

Biogenic amine level and microbial contamination as quality and safety indicators of dried fish and squid snacks

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Introduction: Biogenic amines (BA) are present in a wide range of foods including fish and seafood products, and can occasionally accumulate in high concentrations [1]. The consumption of products containing large amounts of these compounds can have toxicological consequences. For these reasons, it is important to monitor BA levels in seafood. Therefore, the aim of this study was to assess the microbiological quality and the level of BA in dried fish and squid snacks.

Materials and methods:

Sampling: In total 12 dried snack products were divided into two groups. The first one, consisting of fish, contained 2 samples of dried fish "Taranka" (Ukraine), 2 samples of prepared fish fillets "Robata" and "Ksiu Hama Yaki" (Japan), 2 samples of salted horse mackerel "Stavridka" and "Polosatnik" (Ukraine), 1 sample of roasted monkfish "Masunaga Shokuhin Anako Stick" (Japan), and 1 sample of dried pipefish "Golka" (Ukraine). The second group contained 4 squid snacks, namely: seasoned "Ika Kun" (Japan), prepared shredded "Sakiika hot smoked" (Taiwan), dried "Natori Oishii Atarime" (Japan), and salted and dried "KalmariSusheni" (Ukraine).

Analytical methods: Eight BA (putrescine, cadaverine, histamine, tyramine, tryptamine, 2-Phenylethylamine, spermine and spermidine) were determined by a HPLC method [3, 4]. The total viable count (TVC), yeast, molds and Enterobacteriaceae were determined in accordance with EN-ISO Standards.

Results: Histamine was present in all fish snack samples and half of the squid snack. Its highest level, 128.3 mg/kg, was measured in the pipefish snack. However, the content of this amine in the remaining samples was below the guidance level of 50 mg/kg set by the FDA [5]. This level is also rated as normal and safe for fish consumption by EFSA [6]. Putrescine, cadaverine, tryptamine and tyramine were detected in all tested products at levels 7.2 - 118.4, 11.0 - 582.4, 0 - 97.0 and 5.0 - 65.3 mg/kg, respectively. Although putrescine and cadaverine are not directly toxic, they can affect the action of histamine, thus pose a risk to food safety [7]. Among the samples examined, pipefish is characterized by the highest concentration of not only histamine but also putrescine (118.4 mg/kg) and cadaverine (582.4 mg/kg) as well as 2-Phenylethylamine (693.8 mg/kg) and tyramine (65.3 mg/kg). It is believed that the presence of the physiological polyamines spermine and spermidine in food does not pose a threat. In the present study, their levels did not exceed 134.4 mg/kg and 68 mg/kg respectively. In terms of microbiological contamination, 7 products do not raise any objections. However, in the remaining 2 samples of dried fish "Taranka", an increased level of TVC was recorded (up to 7×10^7 cfu/g). Moreover, in one sample of salted horse mackerel "Stavridka" and in the sample of dried pipefish "Golka" the presence of molds was observed at the level up to 1.7×10^4 cfu/g, and additionally in prepared shredded "Sakiika hot smoked" Enterobacteriaceae (4×10^2 cfu/g) were detected.

Conclusion: In the 12 snack seafood products tested (except for the pipefish snack), the level of biogenic amines is low enough that these products do not pose a threat to the health of consumers. Moreover, BA intake is low due to the small portions usually consumed. In 5 products, some concerns are raised by the presence of molds, Enterobacteriaceae and the high number of TVC.

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Literature:

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