Lactobacillus plantarum AK-3 Performance in Reducing Saponin Trembesi Leaves

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Lactobacillus plantarum AK-3 Performance in Reducing Saponin Trembesi Leaves

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***Abstract*— This study aims to see the effectiveness of Lactobacillus plantarum AK-3 in reducing saponin content in trembesi leaves. Trembesi leaves in fermentation with the addition of Lactobacillus plantarum AK-3 that is isolated from cow milk waste. This research is descriptive so that the data obtained is descriptive data about the performance of Lactobacillus plantarum AK-3. The conclusion is Lactobacillus plantarum AK-3 can reduce saponin content up to 0.12% and increase of 22.70% protein content.**

Keywords*— *fermentation, Lactobacillus plantarum AK-3, trembesi leaves

I. INTRODUCTION

Milk is the main product of dairy livestock which is currently widely marketed in the form of packaged milk. This pure milk packaging is usually the result of pasteurization or the result of UHT technology. Both of these post-harvest milk technologies have a limited shelf life. Pasteurized pure milk is cheaper but has a shorter shelf life than UHT milk. The limitations of storing a dairy product are due to the development of bacteria contained. In the pasteurization process it will not kill all bacteria in the milk. Bacteria in milk are *lactic acid bacteria*. On the other hand, *lactic acid bacteria* can accelerate the process of trembesi leaves fermentation. *Lactic acid bacteria* contained in milk there are several types including *Streptococcus* and *Lactobacillus*. *Lactobacillus plantarum* which is used as an agent for trembesi leaf fermentation has been shown to reduce saponins.

In the waste of stale fresh cow's milk, *Lactobacillus* was identified as *Lactobacillus plantarum*. There were two *Lactobacillus plantarum* found, namely *Lactobacillus delbrueckii* and *Lactobacillus plantarum* which were later named after *Lactobacillus plantarum AK-1*. *Lactobacillus plantarum* was also found in stale pasteurized milk which was later named for *Lactobacillus plantarum* AK-2 and *Lactobacillus plantarum* AK-3[1] .

There are 4 types of *Lactobacillus* found in milk waste, to be able to utilize the *Lactobacillus* bacteria it is necessary to multiply. *Lactobacillus* propagation was found to be used by various fillers in order to find out the filler that is most suitable for *Lactobacillus* found.

Trembesi leaves have high potential as animal feed but have limitations in the presence of saponin content..

The saponin content in tamarind leaves can be lowered through fermentation. The results of the research that have been carried out yield that the saponin content can be reduced to 0.22% [2]. To see the effectiveness of *Lactobacillus* obtained, it is necessary to ferment trembesi leaves by using *Lactobacillus* found.

From the description above, it is necessary to conduct a study which objevtive to examine the effectiveness of *Lactobacillus* which is found as a starter of leaf fermentation, so that it can help solve the problem of forage availability.

II. METHODS

The research was carried out in at Biology, Chemistry and Microbiology the Laboratory , Agriculture Faculty, Universitas Veteran Bangun Nusantara, Sukoharjo. Bacterial identification carried out at the PAU Microbiology Laboratory, Gadjah Mada University, Yogyakarta. The material used was leaves of trembesi and *Lactobacillus plantarum* AK-3.

A. *Trembesi leaves Fermentation with Lactobacillus plantarum AK-3*

The collected trembesi leaves plus *Lactobacillus plantarum* AK-3 are then put in plastic, and the plastic is given small holes then covered with duct tape. After three days of demolition, the nutrient content was measured proximate and saponin analysis.

B. *Experimental Design*

This research will produce descriptive data in the form of results from saponin analysis and proximate analysis.

III. RESULT AND DISCUSSION

Before being used as a fermentor, *Lactobacillus plantarum* AK-3 I bacteria were cultured. Fermentation was carried out for 3 days. After 3 days of opening the fermentation, saponin content and nutrient content were analyzed through proximate analysis. The results of the analysis are listed in.

