



## **ROUND-TABLE MEETING**

### *Agricultural Biodiversity for Nutrition and Health*

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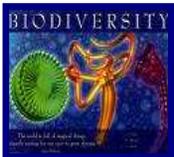
October 16, 2009, Brussels



# **BIODIVERSITY, TRADITIONAL FOOD PRODUCTS AND CONSUMER'S HEALTH**



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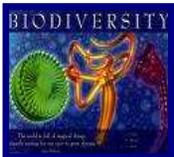


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# *New Connotations of Food Quality : Extension and Enrichment of Food Quality Concept*

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**Quality is becoming a subjective parameter, that differs from individual to individual and depends from consumers' views: aspects of the quality differ from person, place and time (Kapsak *et al.* 2008)**

**Consumers are demanding more information on product quality: characterization and measurement of nutritional values and anti-nutritional factors of foods. Research is needed to inform and model consumer choices and evaluation of foods**



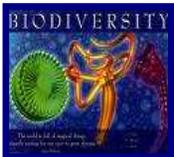


## “From Farm to Fork”

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“From Farm to Fork” is a term emphasizing the different stages of the food chain system and examining the practices and producers that ensure the safety and quality of food.



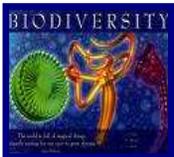
**Traceability:** *“the ability to follow the movement of a food through specified stage(s) of production, processing and distribution”* (Codex Alimentarius Commission)





## Alternatives of Food Quality Models: *Typical foods and Functional foods (1)*

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**Priority: to investigate traditional, local and seasonal foods: alimentary products, grown using techniques based on historic and cultural traditions that are specific to a unique territory. Need to assess the extent to which will be clear that local/traditional foods play an important role in the food pattern of many population groups in the European countries. Components of traditional diets can be reinforced and promoted for their nutritional quality, health properties, and safety.**

*Within the Project "TRUEFOOD" nutritional characteristics and antioxidant properties of typical Italian products have been evaluated: our results have shown that in most cases typical products contain greater nutritional value than commercial products.*



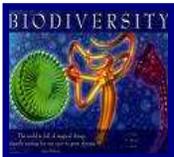
## Alternatives of Food Quality Models: *Typical foods and Functional foods (2)*



Product	FRAP (mmol/kg)	TRAP (mmol/kg)
Strawberry "Mara des Bois"	17.78±0.43	9.871±0.28
Strawberry "Aprica"	62.85±3.23	16.31±1.20
Commercial Strawberry	19.74±0.68	10.34±0.15



Product	Coumric Acid mg/100 gr	Quercetin mg/100 gr	Kaempferol mg/100 gr
Strawberry "Mara des Bois"	1.24±0.20	3.10±0.04	1.56±0.59
Strawberry "Aprica"	0.80±0.31	2.46±0.45	3.38±0.97
Commercial	1.87±0.84	2.06±0.87	1.14±0.01



*From European Project TRUEFOOD*



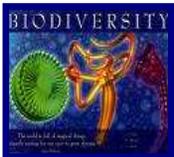
## Alternatives of Food Quality Models: *Typical foods and Functional foods (3)*



Product	FRAP (mmol/kg)	TRAP (mmol/kg)	Vitamin C (mg/100g)
Cherry “Aprìca”	18.55±1.91	16.49±1.07	22.92±0.76
Commercial Cherry	6.25±0.07	6.80±0.05	6.44±0.62



Product	FRAP (mmol/kg)	TRAP (mmol/kg)	Vitamin C (mg/100g)
Raspberry “Cansiglio”	57.7±6.2	23.72±1.12	22.21±1.34
Commercial Raspberry	11.5±0.99	11.93±1.31	19.31±0.57



*From European Project TRUEFOOD*





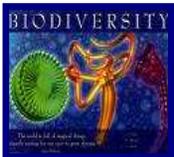
## Alternatives of Food Quality Models: *Typical* foods and *Functional* foods (4)



Functional foods represent new foods or dietary components that, respect to conventional foods, could have major specific health benefits, additional activities, physiological properties and effects. They are defined as ‘foods for specified health uses’.



