PRODUCTION OF TEMPEH FLOUR USING DIFFERENT RHIZOPUS SPECIES

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ABSTRACT

Tempeh which is culturally an Indonesian food was produced by fermenting soybeans with different Rhizopus species- *Rhizopus oryzae*, *Rhizopus stolonifer* and *Rhizopus oligosporus*. The tempeh was subsequently dried and milled. The tempeh flours were subjected to proximate analysis, physicochemical (total titratable acidity, pH and water absorption capacity) and microbiological tests. Selected minerals such as calcium, potassium, iron and zinc were analyzed. Vitamin B1, Vitamin B2, Vitamin C, Vitamin D and Niacin contents were evaluated. Sensory evaluation was conducted in order to determine the acceptability of the samples. The statistical analysis was carried out using the Analysis of Variance (ANOVA) at 95% confidence limit and Duncan test. The pH and total titratable acidity ranged from 6.8 to 7.0 and 0.032 to 0.077/g/100g. no significant difference existed among the water absorption capacities of the samples. The average percent crude protein was 44.27%, 44.62% and 44.85% for the three samples. The percent ash of the samples ranged from 5.00 to 5.02. The fat content ranged from 16.45% to 17.12% while the % crude fibre content ranged from 0.38 to 0.42. The carbohydrate content calculated by difference ranged from 32.52% to 33.55%. There was no statistically significant difference in the Vitamin B2, Vitamin C and Vitamin D content of the samples while a significant difference existed in the Vitamin B1 and Niacin content among the samples. The
result of the mineral content analysis revealed that the potassium, iron, zinc and calcium contents ranged from 0.14% - 0.17%, 0.011%- 0.014%, 0.0046%-0.0050% and 0.19% and 0.21% respectively. Yeast and Coliform was not detected in the samples. The total bacterial count ranged from $0.5 \times 10^5$ to $1.6 \times 10^5$ cfu/g, the lactic acid bacteria ranged from $18.0 \times 10^5$-22.4$ \times 10^5$ cfu/g while the mould count ranged from $0.8 \times 10^5$-1.4$ \times 10^5$ cfu/g. There was no significant difference in the aroma and texture of the flour samples. The tempeh flour produced using *Rhizopus oligosporus* and the one produced using *Rhizopus oryzae* compared to each other in terms of colour and overall acceptability.

**Key Words:** Tempeh, Soybeans, *Rhizopus oligosporus, Rhizopus oryzae, Rhizopus stolonifer*