

4036479 SCBT/M : MAJOR : BIOTECHNOLOGY ; M.Sc. (BIOTECHNOLOGY)

KEY WORD : SOYBEAN PASTE/ FLOUR/ GAMMA RADIATION/
MICROBIOLOGICAL QUALITY/ *BACILLUS CEREUS*

MONCHAYA ROMWAPEE : UTILIZATION OF IRRADIATED FLOUR
TO REDUCE *Bacillus cereus* IN SOYBEAN PASTE FERMENTATION. THESIS
ADVISORS : APINYA ASSAVANIG, Ph.D., AMARET BHUMIRATANA, Ph.D.,
PAIROJ LUANGPITUKSA, Dr.Agr.Chem., 136 p. ISBN 974-644-383-5

Soybean paste (Tao-chieo) is a semisolid fermented food with a salty taste and a distinct aroma of meat extracts. It is commonly contaminated by many microorganisms, such as bacteria especially *Bacillus cereus*, yeast and mold. These contaminating microorganisms may come from raw materials such as flour, soybean, or salt water. The presence of microbial contamination in three different brands of flour sampled from factories during one year was determined. It was found that total bacteria ranged from 7.3×10^2 - 5.5×10^5 CFU/g dry weight of flour, total yeast and mold ranged from less than 1.0×10^2 - 1.3×10^5 CFU/g dry weight of flour, and *B. cereus* were less than 1.0×10^3 CFU/g dry weight of flour. *B. cereus* is a spore-forming bacterium which can cause food poisoning in man and, may persist in the dry environment and remain particularly in flour. Therefore, an attempt to eliminate this microorganism in flour by using gamma radiation from Cobalt 60 (^{60}Co) was carried out. The results indicated that the D_{10} values of 3 strains of *B. cereus* (No. 1, 2, and 3) isolated from the 3 brands of flour were in the range of 1.38-2.00 kGy. The radiation doses of 4 and 6 kGy were used to eliminate *B. cereus* in wheat flour and rice flour, respectively. The numbers of *B. cereus* and other microorganisms in irradiated flour were at undetectable level or, significantly lower than those in nonirradiated flour ($P < 0.05$). Storage of irradiated flour in regular flour bags and/or additional plastic (polypropylene) bags at room temperature for 30 days did not increase the numbers of the microorganisms. Irradiated flour had potential effect on microbial reduction especially on *B. cereus*, but no effect on physical and chemical properties of soybean paste from both laboratory and pilot scale fermentation. Therefore, utilization of irradiated flour can provide an alternative way to improve the microbiological standard of soybean paste products.