*Within the Project “CARCIOFO” (Ministry of Agricultural, Food and Forestry Policies), our investigations have shown that artichoke could represent a functional food*



*-Azzini E., Bugianesi R., Romano F., Di Venere D., Miccadei S., Durazzo A., Foddai M.S., Catasta G., Linsalata V. and Maiani G. “Absorption and metabolism of bioactive molecules after oral consumption of cooked edible heads of *Cynara scolymus* L. (cv Violetto di Provenza) in humans” *Br J Nutr* (2007), 97,963-969.*

*-Miccadei S., Di Venere D., Cardinali A., Romano R., Durazzo A., Foddai MS., Fraioli R., Mobarhan S. and Maiani G. Antioxidative and Apoptotic Properties of Polyphenolic Extracts from Edible Part of Artichoke (*Cynara scolymus* L.) on Cultured Rat Hepatocytes and on Human Hepatoma Cells. *Nutr. Cancer*, 60(2), 276-283.*





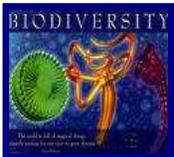


## Which factors does food quality depend on?

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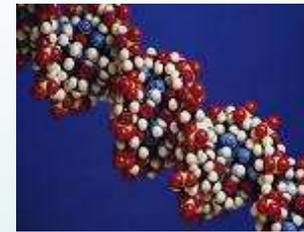


- 1) Genetic factors and agricultural practices
- 2) Technological processes
- 3) Domestic treatments





# Level 1: Pre-Harvest Factors



*Genetic factors*

*Species*  
*Cultivar*



## *Agricultural practices*



*Soil characteristics*

*Sunlight exposition*

*Irrigation*

*Seasonal condition*

*Geographical condition*

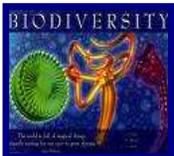
*Pedo-climatic condition*

*Soil fertilization*

*Grade of ripeness*

*Time of harvest*

*Methods of harvest*





## Level 2 and Level 3: Post-Harvest Treatments

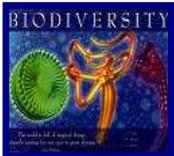


### *LEVEL 2*

#### *Technological processes*



*Blanching*  
*Pasteurisation*  
*Freezing*  
*Canning*  
*Milling*  
*Drying*  
*High pressure treatments*  
*Cooking*  
*Storage*



### *LEVEL 3*

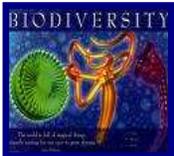
#### *Domestic treatments*

*Cooking*  
*Storage*  
*Modalities of consumption*





## Effect of Genetic Factors on Total Antioxidant Capacity

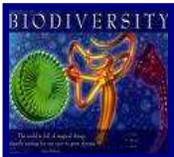


FRAP (mmol/Kg)	Typical Product	Commercial Product
Chicory	20.4±0.08	8.1±0.03
Apple	7.7±0.46	3.0±0.00
Pear	2.9±0.28	4.2±0.06

*From Italian Project "QUALITA' ALIMENTARE"*



## Influence of domestic cooking on TAC

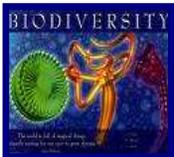


<i>Carrot</i>	<i>Typical</i>	<i>Commercial</i>
<i>FRAP (mmol/kg)</i>		
Raw	$0.9 \pm 0.11$	$0.8 \pm 0.04$
Cooked	$0.8 \pm 0.02$	$0.7 \pm 0.02$
<i>TRAP (mmol/kg)</i>		
Raw	$1.9 \pm 0.007$	$1.4 \pm 0.03$
Cooked	$1.5 \pm 0.03$	$1.3 \pm 0.06$

*From Italian Project "QUALITA' ALIMENTARE"*

## Biodiversity (1)

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**The question is whether environmental changes could affect the composition and bioavailability of bioactive and other food components and in what way the production of local and traditional foods in the various European countries can be improved by applying advanced technologies .**



## Biodiversity (2)

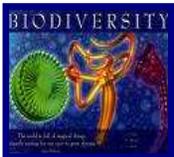
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Appropriate farming based land use, protection of animal health and welfare, environmental conservation as linked to climate knowledge, soil quality and landscaping, lead to the improvement of product quality.



