

Effect of Salts on Activities of Fungal Cell-Wall Lytic Enzymes and Their Application for Preservation of Salt-Containing Food

Mamoru Wakayama¹, Kazuyoshi Takagi¹, Shigekazu Yano²

¹ Ritsumeikan University, ² Yamagata University

Summary

In Japan, it is thought that one of the causes of hypertension among life style related diseases is Japanese dietary habit taking in food containing relatively high amount of salt. While salt intake recommended by WHO is less than 6 g/day, the average of Japanese salt intake is around 10 g/day. Soy sauce, one of typical traditional fermented foods, representing Japanese food culture is necessary for Japanese life style and a wider variety of ingredients made from soy sauce have been used. But soy sauce and soy sauce-based food necessarily contain high concentration of salt. Prevention of life style related diseases, in particular hypertension, 50% reduced salt soy sauce is commercially available. On the other hand, it is difficult to conduct further reduction of salt concentration of soy sauce from the viewpoint of prevention of microbial pollution such as fungous propagation during the period of use. It has been known that some of *Bacillus* sp. and *Paenibacillus* sp. produce α -1,3-glucanases and chitinases, which degrade the significant constituents of fungous cell wall, α -1,3-glucan and chitin, respectively.

In this study, we focused on α -1,3-glucanases and chitinases from *B. circulans* KA-304 and *Streptomyces thermodiastaticus* HF3-3. The effects of these enzymes on growth inhibition of fungi in food containing relatively high concentration of salt were investigated. As a result, growth inhibitory effect against *Aspergillus oryzae* and *Rhizopus oryzae* by these enzymes in PDA medium and mentsuyu (noodle soup) was obviously observed, but little growth inhibitory effect against *A. niger* by these enzymes in both media was observed. Also little growth inhibitory effect against both fungi by these enzymes in tsukemono (pickled vegetables) was observed. Three types of α -1,3-glucanases and two types of chitinases were used in this study and effect of enzyme type on growth inhibition against fungi was scarcely observed. However, it was shown that growth inhibitory effect by the enzymes was significantly affected by types of fungi and subjected foods. Growth characteristics of the fungi and components and NaCl concentration of the subjected food might affect growth inhibition of fungi in food by the enzymes.