No. 1656

Maintaining the Taste of Dried Fish by Using Bittern

Hiroko Seki, Naoko Hamada-Sato

Tokyo University of Marine Science and Technology

Summary

The pointhead flounder is mainly fished from the Sea of Japan, the Sea of Okhotsk, and the Pacific Northwest. As the quality of flounder generally deteriorates quickly, it is often processed and sold as dried fish. Salt is used in the production of dried fish, as it inhibits bacterial growth and preserves taste. Inosinic acid, or inosine monophosphate (IMP), is a major taste component in fish. After the fish dies, IMP is generated through the degradation of ATP; however, the IMP-degrading enzyme IMPase converts IMP to inosine, which does not contribute to taste. Suppression of IMPase activity is important for maintaining the taste of fish. It has been reported that sodium chloride (NaCl), which is used in fried fish, inhibits IMPase activity in various fish. Therefore, we hypothesized that NaCl may also inhibit IMPase activity in the pointhead flounder. In most cases, high concentrations of NaCl are used in the production of dried fish. However, as excessive salt intake has recently been shown to increase the risk of cancer and hypertension, an alternative method that requires less salt is needed. However, in foods like dried fish, in which high salt concentrations are required to prevent bacterial contamination during long-term storage, the concentration of NaCl cannot be decreased. Bittern is a compound containing high concentrations of NaCl, and is a byproduct of salt manufacture. Bittern is a liquid composed primarily of NaCl and magnesium chloride ($MgCl_2$); therefore, it shows strong potential for use in the processing of dried fish. In this study, we aimed to investigate the effects of NaCl, $MgCl_2$, and a combination of both on IMPase activity in the pointhead flounder and assess the potential of bittern as an alternative to the excess use of salt. To determine the viability of using bittern for dried fish processing, we compared fish dried using salt and fish dried using salt and bittern by measuring the IMP concentration of each sample and comparing the taste through a sensory evaluation test. We found that IMPase activity was inhibited by NaCl, but not by $MgCl_2$; the greatest IMPase inhibition was observed after treatment with NaCl containing low concentrations of $MgCl_2$. The concentration of IMP in bittern-salted-dried samples was considerably higher than that in salt-dried samples. The sensory evaluation test did not show a significant difference in taste between the two samples, indicating that bittern preserved the taste of the fish. Therefore, bittern is a promising alternative for the production of salted dried fish.