Nutrition science should support sustainable ecosystems, ecological resources and healthy environments: nutrition and environmental sustainability are strictly linked through the food system.





## Biodiversity and Mediterranean Diet

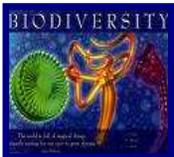
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Knowledge of the various environmental factors that contribute to the food quality across Europe will be important for maintaining or assessing "optimal" diets for human health.

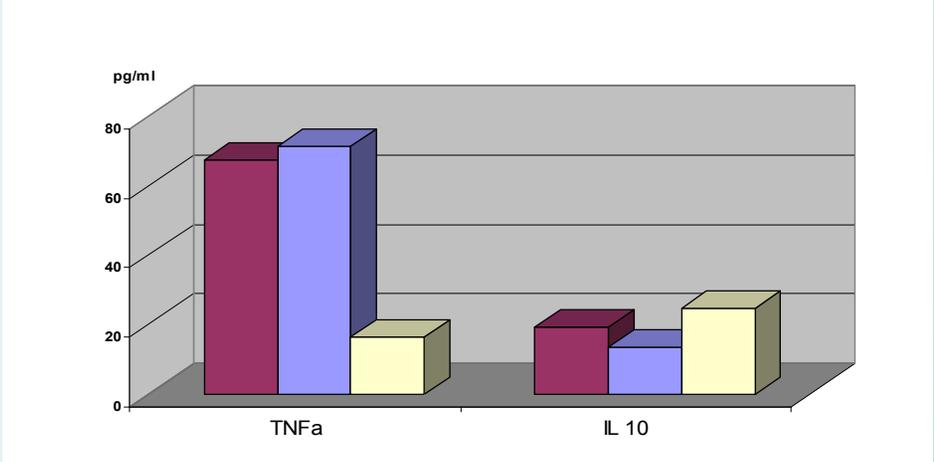
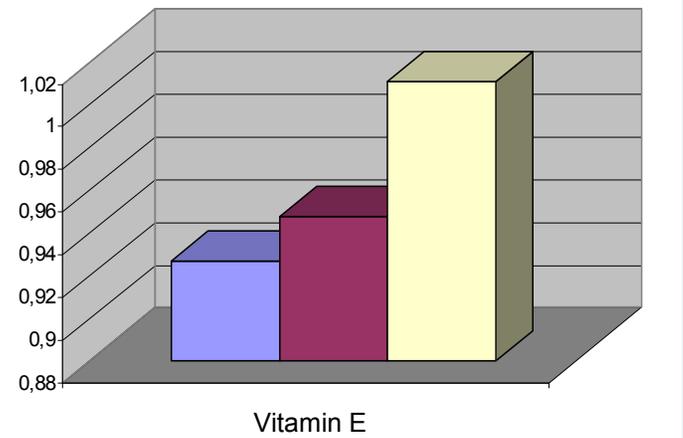
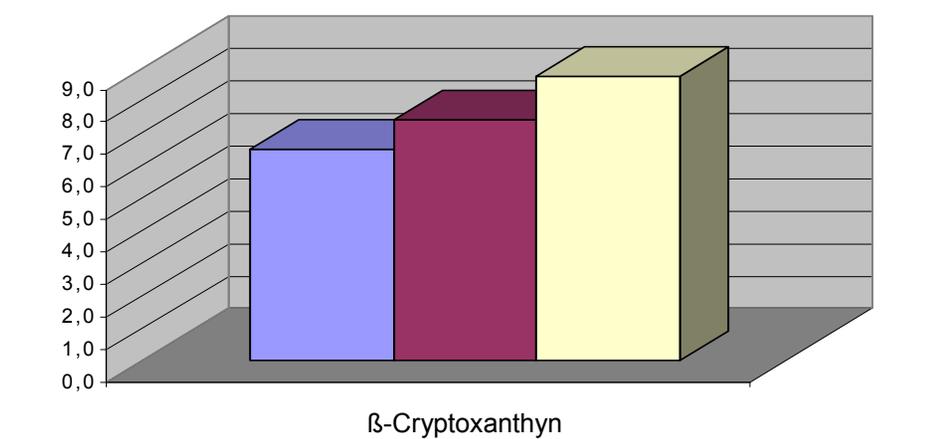
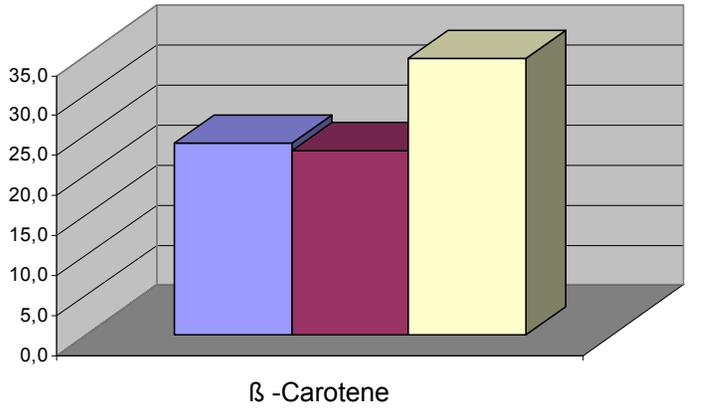


