The thesis was to study the effects of fermenting and dehydrating techniques on enzymatic activities and functional compounds of Natto and Tempeh. Six experiments were conducted to achieve the above objectives. Experiment I (Chapter 3) was conducted to evaluate the effect of fermentation time on the proteins in steamed soybean inoculated with Bacillus subtilis, natto. The results indicated that the contents of trichloroacetic acid soluble nitrogen (TCA-N) and the degree of hydrolysis (DH) of the protein increased as the fermentation time increased. Protein solubility initially decreased with increasing fermentation time, and then increased. Sodium dodecyl sulfate polyacrylamide gel electrophoretogram (SDS-PAGE) showed that soy protein components with molecular weight above 20 kDa disappeared from the electrophoretograms for the samples fermented for 24-48 h. Though most essential amino acids declined after 36 h of fermentation, except histidine all increased after 48 h of fermentation. Experiment II (Chapter 4), was conducted to investigate the effect of drying process on enzyme activities of natto. The dries fermented steamed soybeans fermented by Bacillus subtilis (natto). Results indicated that vacuum drying, freeze-drying, or conventional oven-drying did not affect the stability of γ-PGA and isoflavone contents, but did affect ACE inhibitory activity in all dried natto samples. Experiment III (Chapter 5) was conducted to investigate the effects of drying methods on enzymatic activities, except that of superoxide anion scavenging ability, were maintained at higher level or almost the same as the fresh natto after drying by current drying methods. We suggest that the drying methods utilized in this study are feasible for processing producing dry natto powder. Experiment IV (Chapter 6) was to investigate effect of the fermentation conditions on bioactive properties of the steamed soybean inoculated with B. subtilis and R. oligosporus. The amino acid composition and electrophoretogram analyses, it could be noted that the enzyme produced by B. subtilis had the highest in proteolytic activity, produced by Rhizopus was ranked as second. From the results of milk-clotting activity/proteolytic activity ratios(MCA/PA ratio) and electrophoretogram analyses, the commercial rennet had the highest in milk-clotting activity. Key words: ACE inhibitory activity, Bacillus subtilis, bioactive property, drying method, enzymatic activity, fermentation condition, isoflavone, microbial rennet, milk clotting, natto, purification, Rhizopus oligosporus, γ-PGA, SDS-PAGE, soy protein, tempeh property, drying method, enzymatic activity, fermentation. Experiment V(Chapter 7) was to investigate effect of the fermentation conditions (pH 5, 7 and 9; temperature 37, 40 and 43℃; time 24, 36 and 48 h, respectively) on the ACE-I and amino acid composition of the products were determined. The result indicated that most of amino acids deceased in the experimental pH 9 and temperature 43℃. Experiment VI(Chapter 8) was to investigate purification and milk-clotting activity of the enzymes produced by Rhizopus oligosporus, γ-PGA, SDS-PAGE, soy protein, tempeh, bioactive property, drying method, enzymatic activity, fermentation.
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