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Use of compositional analysis to distinguish farmed and wild gilthead sea- bream (*Sparus aurata*)

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RIASSUNTO – Orate selvagge e allevate: differenze chimico-bromatologiche e riconoscimento del metodo di produzione. *La ricerca ha lo scopo di valutare e di confrontare tra loro le caratteristiche chimico-bromatologiche e le proprietà nutrizionali di lotti di orate differenti per il metodo di produzione, nell'intento di identificare taluni indicatori atti a consentirne il riconoscimento. In considerazione dei risultati ottenuti le orate allevate possono essere differenziate dai soggetti pescati in virtù del più abbondante contenuto in lipidi del tessuto muscolare, del superiore quantitativo in acidi grassi monoinsaturi ed in acidi grassi polinsaturi facenti parte della serie n-6 e al tempo stesso in relazione alla minore quantità percentuale di acidi grassi appartenenti invece alla serie n-3 riscontrata nella porzione commestibile.*

Key words: gilthead seabream, fatty acids, principal component analysis, linear discriminant analysis.

INTRODUCTION – Recent food scares have emphasized the need for traceability in the food chain. This is particularly true in the fish sector, where a large difference in the final price between wild and farmed fish and even between farmed fish reared in different countries exists. So for these commercial and hygienic rea-

sons it is very important to find useful tools for the characterization of quality of fish and for the differentiation of fish from different production methods and from different countries, in accordance with EC Regulation No. 2065/2001 and Italian Ministry of Agriculture Decree No. 27.03.02, that allow retail trade of fishery and aquaculture products only against the indication of the official commercial name, the method of production and the geographical origin of fish (Moretti *et al.*, 2003).

On this basis, and owing to the commercial importance of marine fish species in most of the Mediterranean countries (ISMEA, 2003), the objectives of the present study were the evaluation of the fillet proximate and fatty acid compositions of farmed and wild gilthead seabream (*Sparus aurata*) and the identification of chemical markers suitable to discriminate the samples according their method of production by means of Principal Component and Linear Discriminant Analyses.

MATERIAL AND METHODS – From September 2003 to June 2004 46 cultured seabream (average weight = 326.7 g) were purchased by four different productive countries (Italy, Greece, Croatia and Turkey). At the same time 19 wild seabream (average weight = 241.4 g), caught in the Mediterranean Sea, were collected from wholesale fish market of Milan.

Fillets were analysed for moisture, protein, lipid and ash according to A.O.A.C. (1996) standard procedures. Fatty acid analysis was carried out on a gas chromatograph fitted with a flame ionisation detector, after extraction of total lipids according to Bligh and Dyer (1959) and preparation of fatty acid methyl esters according to Christie (1982).

Data are reported as mean \pm standard error of mean. Homogeneity of variance was confirmed and comparison between means was completed by one-way ANOVA (significance was accepted at $P < 0.05$). Finally data were subjected to Principal Component Analysis and Linear Discriminant Analysis when appropriate.

RESULTS AND CONCLUSIONS – Results concerning protein and lipid contents (% of wet weight) and the most important fatty acids or fatty acid classes (% of total fatty acids) are shown in Table 1. Data are reported as mean \pm standard error of mean; means within rows without superscript are not significantly different from each other.

Table 1. Protein and lipid contents (% of wet weight) and the most important fatty acids or fatty acid classes (% of total fatty acids) of farmed and wild seabream.

	Farmed seabream	Wild seabream
Crude protein	23.3 \pm 0.29 ^b	20.4 \pm 0.38
Crude lipid	2.6 \pm 0.14 ^b	0.7 \pm 0
C18:1n-9	17.57 \pm 0.26 ^b	12.42 \pm
C18:2n-6	12.47 \pm 0.60 ^b	1.22 \pm 0