Mediterranean Diet appears as a valid model of sustainability from the health, environment and economic point of view, helping to support quality in food and in the meantime helping to promote sustainable resource management through environmental sound farming systems linked to territorial characterisation and to local cultural heritage.



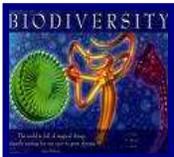
# Mediterranean Diet

- Low
- Medium
- High



## Different approaches and research strategies for improving food quality (1)

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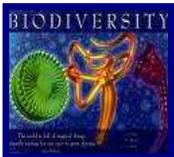
-The overall aim is to improve the competitiveness of the typical local/traditional products by identifying and evaluating food nutritional quality and safety characteristics: identification, description and characterization of the many different local/traditional foods in Europe, their production methods and the (environmental) factors that may affect food quality and food safety.

-Improvement of a system of certification to ensure high standard of quality (nutritional, hygienic, sensorial and technological).

-Elucidation and cataloguing of new foods or dietary components that, respect to conventional foods, could have major specific health benefits, additional activities, physiological properties and effects. A database of possible nutraceutical compounds will be carried out .

## Different approaches and research strategies for improving food quality (2)

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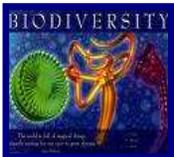
-Elucidation and clarification of relationship between the environment and the food quality. Examination of the influence of agricultural practices, wild species and intra-species biodiversity, environmental factors and other factors on food quality and food safety will be carried out .

-Examination of new technologies through the integration of advanced technologies into traditional food production (i.e. fermented food, physical methods for conservation, new packaging systems).

-Development of a new system of production, consumption and marketing of foodstuffs products and support towards a *sustainable and productive system*.

## Different approaches and research strategies for improving food quality (3)

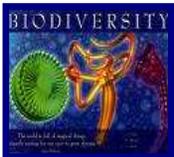
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-Formulation and dissemination of dietary guidelines, educational strategy and social education principles and public health protection handbook on the benefits, risks, safety of specific dietary choices will be carried out, assessing consumers' information needs and encouraging the consumers to choose a healthy diet; the importance of a balanced diet, and its impact on health, will be presented to consumers. In particular, the importance of local/traditional foods in this respect will be a key element.

-Elaboration of indications on production and transformation processes of farmers and agro-industries, in both developed and developing countries for improving the nutritional properties.

-The cooperation between researches in Europe should lead up to nutrition guidelines efficient and equitable in Europe Community.



## Conclusion

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The future of food is in the joint efforts of government, food producers, public health authorities, and consumers. The overall benefits can be described in terms of increasing the nutritional value of local/traditional foods in the various European countries, ensuring their quality and education of consumers regarding the use of those foods, fitting into a recommended dietary food pattern.