ABSTRACT

Optimization of germinated sorghum flour fermentation has been conducted to determine the optimal condition of fermentation based on soluble protein content measured by spectrophotometer at 550 nm using Biuret reagent. Germinated sorghum flour was fermented by *Lactobacillus plantarum* 3704. The data of soluble protein contents of sorghum flour were analyzed using Factorial Treatment Design $3 \times 3 \times 3$ with Randomized Complete Block Design. The first factor was concentration of soy protein concentrate (1%, 2%, and 3%). The second and third ones were concentration of *L. plantarum* suspension (0.25%, 0.5%, 0.75%) and the duration of the fermentation (24 h, 36 h, and 48 h), respectively. Data were assessed by Tukey’s HSD (Honestly Significant Difference) test with a significance level of 95%. Result showed that there were several optimum condition of fermentation. Result showed that there were several optimum conditions of fermentation. They were fermentation duration of 24 h (W1) or 36 h (W2) with *L. plantarum* 0.25% (K1) or 0.75% (K3), soy protein concentrate 2% (P2); and soy protein concentrate 3% (P3) with *L. plantarum* 0.25% (K1) for 36 h of fermentation duration (W2). The soluble protein content on the optimum condition ranged between 11.52-13.56%. Fermentation condition P2K1W2 was selected for further analysis as the duration of fermentation corresponded with the previous study. The modified sorghum flour quality met the SNI standard except the ash content. The germinated showed an increased amino acid variation and quantity. Fermented sorghum flour did not show any significant amino acids improvement. Germination process reduced the tannin contents in sorghum for 90.30%. Germination process combined with fermentation process reduced the tannin content for 91.51%. Sensory test showed that bread with modified sorghum flour substitute were least preferable. Bread with 0% sorghum flour addition scored 3.96±0.29 (with scale 1-5 which 1 is the most unfavorable and 5 is the most favorable) still favored by the panelist; 25%, 50%, 75%, and 100% sorghum flour addition were not favored by the panelist with the lowest score in 100% sorghum four scored 1.84±0.25.

Keywords: soy protein concentrate, sorghum, *Lactobacillus plantarum*, fermentation, bread