

ABSTRACT

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PARTIAL SUBSTITUTION OF WHEAT FLOUR WITH GEMBILI (*DIOSCOREA ESCULENTA* L.) FLOUR MODIFIED WITH HEAT MOISTURE TREATMENT IN AFFECTING PHYSICO-CHEMICAL AND ORGANOLEPTIC PROPERTIES OF SPONGE-DOUGH PAN BREAD

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(xv + 58 pages, 13 figures, 17 tables, 8 appendices)

Bread had been a staple food product worldwide as it provides sufficient balance of macronutrients where, wheat flour highly contributes to the structure of bread. However, wheat flour is still highly imported. Gembili (*Dioscorea esculenta* L.) can be further processed into flour and used in a partial substitution of wheat flour. Modification was required to improve the properties of gembili flour. These research objectives were to determine effect of time and temperature of Heat Moisture Treatment (HMT) on characteristics of treated gembili flour in terms of swelling power, solubility, and lightness to select the best treatment, and to determine effect of ratio of wheat flour to the HMT modified gembili flour on the organoleptic and physicochemical properties of pan bread made with sponge-dough method. The modifications of gembili flour were conducted at 78, 83, 88, and 93°C for 4, 6, 8, and 10 h. The selected HMT treatment to flour was 83°C for 8 h. The substitution ratios of wheat flour to selected modified gembili flour used in the making of pan bread were 90:10, 85:15, 80:20, 75:25, and 70:30. Modification with HMT on gembili flour result in slightly higher values of solubility ($26.19 \pm 0.35\%$) and swelling power (10.88 ± 0.11 g/g) but, still comparable to the control ($25.65 \pm 2.38\%$ and 8.48 ± 0.58 g/g, respectively). After modification of gembili flour with HMT at the selected best treatment, slight increases in moisture ($8.83 \pm 0.26\%$), ash ($1.75 \pm 0.04\%$), and amylose content ($16.29 \pm 1.76\%$) and slight decreases in protein ($6.39 \pm 0.04\%$), fat ($0.21 \pm 0.08\%$), carbohydrate ($82.83 \pm 0.26\%$), starch ($45.87 \pm 1.55\%$), and amylopectin content ($29.58 \pm 3.23\%$) were observed as compared to those of native flour, which were 6.81 ± 0.31 , 1.68 ± 0.13 , 14.78 ± 2.10 , 6.49 ± 0.03 , 0.94 ± 0.13 , 84.08 ± 0.29 , 77.22 ± 2.22 , and $62.44 \pm 0.17\%$, respectively. Pan bread made with 90:10 ratio showed similar results of hardness (650.35 ± 60.9 g), bread volume (788.33 ± 5.20 cc), and scores of overall acceptance (5.43 ± 0.38) to that of made with 100:0 (control) with values of 619.2 ± 10.24 g, 845.83 ± 5.20 cc, and 5.55 ± 0.26 , respectively. Ratio of 90:10 was selected as best formulation because it is comparable to the characteristics of the control.

Keywords : Heat-Moisture Treatment (HMT), gembili flour, pan bread, partial substitution

Reference : 95 (1995-2022)