

## ABSTRACT

### STUDY OF PHYSICO-CHEMICAL PROPERTIES OF SWEET POTATO FLOUR (*Ipomoea batatas*) LACTIC ACID FERMENTATION MODIFIED AND APPLICATION IN FRESH BREAD

by

YULIZA RATNA DEWI

Principles of lactic acid fermentation in modification of sweet potatoes properties is by fermentation using the LAB (Lactic Acid Bacteria) that will degrade amylose, amylopectin and branches out at the amorph which will further improve the physicochemical properties of sweet potato flour. In this study, sweet potato cubes were fermented for 7days with different starter's condition and without fermentation as a control before being processed into flour to improve the physicochemical properties. The experimental design used was a completely randomized design (CRD), a single factor with eight treatments consisted of sweet potato flour without fermentation as a control (A), with spontaneous fermentation (B), fermentation with pickle starter (C), and fermentation with cultures of *L. plantarum* (D), composite flour with 40% of control sweet potato flour as substituent (E), with 40% of spontaneous fermented flour as substituent (F), with 40% of fermented pickle flour as substituent (G), with 40% of fermented *L. plantarum* flour as substituent (H).

Analysis of the physicochemical properties of all flour was performed three replications on pH, *water absorption capacity* (absorption of flour), *swelling power* (the power of granule swelling), *solubility* (solubility) and amylose content. Sweet potato flour substitutions as much as 40%, respectively in control, spontaneous fermentation, pickle, *L. plantarum* were done for making bread products. These were then tested four replications on sensory properties and their specific volume development was measured. Proximate data of sweet potato flour on A, B, C, D, E, F, G and H were performed two replicates and were presented descriptively. Data of physicochemical properties of sweet potato flour (with and without modification) as well as the bread properties were first analyzed with Bartlett, and Tuckey test. Data were then analyzed on their variance (ANARA) using F test to obtain the error variance estimate or sand to investigate the influence among the treatments. Further test was then done using Duncan test at 5% level.

The results showed that the fermentation treatment significantly affect the physicochemical properties of sweet potato flour. A decrease of pH was occurred on flour of spontaneous (4.11), pickle (4.14), *L.plantarum* (3.70); and increase of swelling power was on spontaneous (6.31%), pickle (8.29%), *L.plantarum* (10.17%). Increase of solubility was on spontaneous (4.80%), pickle (2.55%), *L.plantarum* (8.67); and *water absorption capacity* was increased on spontaneous (203.42%), pickle (211.54%), *L.plantarum* (256.94%). Increase levels of amylose was occurred on flours of spontaneous (27.68%), pickle (28.44%), and *L.plantarum* (27.22%). Treatment of pickle fermentation produced the best physicochemical properties of flour to produce bread product. The characteristic of this bread was following: brighter bread crust color, softer bread crumb, more uniform pores, taste salty, sour aroma and highest bread specific volume development.

**Keywords:** Spontaneous lactic acid fermentation, pickle, *L.plantarum*, modified sweet potato flour, fresh bread