make the dietary pattern worldwide more and more similar

Figure 1- National production of the main foods characteristic of Mediterranean diet in the period 2000-2011 (from STAT FAO, 2016 http://faostat3.fao.org/browse/FB/*/E)

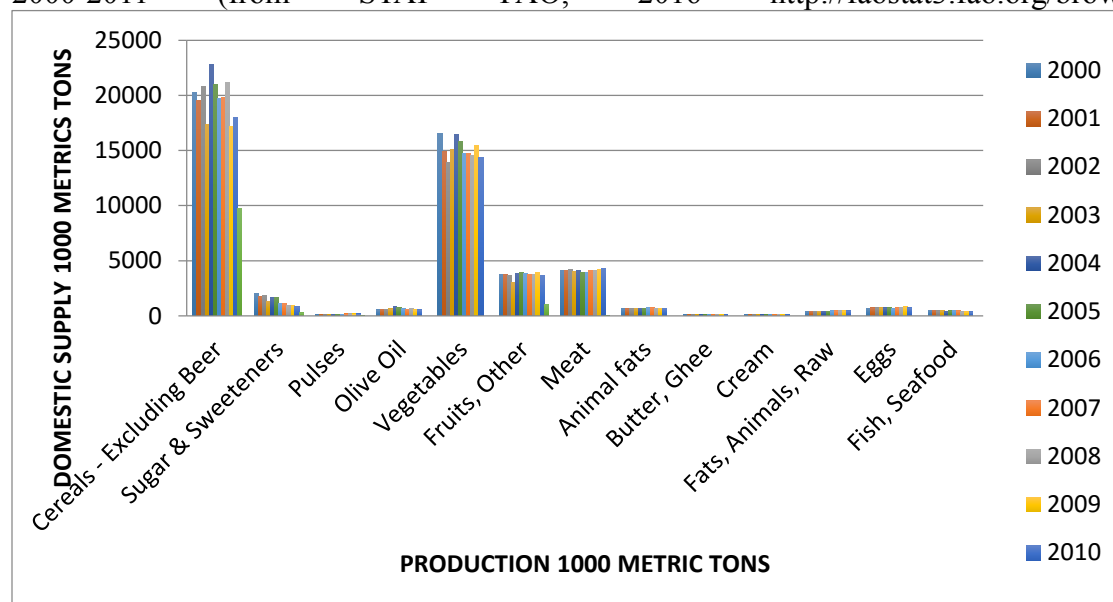
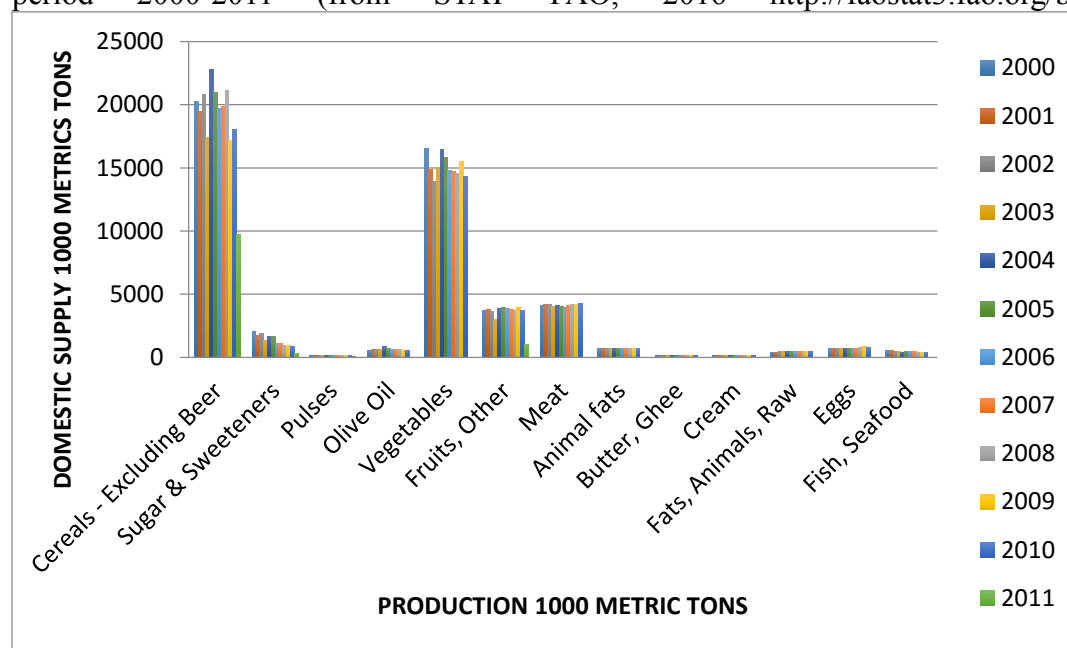


Figure 2- National consumption of the main foods characteristic of Mediterranean diet in the period 2000-2011 (from STAT FAO, 2016 http://faostat3.fao.org/browse/FB/*/E)



POTENTIAL BENEFITS OF ALGAE IN THE MEDITERRANEAN DIET E.D. Bahbouth, ATS Insubria, Varese

Introduction: The last decades have seen the emergence of the Mediterranean diet as a healthy nutritional model characterized by a high environmental and economic sustainability.

The traditional Mediterranean diet is based on food patterns typical of Crete, Greece and Italy, and emphasizes eating plant-based foods, such as legumes, grains, nuts, fruits and vegetables.

Edible algae are widely consumed in Asia, but not in the Mediterranean area.

