Comparison on the Functional Component Contents in Fermented Dehulled Black Soybeans Inoculated with Bacillus subtilis

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ABSTRACT

Natto is a traditional fermented food in Japan which is made by fermenting steamed soybeans with Bacillus subtilis. It is characterized by unique viscous material and flavor. Tempe is a protein source of Indonesian diet, which is made by fermenting steamed dehulled soybeans inoculated with Rhizopus oligosporus and packed with banana leaf. The cotton-like hypha grow and make the fermented soybeans become pressed cake-form product with desirable flavor. In this study, the steamed dehulled black soybeans are used as row material which is inoculated with Bacillus subtilis var. natto(Bsn, a commercial strain obtained from Japan), Rhizopus microsporus var. oligosporus(Rmo, a commercial strain obtained from Indonesia) individually or combination. Mintab 10 software is utilized to analyze the data to investigate the effects of organisms, inoculating order and temperature on the production of functional compounds. The incubation temperature : 40°C and 42°C for Bsn；37°C and 40°C for Rm o；40°C for the combination of both. The chemical composition including moisture, crude protein, amino nitrogen, degree of hydrolysis ; functional compounds content including flavonoids、 γ-PGA and Q10 ; antioxidant enzymes including GSH-Px and SOD activities, DPPH free radical scavenging ability ; protease and lipase activities and ACE inhibitory ability are determined and compared the different data among the treatments. The results are used to study the optimal condition-time, temperature and inoculating sequency for functional compound production. The results are as follows: The chemical composition of the products obtained from different strains did not change as temperature increased obviously. However, amino notrogen and increased to some extent with fermenting time increased. The production of functional components from individual strain fermented products are influenced by fermenting temperature and time. And the production of these components from both strains combination are influenced by inoculating sequency and fermenting time. GSH-Px and SOD activities of the products obtained from both the individuals and combination increased with fermenting time increased, and the removing rate of free radical also increased with fermenting time. The activities of protease and lipase are influenced by fermenting temperature, however, as compared to the combination fermentation protease and lipase activities and ACE inhibitory ability for the individual strain fermentation increased as time increased.

Keywords : fermented food, functional component, antioxidant activity , enzyme activity, angiotensin-converting enzyme

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