DO LOW PRICE FISH, HAVE HIGH NUTRITIONAL VALUE?

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ABSTRACT

The aim of this paper was to compare the nutritional value of some low price fish (*Sardina pilchardus, Engraulis encrasicholus, Anguilla anguilla, Salmo trutta, Mugil chepalus*) to high price fish with high consumption rate (*Sparus aurata, Merluccius merluccius, Dicentrarchus labrax*).In general, the commercial values of several fish species in Greece was not always related with the nutritional value (proteins, lipids and polyunsaturated fatty acids). Despite the price differences, total lipid content is higher in eel (*Anguilla anguilla*) and grey mullet (*Mugil chephalus*), compared to other species. Moreover, concerning unsaturated fatty acid content, there are significant differences in favour of grey mullet and sardine (*Sardina pilchardus*). Differences in favour of eel are also reported for cholesterol, as well as differences in energy content in favour of eel and grey mullet. Absorption index for all species was higher than 0.92. In conclusion, fish with very low price seem to have the same or higher nutritional and energy value, compared to highly priced fish.

Keywords: nutritional value, commercial fish value, proteins, lipids, polyunsaturated fatty acids, cholesterol, energy.

INTRODUCTION

Nutritional value of fish as in case of any other food sources, depends on the qualitative and quantitative substance of nutrient elements, their digestibility and the energy that are capable to release during metabolism. The rarer and essential nutrient elements are included in the food sources, the more their nutritional value is increased [1, 2].

Polyunsaturated fatty acids (PUFAs n-3) cannot be synthesized by the human organism, even though they are essential. Therefore, they must be taken through food consumption. Fishery products are the primary natural food sources containing PUFAs (n-3). PUFAs n-3 are considered having anti-canser properties [3], reduce cholesterole, cardiac pathologies, brain thrombosis and cerebral episodes [2]. Moreover, they enhance the immune system [4].

The aim of the paper was to: a) assess the qualitative substance of proteins and lipids of the edible part of the previously mentioned fish species b) estimate the nutritional value concerning their content in nutritional elements and c) correlate the nutritional value (protein and PUFAs content) of fish with their commercial value

MATERIALS & METHODS

Fifteen specimens of commercial size from each species were formed the monthly sample used for flesh quantitative analysis (MOPFA method, bomb calorimeter, chromatography) [5,6]. The analyses were performed in an annual base during 2007.

RESULTS

Mean annual content of nutritional elements (proteins and lipids) per 100 g of flesh, energy content, cholesterole and mean annual prices during 2007 are shown on Table I.

Table I: Mean values of protein and lipid content (g), cholesterol (mg), energy (Kcal) in 100 g of edible part of fish and commercial value per Kg

Species	Proteins (g)	Fat (g)	Saturated Fatty Acids (g)	PUFAs (g)	Cholesterole (mg)	Energy (Kcal)	Mean annual price (€ /Kg)
Sardina pilchardus	**17,4**	**3,2**	**0,7**	**1,0**	**60**	**98**	**2,75±1,0**
Salmo trutta	**14,7**	**3,0**	**0,7**	**0,4**	**55**	**86**	**5,0±0,5**
Engraulis encrasicholus	**16,8**	**2,4**	**0,6**	**0,6**	**70**	**89**	**5,7±1,5**
Anguilla anguilla	**14,6**	**19,6**	**4,9**	**0,5**	**117**	**237**	**6,0±1,0**
Mugil chephalus	**15,8**	**6,8**	**2,2**	**1,3**	**70**	**127**	**6,0±3,0**
Dicentrarchus labrax	**16,5**	**1,5**	**0,3**	**0,3**	**64**	**82**	**10,5±1,5**
Merluccius merluccius	**17,0**	**0,3**	**Traces**	**0,1**	**46**	**71**	**15,0±2,0**
Sparus aurata	**19,8**	**1,2**	**0,3**	**0,3**	**52**	**90**	**23,0±5,0**

Correlation between the protein content of each species and their commercial price is shown in Figure 1. Correlation is positive ($r=0,73$, $n=8$, $p<0.05$).

