



Zürcher Hochschule  
für Angewandte Wissenschaften

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## Gesundheitswert von Olivenöl – neue und alte Erkenntnisse –

10. International Olive Oil Congress Zurich




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## Outline

- Introduction
- Olive oil and its health properties
- Olive oil and phenols
- Olive oil and what we know about its health properties today
- Conclusions



## Introduction



- Many archeological findings give testimony of the ancient use of olive oil for more than 7000 years
- An old proverb in Greece states that «bread gives substance, oil gives richness»
- Due to Greek myths, it was the Godness Athens who gave the olive tree as a gift to the people
- Until today, the olive tree is looked upon as symbol of hope, peace and sacredness
- Today we find the sign of the olive tree as part of the UN flag!



## The symbol of the olive branches the world ...

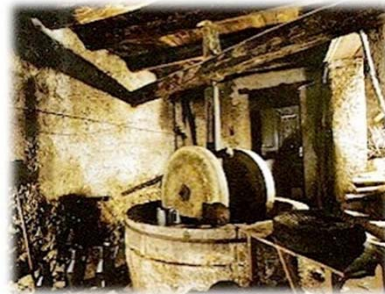




## Olive oil and its health properties



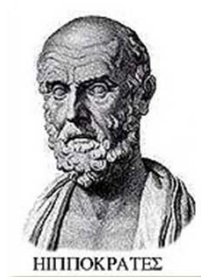
In the past olive oil has been used as a traditional medicine curing almost every then known maladies such as ear aches, stomach aches, constipation, ointment for swellings, beauty agent and even as aphrodisiac treatment.



## Hippokrates:



«Your food should be your Pharmakon and your pharmakon should be your food. The best way, however, to bring forward your inner doctor (healing) is when solid food is omitted. This will lead to the forthcoming of wonderful healing power»



## World wide dietary patterns of lipid intakes

There seems to be a world wide «lipid pattern» of diets, which is regionally very heterogenous but distinct, both in its health consequences and life style:

- High total dietary lipids, high intake of animal lipids (most EU, North America, Oceania, high incidence of CHD, cancers)
- High total dietary lipids, low intake of animal lipids (mediterranean countries, low CHD and cancer rates)
- Moderate dietary lipids, low intake of animal lipids (Middle East, South America, low incidence of CHD, cancers)
- Low dietary lipids, low intake of animal lipids, (Asia, Africa, low incidence of CHD, low rates of cancers)

## Dietary lipids availability according to source world wide

**TABLE 1**  
Dietary lipids availability according to source in major world regions (1990)<sup>1</sup>

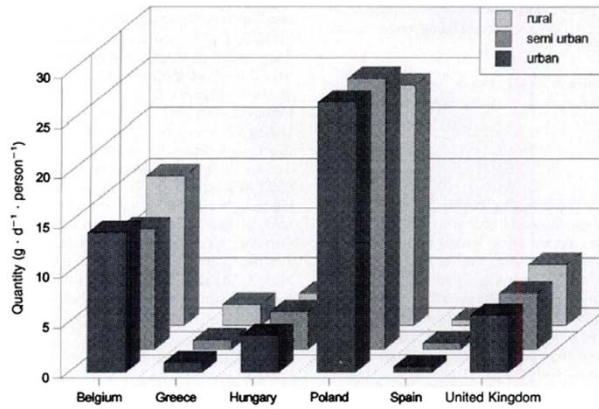
Region	Total dietary lipids availability $g \cdot d^{-1} \cdot person^{-1}$	Visible dietary lipids from		Invisible dietary lipids from		
		Plants <sup>2</sup>	Animals	Meats	Dairy	Plants
Africa	43	48	4	9	5	34
Far East	45	35	6	24	6	29
Near East	72	49	7	11	7	26
South America	75	43	9	22	10	16
Former Soviet Union	107	25	22	26	12	15
Oceania	138	20	18	40	13	9
Europe	143	30	20	28	12	10
North America	151	39	9	27	14	11
World	68	36	11	23	9	21

<sup>1</sup> Data from the Food and Agriculture Organization (4).

<sup>2</sup> Including margarines.

