

EFFECT OF TWO SALT CONCENTRATIONS ON PROXIMATE COMPOSITION, OXIDATION AND FATTY ACID PROFILE OF MISSOLTINO, AN ITALIAN TRADITIONAL FISH PREPARATION

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Introduction

Missoltino is a traditional Italian product obtained from salted and dried twaite. Twaite (*Alosa fallax lacustris*) is a landlock subspecies of shad (*Alosa fallax*), an endemic fish of northern Italian lakes. A large amount of these fish is caught near its reproductive period, during the end of spring. This reason had led local professional fishermen to find a way to preserve the fish for all the year using an old-fashioned preservation techniques. Briefly the freshly-caught twaite, weighing about 80g, are eviscerated and then salted using fine sea salt, about 80g kg⁻¹ of fresh fish, for 2 days. The exceeding salt is removed by water washing and the fish are naturally dried in a room for 3-5 days, according to the humidity and temperature. Afterwards fish are arranged in layers in metallic containers and pressed for a long period, nearly 3 month. These containers are closed with a wooden lid and the pressure is progressively increased with a crank handle. During this period fish lose water and lipid. The maximum loss occurs in the first twenty days.

The aim of this work is to study the effects of the use of two different levels of salt during the preparation of missoltino on the quality of product, according to the WHO advice of reduce the amount of salt in human diet to prevent cardiovascular disease.

Materials and methods

Samples of twaite caught in Como lake were collected during the summer of 2010 and used to make missoltini with 2 different salt concentrations, 80g kg⁻¹ (A) and 40g kg⁻¹ (B). Four samples were sampled: a) after catching, b) during salting c) after 30 days, d) after 60 days and e) after 90 days of pressing. Analyses were carried out also on the fresh fish. Moisture, protein and ash were determined according the AOAC methods (1996); lipids were determined according to Folch (1957), thiobarbituric acid value (TBARS) was investigated according to Vyncke (1975). Fatty acids were determined by chromatographic analysis according to Christie (1982).

Results

Fresh twaite used in this trial showed a lipid percentage of 6.7± 2.41. This percentage increased progressively in missoltini while the moisture content decreased during drying and pressing. The salt percentage had a direct influence on the lipid content; in missoltini made using 80g kg⁻¹ of salt lipids are lower than missoltini made using 40g kg⁻¹ of salt. This difference is statistically significant (p < 0.001) after 2 months of pressing (B 5.93 ± 0.15, A 10.4 ±0.43) and after 3 months to the same extent. Salt influenced obviously the ash content, being a part of it. Ash and fat are negatively correlated with a significance level of 0.002. Moisture and protein did not show variations after the first month of pressing.

TBARS values were statistically different after 60 days of pressing. Group A showed a higher TBARS (0.15 ±0.006 mM g⁻¹ of malondialdehyde) when compared to group B (0.13 ±0.012 mM g⁻¹ of malondialdehyde). These values were not correlated with lipid concentration.

The fatty acid profile of missoltino was characterized by the prevalence of oleic acid (18:1n-9, 25.5% \pm 2.03), followed by palmitic acid (16:0, 21.4% \pm 2.04). The content of polyunsaturated fatty acid was also high, especially for fatty acid belongs to n-3 series, eicosapentaenoic acid (EPA) (8.2% \pm 0.70) and docosahexaenoic acid (DHA) (5.7% \pm 0.90).

Moreover, the fatty acid profile of missoltino showed some difference if compared to the fresh fillet. Saturated fatty acid, mainly palmitic acid, increased during the ripening of salted product, (from 27.4% \pm 0.39 to 30.5% \pm 2.45) while the polyunsaturated fatty acid decreased (from 34.8% \pm 2.21 to 33.2% \pm 1.69). Palmitic acid was the only fatty acid affected by the different salt concentration used in missoltino preparation and its content was statistically lower in group A than in B (24.4% versus 26.6%).

Conclusions

According to our results missoltini have a good nutritional value even if the content of polyunsaturated fatty acid was lower compared to fresh twaite. The reduction of salt usage could improve the nutritional quality of the product with a higher fat concentration and led to a reduction of lipid oxidation during ripening. Further work on salt reduction should be carried out to investigate the microbiological properties of missoltini made with a lower concentration of salt.

References

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