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PROXIMATE COMPOSITION OF EDIBLE SEA URCHIN *PARACENTROTUS LIVIDUS* ROE COMMERCIALISED IN SARDINIA

COMPOSIZIONE CENTESIMALE DI GONADI DEL RICCIO DI MARE EDULE PARACENTROTUS LIVIDUS *COMMERCIALIZZATE IN SARDEGNA*

Abstract *- Chemical analyses on edible sea urchin* Paracentrotus lividus *(Echinoidea) gonads legally (L) and illegally (I) sold in Sardinia (Italy) were carried out during the fishing season 2008-2009. Statistical tests performed on moisture, ash, crude protein, lipid and carbohydrate content detected significant differences between L and I samples, but also among roe illicitly commercialised (I) by ambulant vendors in different Sardinian coastal districts.*

Key-words: *chemical composition, roe fisheries,* Paracentrotus lividus*, Mediterranean Sea.*

Introduction - The purple sea urchin *Paracentrotus lividus* (Lamarck, 1816) is an Echinoid of commercial importance with a high market demand for its roe. In Sardinia, the harvesting of this species is intensively practised (Pais *et al.*, 2007) and, with the exception of a few authorised dealers, it is illicitly sold without veterinary inspection. Since a recent study has demonstrated significant differences in the microbial content of sea urchin roe legally and illegally commercialised in a number of Sardinian coastal districts (Floris *et al.*, 2009), the aim of this work was to compare their proximate composition in order to highlight further differences in their quality traits.

Materials and methods - Sea urchin roe collected in the Gulf of Oristano and packed in glass jars by an authorised seafood dealer (hereafter L), and roe samples purchased from unauthorised ambulant vendors (hereafter I) in the districts of Alghero, Sassari and Cagliari were analysed during the fishing season 2008-2009. Three samples from each group were tested. Every sample was initially homogenised, then the moisture content was determined after drying in an oven at 105 °C for 24 h. Ashes were evaluated after combustion at 550 °C for 12 h in a muffle furnace. Crude protein was obtained by the Kjeldhal method (AOAC, 1990), and total lipids were quantified through the method proposed by Folch *et al.* (1957). Finally, carbohydrate content of each sample was determined by difference. All analyses were carried out in triplicate, and the results were expressed as percentages of the wet weight (%WW). One-way Analysis of Variance was used to detect putative differences between the roe analysed and the Student-Newman-Keuls (SNK) test was used for *post-hoc* comparisons.

Results - Proximate composition of *Paracentrotus lividus* roe examined is reported in Tab. 1. The sea urchin gonads legally packed (L) in Oristano showed a significant higher moisture content ($p<0.01$) than those illicitly sold (I) in Alghero, Cagliari and Sassari districts, respectively. On the other hand, ash, crude protein, total lipid and carbohydrate content of the L group was always lower (Tab. 1) than those illegally commercialised by ambulant vendors. For these latter variables, however, the SNK test revealed significant differences ($p<0.01$) also among the I roe samples, being those from Cagliari always characterised by higher mean values (except for ash content).

Tab. 1 - Proximate composition (% wet weight±SD) of *Paracentrotus lividus* gonads (L=legal; I=illegal). Different superscripts indicate significant differences ($p<0.01$).

Composizione centesimale (% peso umido±DS) delle gonadi di Paracentrotus lividus *(L=legali; I=illegali). Esponenti diversi indicano differenze significative (p<0,01).*

	Oristano (L)	Alghero (I)	Cagliari (I)	Sassari (I)
Moisture	85.00±0.41^a	84.06±0.76^b	81.77±0.43^c	84.27±1.18^b
Ash	1.88±0.03^c	2.10±0.12^b	2.21±0.03^b	2.35±0.25^a
Crude protein	10.96±0.21^c	11.64±0.65^b	12.20±0.28^a	10.60±0.68^c
Lipid	1.87±0.09^c	1.85±0.05^c	2.17±0.08^a	1.98±0.09^b
Carbohydrate	0.29±0.12^c	0.35±0.10^c	1.65±0.18^a	0.80±0.27^b

Conclusions - This study evidenced significant differences in proximate composition of *Paracentrotus lividus* roe legally and illegally commercialised in several Sardinian coastal zones. In particular, sea urchin gonads packed by an authorised seafood dealer showed a higher content of moisture, probably due to intense washing procedures before packaging (De la Cruz-García *et al.*, 2000). Previous studies have highlighted seasonal variations in the chemical composition of raw sea urchin roe from both Mediterranean (Dincer & Cakli, 2007; Mol *et al.*, 2008) and Atlantic areas (Montero-Torreiro & Garcia-Martinez, 2003), but little is known about quality changes due to handling or alteration of the product. In fact, while *P. lividus* gonads illicitly sold can have different quality traits attributable to different time periods from harvest to sale (the so-called "food miles"), further research is needed to test if legal glass jars storage can modify the chemical-bromatological properties of the purple sea urchin roe.

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