

Chemical characterization of European eels (*Anguilla anguilla*) of different origins collected from Italian market

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European eels farming is based on different production systems: an extensive culture in brackish water of lagoon known as *valliculture*; an intensive farming in earth tanks with the use of moist feed, common in Italy, and an iper-intensive culture in recirculation systems with the use of extruded feed, typical of Northern European countries. Generally, eels are marketed into two different sizes: large eels named *Capitoni* (C) (>400 g live weight) and small eels, *Buratelli* (B) (~100-200 g live weight). In order to investigate the influence of production system on the proximate composition of eels a total of 37 eels were collected: 14 were from Italian intensive farming (C+B), 12 (C+B) from iperintensive farming (6 raised in Netherland and 6 in Denmark), 6 were captured in Adriatic Sea and 5 were purchased in an Italian valliculture. The fillet proximate composition (AOAC standard methods) and fatty acid profile were determined and data were analysed by SPSS 22 statistical package. Intensively and iper-intensively farmed eels presented a higher lipid content (30.2%) than lagoon raised (16.7%) and wild eels (15.9%). In addition, the protein content showed differences among groups, resulting 14.1%, 16.7%, 18.5% in intensive farmed, lagoon and wild eels, respectively. Fatty acid profile revealed some interesting differences among origins. Eels fed with wet feed did not show differences between sizes C and B; they presented the highest amount of oleic acid (41.0%) and linoleic acid (7.7%) and the lowest amount of *n*-3 polyunsaturated fatty acid (*n*-3 PUFAs, 9.8%) when compared to others eels. No differences were found between Danish and Dutch eels where gondoic and cetoleic acids were found to be more abundant in B than C.

As concerns valliculture and wild eels, they presented different content of linoleic acid, which was 3.6% in lagoon eels and 1.3% wild eels. Even if the total *n*-3 PUFAs did not vary between these two groups, a different ratio between EPA, dominant in wild fish, and DHA, more abundant in lagoon eels, was observed.

Our results confirm the correlation between fatty acid profile of muscle and the production system, with emphasis on the impact of fish diet. It appeared that wet and extruded feed were formulated using different lipid sources and that B and C farmed in Northern Europe received different diets. Differences were also found between wild and lagoon eels, suggesting that apparently similar *habitats* could present different food web structure.