

IMPROVEMENT PROTEIN QUALITY OF CASSAVA PEEL BY SOLID SUBSTRATE FERMENTATION USING CELLULOLYTIC MICROBIAL CONSORTIUM

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Abstract

This study aims to determine the change in the composition of amino acids of cassava peel (*Manihot esculenta* Crantz) by SSF (Solid State Fementation) fermentation using cellulolytic microbial consortium *Aspergillus tamarii*, *Bacillus megaterium* and *Bacillus mycoides*. Usefulness of this research is to improve the quality of the nutritional value of cassava peel so it can be used as feed material herbivorous fish. The experiment was conducted at the Laboratory of Microbiology Department of Biology Padjadjaran University, while the analysis of amino acids in Bogor Agricultural University Integrated Laboratory. Research carried out by fermentation using the best treatment of microbial fermentation using consortium of *Bacillus mycoides*, *Bacillus megaterium*, *Aspergillus tamarii* 5% [2], while the data were analyzed using T Test. Fermentation is done for 7 days at a temperature of 28° C by the method of solid substrates. The parameters measured were total protein content by the method Kjeldhal (Titrimetry) and amino acids using HPLC method. While reducing sugar content was measured using the DNS (3,5-Dinitrosalisilat Acid) method. The results showed that the enzymatic activity of consortium of microbial in the fermentation process was improve the quality of the nutritional value of cassava peel. There was an increase in total protein and amino acid composition, both essential amino acids and non-essential, but there was no increase in the different amino acid lysine, and thyrosine methionin. In general, the fermentation products have better nutrition so it deserves to be used as feed material herbivorous fish.

Key words: Cassava tuber skin, fermentation, microbial, quality nutritional value, total protein, amino acids

INTRODUCTION

Tapioca is one of the important agro-industry in Indonesia. Tapioca production process produces cassava peel waste are abundant and should be utilized in order not to pollute the environment. Utilization of cassava peel waste can be used as fish feed ingredients. However, a low nutrient content, crude fiber and nutrients in the form of anti-hydrogen cyanide contained in the cassava peel, an obstacle in the direct utilization. One of the nutritional improvement of cassava peel waste is by using solid substrate fermentation.

Enzymatic processes that occur in the fermentation process proven to increase crude protein, crude fiber content as well as lower

and antinutrition in various agricultural wastes. The use of microbial consortium will improve the efficiency of degradation of crude fiber and antinutrisi. Several studies have shown a decrease of crude fiber and crude protein increased higher when using microbial consortium as compared to a single microbe. But the increase in crude protein in the fermentation process has not been observed more in depth on the changes in the composition and amino acid content of the product. The use of microbial fermentation of *Trichoderma viridae* on cassava peel and the results showed a significant increase in amino acid composition [3]. The research of fermentation ability of *Aspergillus tamarii*, bacteria *Bacillus megaterium* and *Bacillus mycoides*, the results showed an increase in crude protein and crude fiber and reduction of cyanide in cassava peel substrate [2012]. However, further research needs to be done to

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