Quelle: Trichopoulou et al, 1997, 962S

## Data from DAFNE (Data Food Networking project of the European Union)



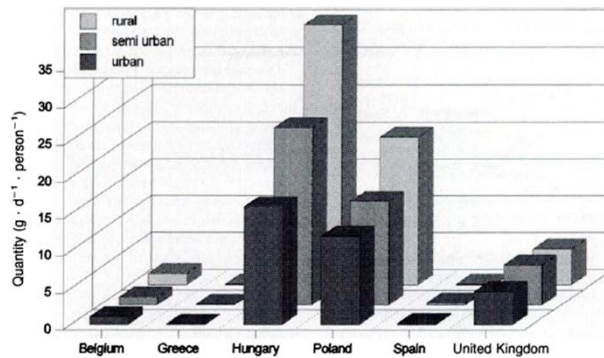
**FIGURE 1.** Availability of butter in six European countries, circa 1990. Data from household budget surveys, as integrated in the Data Food Networking (DAFNE) project of the European Union.

Quelle: Trichopolou et al, 1997, 962S

## Data from DAFNE (Data Food Networking project of the European Union)

### DIETARY LIPIDS AND HEALTH IMPLICATIONS

963S



**FIGURE 2.** Availability of visible animal lipids other than butter in six European countries, circa 1990. Data from household budget surveys, as integrated in the Data Food Networking (DAFNE) project of the European Union.

Quelle: Trichopolou et al, 1997, 963S

## Data from DAFNE (Data Food Networking project of the European Union)

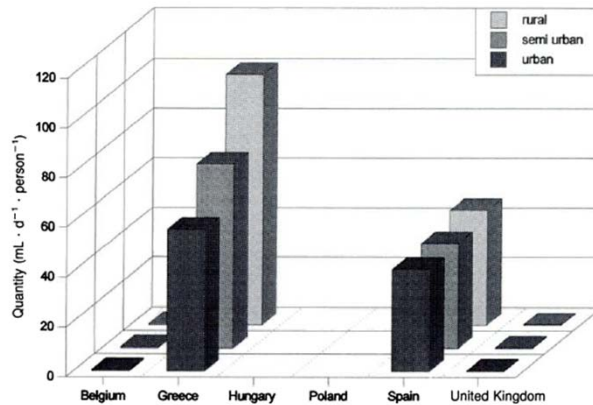


FIGURE 3. Availability of olive oil in six European countries, circa 1990. Data from household budget surveys, as integrated in the Data Food Networking (DAFNE) project of the European Union.

Quelle: Trichopoulou et al. 1997, 963S

## Olive oil as part of the health concept



It was Ancel Keys, who developed the concept of “the Mediterranean diet” which was initiated by the findings of his Seven Countries Study in the 1950s. In this study there were remarkable findings that despite a high fat intake, the population of the island of Crete in Greece had very low rates of coronary heart disease and certain types of cancer and had a long life expectancy. Keys considered the traditional dietary patterns typical of Crete, much of the rest of Greece, and southern Italy in the early 1960s to be largely responsible for the good health observed in these regions.



## Olive Oil today



Despite the fact that already in the 50s olive oil was seen as part of a healthy diet, in 1981 olive oil, especially Spanish olive oil, was shadowed by a huge **scandal** which had caused hundreds of deaths and many more people injured.



The 80s were years of **fat phobia**, high blood cholesterol levels were thought to be directly linked to fat intake. This as a consequence led to many «recommendations» such as reducing fat intake or even banning fats and oils.

## New scientific insights



For many decades dietary recommendations have focussed on two principles:

- Reduction of dietary lipids
- Increasing of the proportion of the ration of polyunsaturated fatty acids and saturated fatty acids

Yet is has to be questioned:

- if a diet low in lipids is feasible and reasonable in Western diets
- if we should rely on polyunsaturated fatty acids whose role in human diets is still not fully clear
- if we better consider diets of people with a high rate of longevity and lower cancer rates

## Problems related to nutrition in Europe



- ✓ Obesity levels in the EU have risen by between 10-40% over the past decade.
- ✓ Range of obesity prevalence in EU countries is from 10% to 27% in men and up to 38% in women.
- ✓ Obesity accounts for up to 7% of health care costs.
- ✓ In the EU, 9.6% of disability-adjusted life-years are lost due to poor nutrition, obesity and physical inactivity (compared with 9% due to smoking).

Obesity is a risk factor for many serious illnesses, including heart disease, hypertension, stroke, diabetes, respiratory disease, arthritis and certain types of cancer.