Methods: A systematic review of the literature was performed in PubMed/MEDLINE to investigate the usefulness of incorporating edible algae to the Mediterranean diet.

Results: Algae may contribute to the supply of critical nutrients and represent a sustainable food option.

Conclusion: Edible algae may be a beneficial part of the Mediterranean diet.

SOME TRADITIONAL MEDITERRANEAN DISHES IN THE ITALIAN DIET E. Camillia, S. Liscianiab, S. Marconia, P. Gabriellia, A. Durazzoa, L. Gambellia, A. Aguzzia, M. Lucarinia, A. Turrinia, B. Zanonib, and L. Marlettaa a *Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria Centro di Ricerca per gli Alimenti e la Nutrizione, Italy* b *Dipartimento di Gestione Sostenibile delle Risorse Agrarie, Forestali e Alimentari, Università degli Studi di Firenze, Italy*

Introduction Italian cuisine is strongly influenced by local history, gastronomic traditions as well as local and seasonal availability of products. Our cuisine is known throughout the world for its taste, with all implications for quality, safety and health; the current eating habits, while reflecting market globalization and lifestyle changes, mainly refer to the Mediterranean Diet (MD), a healthy dietary pattern differently interpreted by all the countries of the Mediterranean area.

This work aims at evaluating the traditionality of some Italian dishes and their adherence to MD by considering the results of various research projects, realized for the lack of composition data of food preparations, particularly traditional ones. Main nutrients and nutritional contribution of each serving portion to the recommended intakes for Italian population¹ were estimated. This study represents a preliminary step for a development of Mediterranean Food Composition Database.

Material & Methods Some popular dishes commonly consumed were selected: pasta alla amatriciana, spaghetti alle vongole, pasta e fagioli, pizza napoletana margherita, pomodori al riso, parmigiana di melanzane, carciofi alla romana. All dishes included typical ingredients of the MD and many were registered in the MiPAAF traditional list².

A “standard recipe” was identified for each dish and one “preparation protocol” was elaborated in order to standardize ingredients, amounts, preparation and cooking techniques; the dishes were prepared and carefully cooked in a dedicated lab-kitchen in CREA-Alimenti e Nutrizione and produced at least in duplicate.

Water, protein, fat, carbohydrate, fibre, were analysed for each ready dish according to official methods; energetic value was calculated according to Greenfield & Southgate (2003). An Index of Traditional Recipe (ITR)³ and a Mediterranean Adequacy Index (MAI)⁴ adapted to evaluate dishes.

Results and Discussions Only pizza napoletana margherita showed the maximum value (ITR=90); carciofi alla romana, pasta alla amatriciana and parmigiana di melanzane proved to be “traditional recipes” (ITR>60) while the others were popular dishes. All the recipes were made

using olive oil, and typical foods of MD. Nutrient contents and energy varied extensively because of the variety of ingredients of dishes.

1 SINU, Società Italiana di Nutrizione Umana. (2014) L.A.R.N (IV Revisione).

2 GU 147 25/06/2013).

3 Camilli E. et al.- X National Congr. Food Chemistry. Firenze, luglio 2014, pag. 824 Alberti-Fidanza A. e Fidanza F. 2004 Public Health Nutrition: 7(7), 937–941

THE ANTI-INFLAMMATORY EFFECTS OF MEDITERRANEAN DIET: A SYSTEMATIC REVIEW A. Rezazadeh¹ ¹Department of Community Nutrition, National Nutrition and Food Technology Research Institute, Faculty of Nutrition and Food Technology, Shahid Beheshti University of Medical Sciences and Health Services, Tehran, Iran

Introduction: Mediterranean Diet is characterized by high consumption of non-refined grains, legumes, nuts, fruits and vegetables, high fat consumption (mostly from MUFA as olive oil), low consumption of red meats and animal products and mild consumption of alcohol intake, usually in the form of red wine. Previous studies suggested that Mediterranean diet (MeDi), can prevent inflammatory and metabolic disease. The aim of this study was to review the relation between Mediterranean diet and inflammation.

Material & Methods: The Medline and Embase databases were searched from 2006-2016 using relevant key words (Mediterranean diet, inflammation, inflammatory markers, metabolic disease, atherosclerosis) in English language. Duplicates and irrelevant articles were excluded

Results and Discussions: Twenty one articles (3 reviews and 18 original articles) were selected according to the inclusion criteria. Outcomes of randomized clinical trials and interventional studies represented that MeDi could down regulate the expression or decrease the serum and intracellular amount of most inflammatory factors (like C-reactive protein[CRP], interleukin [IL]-6, tumor necrosis factor (TNF)-alpha, amyloid A, LpPLA2), adhesion proteins (ICAM-1, VCAM-1 and E-selectin), Chemokines (monocyte chemoattractant protein [MCP]-1), increasing anti-inflammatory cytokines (adipokines) and reduction in plasma concentrations of retinol binding protein [RBP4] (as an adipokine that contributes to insulin resistance). Also, MeDi can inhibit inflammation caused NF-kB-mediated VCAM-1 induction by homocysteine. Anti-inflammatory effects of Med-Diet can improve insulin sensitivity and prevent atherosclerosis and cardiovascular disease and other inflammatory related disorders. Studies suggested the inverse relationship between MeDi and inflammation. This protective effect may be due to high MUFA and polyphenolic and antioxidant and anti-inflammatory content of this dietary pattern.

Conclusions: Findings emphasize the need for actions from public health care professionals in order to prevent the development and progression of inflammatory and metabolic diseases through the adoption of low animal fat diets, like the Mediterranean diet.



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