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KEY WORD : SOYBEAN MEAL HYDROLYSATE / SOYBEAN MEAL / SOY SAUCE

WANIDA SAEJUNG : PROTEIN ENRICHMENT OF TRADITIONAL FERMENTED SOY SAUCE WITH ENZYME DIGESTED SOYBEAN MEAL. THESIS ADVISORS : AMARET BHUMIRATANA, Ph.D., TIMOTHY W. FLEGEL, Ph.D., NAPHA LOTONG, M.Sc., APINYA ASSAVANIG, Ph.D., 156 P. ISBN 974-663-839-4

Soy sauce is widely used in Thailand as a flavor enhancer. The quality of soy sauce is usually judged by consumers on its flavor and aroma. However, food registration agencies usually judge soy sauce on its protein content. Also, it is known that qualities as well as quantities of soluble protein in soy sauce contribute greatly to the proper development of flavor and aroma in soy sauce. Thus, the enhancement of soluble protein content in soy sauce products should have beneficial effects for consumers as well as manufacturers. In this study, protein enhancement was carried out by the addition of soybean meal hydrolysate.

Soybean meal hydrolysate (SBH) was prepared by enzymatic hydrolysis of defatted soybean meal (SBM), a by-product from the production of soybean oil, with Kojizyme™. The optimal conditions for hydrolysis of SBM were carried out by using Kojizyme™ at 2% of protein in SBM and a total solid content at 22% and then incubated at 50°C for 12 hr. The soluble protein content and degree of solubilization of SBH product were found at 8.4% and 63% in laboratory scale hydrolysis and 5.9% and 49% in large scale hydrolysis, respectively.

The SBH was used to supplement the protein content in soy sauce in two ways. The first involved the addition of clarified soybean meal hydrolysate (cSBH) directly to the final soy sauce product. The second way involved addition of SBH during various stages of the moromi fermentation. Addition of cSBH to the final soy sauce product enhanced soluble protein content in final products but could not maintain traditional characteristics if too much cSBH was supplemented. When SBH was supplemented at primary and secondary moromi fermentation, it was found that the soluble protein content of the final product was greatly enhanced if the addition was done in the secondary moromi fermentation. In this way, the protein content increased over three fold when compared with the typical fermentation. The modified soy sauce obtained from secondary moromi fermentation gave acceptable characteristics in general appearance, odor, flavor, overall acceptability and taste at the probability level of $P > 0.05$.

The estimated cost for production of one kg each of SBH and cSBH was calculated to be at 9.50 and 13.52 Baht, respectively. Calculating the cost for production of modified soy sauce, it was shown that the addition of cSBH into finished soy sauce could save about 12.87 Baht per liter (Baht/L) for producing first grade soy sauce (3% protein) and save about 10.66 Baht/L for increasing the soluble protein content from 3% to 4% in the soy sauce product. In modified secondary cycle moromi fermentation, the addition of SBH provided a saving of 2 Baht/L for producing 3% protein soy sauce.

In spite of the small reduction in savings, SBH should be used with traditionally produced soy sauce to enhance soluble protein content, especially by addition at the secondary moromi fermentation. The soy sauce product from this modification provided significantly increased protein content and also provided a product with acceptable characteristics.