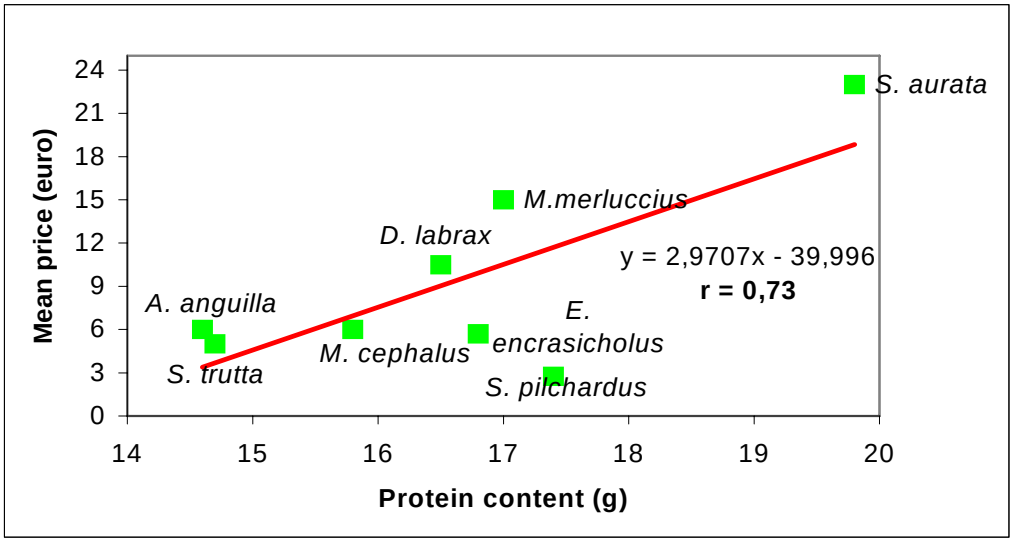

Figure 1. Correlation between protein content and commercial value of fish

On the other hand, correlation between PUFAs content of each species and commercial price is negative (r=-0,58, n=8, p>0.05) (Figure 2).

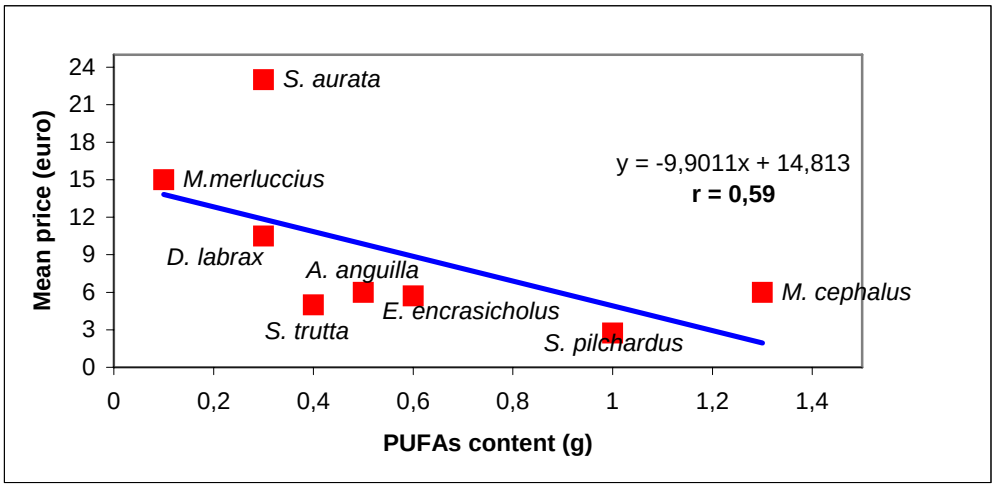

Figure 2. Correlation between PUFAs content and commercial value of fish

DISCUSSION

Species under investigation were nutritionally classified in the following order:

Proteins: *Sparus aurata> Sardina pilchardus> Merluccius merluccius > Engraulis encrasicholus> Dicentrarchus labrax> Mugil chepalus> Salmo trutta> Anguilla anguilla.* No major divergence between species.

Fat: *Anguilla anguilla > Mugil chepalus> Sardina pilchardus> Salmo trutta > Engraulis encrasicholus> Dicentrarchus labrax> Sparus aurata> Merluccius merluccius.* Major divergence in favour of eel and grey mullet.

PUFAs: *Mugil chepalus> Sardina pilchardus> Engraulis encrasicholus> Anguilla anguilla> Salmo trutta> Dicentrarchus labrax> Sparus aurata> Merluccius merluccius*. Major divergence in favour of grey mullet and sardine.

Energy: *Anguilla anguilla> Mugil chepalus> Sardina pilchardus> Sparus aurata> Engraulis encrasicholus> Salmo trutta> Dicentrarchus labrax> Merluccius merluccius.* Major divergence in favour of eel and grey mullet.

In general, species with high protein content have higher mean commercial prices. However, in the case of *Merluccius merluccius* and *Engraulis encrasicholus*, it seems that their nutritional value is not reflected on their commercial value. The correlation between the PUFAs contents and commercial price clearly showed that species with high PUFAs contents had the lower price in the market. In conclusion, it was ascertained that popular low price fish had the same and often higher nutritional value compared to high price fish.

REFERENCES

Kinsella JE, Lokesh B, Broughton S, Whelan J. Dietary PUFA and eicosanoids Potential effects on the modulation of the immune function. An overview, *Nutrition* 1990, 6:1: 24-44

Keli SO, Feskens EJM, Kromhout D. 1994. Fish consumption and risk of stroke: The Zutphen study. *Stroke*, 25:328-332

Doll R and Peto R. 1981. The causes of cancer. Quantitative estimates of avoidable risks of cancer in the United States today. *Journal of the National Cancer Institute*, 66: 1191-1308

Marsall LA & Johnston PV, 1985. The influence of dietary essential fatty acids on a rat immunocompetent cell, prostaglandin synthesis and mitogen-induced blastogenesis. The *Journal of. Nutrition*., 115: 1572-1580

Papanastasiou D. 1990. Technology and quality control of fishery products, ION, Athens, pp. 191-213.

Stansby E.M. 1962. Proximate composition of fish. (Fish in Nutrition), *FAO*, London, 57p.