## Nutritional Problems today



Coronary heart diseases  
Overweight  
Diabetes  
Cancer  
Eating disorders

# Overweight adults



source: Deutsches Diabetes-Zentrum DDZ Düsseldorf, 2007

# Overweight children

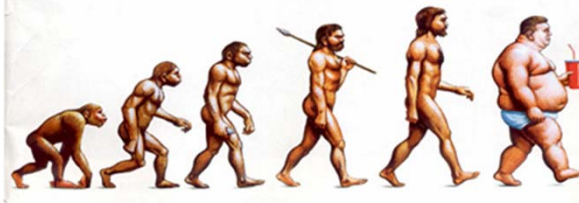


source: Diabetes-Stiftung [www.diabetes-risiko.de/dr\\_news\\_single.html?&n...\\_10.01.2007](http://www.diabetes-risiko.de/dr_news_single.html?&n..._10.01.2007)

**The  
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**The shape of things  
to come**



## Olive oil, a change in the fat discussion



Nutritional epidemiology has developed, since there is an increasing interest in the onset of diseases which we understand as nutrition related.



## Mediterranean diet



- This is a diet of food patterns typical of Crete, Greece, and southern Italy in the early 1960s.
- The diet emphasizes plenty of plant foods, 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. Total fat in this diet is 25% to 35% of calories, with saturated fat at 8% or less of calories (Willet et al 1995)



## Mediterranean diet



<http://zero-luna.com/wp-content/uploads/2011/03/mediterranean-diet-food-pyramid.jpg>

## Health properties of olive oil



- The main components of olive oil are oleic acid, phenols and squalen.
- Oleic acid is a monounsaturated fatty acid which has been discussed to inhibit oxidative stress.
- In olive oil there is also a range of phenols (between 196-500 mg/kg). Virgin oil has a higher content of phenols than refined virgin oil.



## Health promoting effects of olive oil



- Phenols inhibit auto oxidation, scavenge free radicals and inhibit low density lipoprotein oxidation.
  - Oxidation of LDL cholesterol has been identified as one of the first steps in the development of atherosclerosis and membrane lesion.
- Preventing LDL oxidation is therefore a major step in prevention of CHD
- Squalene is believed to be responsible for lower skin cancer



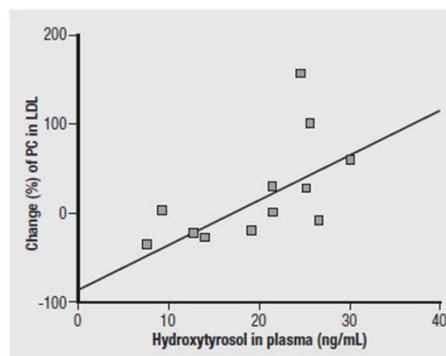
## Blood pressure and olive oil



Olive oil and vegetables ingestion, which are frequently consumed together, indicated that olive oil has the dominant beneficial effect on arterial blood pressure in the Greek population. In epidemiological studies there is a reduced incidence of hypertension of populations that follow a mediterranean diet.



## Phenols and LDL plasma levels



**Fig. 1 |** Relationship between the change in the total phenolic content (PC) of the LDL and plasma hydroxytyrosol concentrations at 30 minutes after ingestion of 40 mL of a high phenolic content (366 mg/kg) olive oil.  $R = 0.780$ ,  $P = 0.009$ , Spearman's correlation coefficient. Adapted from: Covas et al., *Free Radic Biol Med*, 2006 [51].

Quelle: Fito et al, 2007

## Olive oil and cancer prevention



- Our immune system has to recognize and destroy cells that are likely to turn into a tumor or kill tumors after they have been formed.
- In various studies of olive oil consumption, it has been shown, that olive oil has properties to lower malignant neoplasms. The antioxidant effects of olive oil has antiinflammatory potential.
- Especially in epidemiological studies it was shown that a higher olive oil consumption correlates with lower risks of breast cancer



## Beneficial role of olive oil based diet



- It does not require extreme restrictions of fat intake
- It does not rely on polyunsaturated fatty acids
- It is a diet that was tested for thousands of years in the mediterranean area and proved to be beneficial!



## Conclusions



- Health is linked with diet and it is recommended to avoid obesity, to increase intake of fruits, vegetables, whole grains, limit alcohol intake and decrease animal fats.
- The mediterranean diet provides an excellent example of such a diet including high amount of olive oil.
- Olive oil contains components which have protective properties: phenols, oleic acid and squalene, tocopherol. Much still needs to be addressed in further research, olive oil today is even recommended when it comes to xerostomia!
- Historical, epidemiological and clinical studies support the findings, that olive oil is a product with unusually high potentials as a healthy food.
- As such, olive oil combines in an ideal way properties that contribute to a highly palatable and healthy diet!

# Thank you



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