

## ABSTRACT

The Patagonian toothfish is one of the fishing species in the Argentinian Sea with the highest commercial value in the world market. It is a fatty fish that is frozen on board and exported mainly headed and gutted -H&G-. However, this is not enough to prevent illnesses that may be caused by this food. The processing of the fish with low dosis of ionizing radiation can eliminate the risk of these illnesses and, what is more, extend its shelf life.

The aims of this work were to provide information about the quality of the headed and gutted portion of Patagonian toothfish captured in the FAO N° 41 area, during its long-term storage at -18°C and to know the effect of Co<sup>60</sup> gamma irradiation on its preservation.

For this purpose it was necessary to determine its oxidative rancidity, the content of nitrogen of total volatile bases, its pH, the composition of lipids and fatty acid in this portion as well as its smell and taste.

In a first stage it was found that the oxidative rancidity was not significant in the different parts of this portion. However, when some signs of operative failures appeared, there was an increase in the secondary lipid oxidation products. Later, it was found that, in general, the application of 1, 3 and 5 kGy Co<sup>60</sup> gamma rays to the frozen products did not affect its oxidative rancidity, its nitrogen of total volatile bases and its muscle pH during storage.

In the defrosted portion kept al 5°C, both the control and irradiated samples were acceptable after storage of up to 72 hours. The fatty acid profiles of the samples had monounsaturated fatty acid as their main components, being the oleic acid (18:1) the principal element in this group. The saturated fatty acid appeared next, especially the palmitic acid (16:0). Seventeen per cent of all the fatty acids were the polinsaturated ones, among which the eicosapentaenoic acid (20:5 n-3) and docosahexaenoic (22:6 n-3) appear as the main ones in the group.

The application of 1 and 5 kGy doses did not affect either the fatty acid profiles or the triglicerides and phospholipids contents and it did not cause the formation of trans fatty acids either. As regards sensorial analysis, the evaluation of odor and taste was more effective in cooked fish than in raw ones.

It was also found that the 1 kGy doses kept good quality for four months more than its control group, whereas the 3 and 5 kGy doses had a detrimental effect. The effects of the different irradiation doses on the analyzed parameters were explained taking into account the present knowledge the radiation chemistry of food.

In conclusion, the H&G portion of Patagonian toothfish captured in the Argentinian Sea presents stability during long-term storage in frozen state. When the product is irradiated with a low dosis of gamma rays it keeps an excellent state for more time. Moreover, the irradiation technology renders the product microbiologically safe, keeping the nutritional characteristics of its fatty acids. Furthermore, these results may be considered as valuable background for the fishing industry as well as the sanitary authorities so as to permit the incorporation of these irradiated marine foods in the Argentine Food Code.