

ABSTRACT

Ludwina Eugenia (01034180107)

EFFECT OF PARTIAL SUBSTITUTION OF WHEAT FLOUR WITH HEAT MOISTURE TREATED GEMBILI (*DIOSCOREA ESCULENTA* L.) FLOUR ON PHYSICOCHEMICAL AND SENSORY CHARACTERISTICS OF STRAIGHT-DOUGH PAN BREAD

Thesis, Faculty of Science and Technology (2022)

(xv + 87 pages, 16 figures, 13 tables, 8 appendices)

Bread is one of the world's most important staple food, with wheat flour as one of its main ingredients. In order to reduce dependency on imported wheat, gembili (*Dioscorea esculenta* L.) can be processed into flour and partially substitute wheat flour in the making of pan bread. Since native gembili flour has poor physicochemical properties, modification is needed. The objective of this research is to determine the effect of Heat Moisture Treatment (HMT) temperature and time towards the swelling power, solubility, and lightness of gembili flour to select the best treatment and to determine the effect of wheat flour to modified gembili flour ratio on physicochemical and sensory characteristics of pan bread prepared using the straight dough method. Gembili flour was modified with HMT at 78, 83, 88, and 93°C for 4, 6, 8, and 10 h. High swelling power (10.88 ± 0.11 g/g) and solubility ($26.10 \pm 0.35\%$) were obtained by the gembili flour modified at 83°C for 8 h; thus it was selected as the best treatment. The selected HMT modified gembili flour (83°C for 8 h) had a significantly lower protein ($6.39 \pm 0.04\%$), fat ($0.20 \pm 0.07\%$), carbohydrate ($82.84 \pm 0.27\%$), starch ($45.87 \pm 1.72\%$) and amylopectin ($29.58 \pm 3.61\%$) but significantly higher moisture content ($8.83 \pm 0.26\%$) than those of the untreated gembili flour. Pan bread was made with substitution ratios of 90:10, 85:15, 80:20, 75:25, and 70:30. The pan bread made with 90:10 ratio was selected as the best formulation as it had similar volume (864.17 ± 16.55 cc), hardness (174.66 ± 33.94 g), and overall acceptance score (5.73 ± 0.05) with the control (100:0). The selected pan bread had a significantly lower protein content ($12.03 \pm 0.40\%$), but had similar moisture ($29.43 \pm 1.38\%$), fat ($7.74 \pm 0.11\%$), ash ($2.04 \pm 0.09\%$), and carbohydrate ($48.75 \pm 1.89\%$) content with the control pan bread. Therefore, pan bread with 10% substitution of HMT modified gembili flour can potentially be used as a future alternative to wheat-based pan bread.

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

References : 96 (2005-2022)