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To cite this article: A. Felici, P. Melotti, A. Roncarati, C. Bianchi, L. Forlini & A. Dees (2007) Natural and synthetic pigments used in the pink-red coloration of salmon flesh: methodology of quali-quantitative assessments and sampling results, Italian Journal of Animal Science, 6:sup1, 799-799, DOI: [10.4081/ijas.2007.1s.799](https://doi.org/10.4081/ijas.2007.1s.799)

To link to this article: <https://doi.org/10.4081/ijas.2007.1s.799>



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Published online: 15 Mar 2016.



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# Natural and synthetic pigments used in the pink-red coloration of salmon flesh: methodology of quali-quantitative assessments and sampling results

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## ABSTRACT

In Europe Atlantic salmon leads the first position in the farmed species contest with more than 763,000t (FES, 2007). In the year 2006, Norway produced alone beyond 603,000t followed by the United Kingdom with 128,000t. In these last years, the demand of organic salmon is gradually increased both in domestic and foreign markets. In these fish the pink-red coloration of flesh is obtained by supplementing the feed with shrimp waste meal. In Italy, Coop Italia since three years has started the commercialization in the context of "prodotti a marchio" of Atlantic salmon farmed following prescriptions reported in terms of specification that prohibits the use of synthetic and GM pigments in the feeds. In collaboration with this supermarket company, the Faculty of Veterinary Medicine of Camerino University carried out the quali-quantitative assessments on the presence of molecules and relative isomers that distinguish the natural carotenoid pigment from the synthetic one. Skinned portion of fillet (10g) were collected from dorsal muscle (retro-cranial, central and caudal region), mixed and homogenized and repeatedly extracted with acetone until they were colourless. The pooled extract were filtered and an aliquot (10ml) was centrifugated (2200xg, 5min). The astaxanthin content in the supernatant was determined by HPLC using a Varian ProStar instrument equipped with UV/vis detector using an external astaxanthin standard at detection wavelength 470nm. Analysis was performed on a Varian Kromasil 100 C 18 250x0.3 mm according to Bjerkeng *et al.* (1997). Identification and determination of stereoisomers were carried out by means of a Sumichiral a-phenylglycine 250x4.6mm column following Abu-Lafi and Turujman method (1999). The analysis performed on all the organic fish have demonstrated the exclusive content of natural pigment. In this group (b.w.=3.9-4.4kg), C-Card for salmonids ranged between 26±1 in 2004 and 21.5±1.3 in 2005 and 21.5±2.1 in 2006. Astaxanthin and isomers decreased from 5.6±0.3mg/kg in 2004 to 2.9±1.1mg/kg in 2006. The low-cost non organic salmon group (b.w.=4.5-4.6kg) resulted pigmented only with synthetic carotenoids and C-card for salmonids ranged between 27.3 in 2004 and 23.7 in 2005 whereas in 2006 it was observed equal to 27. Also in this batch, astaxanthin and isomers decreased passing from 6.5mg/kg in 2004 to 4.9mg/kg in 2006.