Table 1. Nutrient and Saponin Content

Bacteria	Water	Ash	Lipid	Protein	Carbohidrat	Saponin
Non Fermentad	5,95	4,44	6,5	21,76	61,34	0,53
Lp AK-3	8,53	3,62	5,72	22,7	59,42	0,12

A. *Nutrient Content*

The results showed that there was an increase in water content in fermented trembesi compared to non fermentation. This can be caused because *Lactobacillus* activity will produce acid. *Lactobacillus* will produce lactic acid. With acidic conditions will inhibit of microorganisms activity in decomposition of carbohydrates and proteins with water vapor by-products. Table 1. shows that trembesi leaves fermentation carried out by *Lactobacillus plantarum* AK-3 shows a higher moisture content compared to unfermented ones.

Ash content is an indication of mineral content in trembesi. From Table 1 it can be seen that trembesi leaves fermentation with *Lactobacillus plantarum* AK-3 is more rendang compared to non fermentation.

The crude fat content of leaves of trembesi decreases after fermentation Fat in more plants which is simple fat [3]. Fats are a group of heterogeneous compounds that are related both actual and potential with fatty acids. In the body, fat functions as a source of energy that is directly and potentially efficient when stored in adipose tissue.

Decreased fat content in the presence of fermentation can be caused because the energy from the existing fat is utilized by microbes to carry out fermentation. Fat in plants is usually a simple fat. Simple fats are fatty acid esters with various alcohols. Simple fat consists of fat and wax [3].

The fermentation treatment turned out to provide a substantial increase content of crude protein in the leaves of trembesi. *Lactobacillus plantarum* AK-3 was addited in fermentation is also effective increasing the content of crude protein of leaves of trembesi. This can be caused because the *Lactobacillus plantarum* is a lactic acid bacteria that also produces bacteriocins. Bacteriocin is a bactericidal protein compound [4].

The protein content in the feed will increase the palatability of the feed. With high palatability, it will increase livestock consumption in these feeds, which is ultimately expected to increase livestock productivity.

Carbohydrates content by fermentation decrease compared to unfermented leaves of trembesi. Carbohydrates in an ingredient consist of crude fiber and extract without nitrogen. Although not a certainty, a decrease in carbohydrates can be an indication of a decrease in crude fiber.

Carbohydrates will contribute as a source of energy in an animal feed ration. See Table 1. It can be said that by fermentation using Lactobacillus can reduce the content of crude carbohydrates but still maintain crude carbohydrates in a state of high enough. It is hoped that those derived from fermentation are crude fiber. Feed with low crude fiber will increase the digestibility value of a feed [5].

B. *Saponin Content*

Saponin content decreases with fermentation treatment. This is in accordance with the opinion of [6] which states that by fermentation occurs of anti-nutrition substances elimination, including glucoside. [3] states that saponin is a glycoside, when it is hydrolyzed it produces sugar (glycone) and sapogenin (aglycone). [3] states that the highest anti-nutrient glycosides are found in leaves.

Saponin in the trembesi leaves which is fermented with *Lactobacillus plantarum* AK-3 is lower than non-fermentation. This can be caused because *Lactobacillus* is a lactic acid bacteria, which is a bacteria that converts lactose and other sugars into lactic acid. Lactose and other sugars belong to the class of carbohydrates. Trembesi has a high carbohydrate content so that it can more effectively streamline the work of Lactobacillus which has the ability to produce bacteriocins which function as antibiotic substances [7].

IV. Conclusion

The conclusion of the research is that Fermentation using Lactobacillus plantarum AK-3 can reduce up to 0.12% saponins and increase by 22.70% crude protein

Acknowledgment

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g”. Avoid the stilted expression “one of us (R. B. G.) thanks ...”. Instead, try “R. B. G. thanks...”. Put sponsor acknowledgments in the unnumbered footnote on the first page.

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