Thesis Title Preparation Methods and Physico-chemical Properties of Various Buk Powders from Elephant Yam (Amorphophallus spp.)

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Abstract

Fresh Amorphophallus oncophyllus corm (Elephant foot yam or Hua Buk) harvested from the northern part of Thailand was found to contain about 18 percent of total dietary fiber (wet basis) which was the highest among the other species of elephant foot yam and root crops. Dried Hua Buk powder was prepared by 3 methods including (1)Thai traditional process, (2)dry milling and (3)modified wet milling. The third method was developed in this study. In Thai traditional method,

fresh Hua Buk was boiled in an alkaline solution before drying and milling process. Brown color and unacceptable odor were normally found in the dried powder product with this method. The dried powder contained only 52.1 percent total dietary fiber and also lost the swelling power and gelation property. However, total oxalic acid could be reduced to an acceptable amount (98.4 mg/100gm) by this preparation method. The dry milling method began with soaking sliced fresh Hua Buk in 2,000 ppm sodium metabisulfite solution for 5 minutes before drying. The dried flake was then ground in either household (mincer mill) or pilot scale grinding machine (hammer mill with air classification system). The physico-chemical properties including swelling power and viscosity of the powder from pilot scale milling process were 90 and 15,000 cps while the one from household milling process were 24 and 4,000 cps, respectively. The two kinds of powder contained 88.9 and 79.7 percent total dietary fiber and had fishy odor and brown color. The modified wet milling process was different from others since it included either pulverization of fresh Hua Buk (wet milling process) washing of dried Hua Buk powder from dry milling process (dry-wet milling process) in an ethanol solution. In case of wet milling of fresh Hua Buk, the sixty percent by volume of aqueous ethanol solution preduced the best quality Hua Buk powder as compared with the powder prepared by other methods mentioned

above. The powder contains 98 percent total dietary fiber and had a swelling power and viscosity of 120 and 88,000 cps, respectively. The dry-wet milling of dried Hua Buk powder in 30, 50 and 70 percent by volume of aqueous ethanol solution also resulted in good quality powder although not comparable with the one from wet milling of fresh Hua Buk. The quality of the dried powder from wet milling of fresh Hua Buk was similar to the commercial Hua Buk powder being used for medical purpose, and its microbial quality could also pass the microbial standard for dried milk powder. As compared with most hydrocolloidal food additives, Hua Buk powder had greater advantage in terms of high viscosity and swelling property.