EFFECTIVENESS OF Lactobacillus plantarum Mut 7 AGENTS FERMENTATION TO REDUCE TREMBESI (Albizia saman) SAPONINS CONTENT

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Abstract

This objectives research to assess the ability of Lactobacillus plantarum Mut 7 in reducing the saponin content while increasing the nutrient content in the leaves, young fruit and trembesi pods (Albizia saman). The study was conducted using a completely randomized design. The addition of Lactobacillus plantarum Mut 7 on the fermentation of 3 parts, namely plant leaves, young fruit and pods. Each treatment was repeated as many as four replications to obtain 12 units of the experiment. This study concluded that the fermentation using Lactobacillus plantarum Mut 7 reduced saponin content and increase nutrient content, especially the content of crude protein.

Keywords: fermentation, trembesi, saponin, nutrient

Abbreviations:
WC: Water content
CF: Crude Fat
CP: Crude Protein
CR: Rough Carbohydrate

1. Introductions

Ruminant livestock are cattle that have a stomach with four compartments plural and constantly undergoing a process of rumination. Sustainability rumination process depends on the presence of feed material which has a high content of crude fiber. Feed ingredients with high crude fiber content found in many forage crops. Cells in the cell walls of plants contain nutrients typical constituent is cellulose. Cellulose is a polymer of D-glucose by binding ß-1, 4 glycosidic [1].

Indonesia is a country of tropical climate. A special feature on this tropical climate has two seasons namely extreme rainy season and the dry season in areas other than the tropical climates have temperatures and high humidity. This scenario is actually very unfavorable for livestock especially cattle feed ruminants because of availability of forage very not guaranteed. During the rainy season, but abundant forage during the dry season is very less even in certain areas can say no.

In drought conditions, for example Winton area will be massive sales of existing stock. This is due to the absence of a staple forage ruminants, so as to maintain the existing livestock breeders will provide forage improvised usually obtained from annual crops.

Tamarind is a perennial plant that is often referred to as "ever green" and in the familia Mimosoideae. Leaves, seeds and bark contain saponins besides tamarind leaves and seeds contain polyphenols [2]. Yet according to [3] saponins exist in all parts of the plant, eg in leaves, stems, roots, flowers and seeds while the amount varies according to time of cutting.

Saponins are glycosides that after hydrolyzed will produce sugar (glikon) and sapogenin (aglycone). Of surface-active compounds such as soap and saponin are detected based on the ability to form foam on agitation and has a bitter taste that has the effect of lowering the surface tension so that damage cell membranes and inactivate enzymes and cell damage cell proteins.

Saponins can impact the body's biological processes and nutrient metabolism by inhibiting enzymes such as labor productivity chymotrypsin enzymes that inhibit productivity and growth of livestock. The main biological effects of saponins are able menghemolisis saponin of red blood cells due to interaction of saponins with membrane (proteins, phospholipids and cholesterol) of erythrocytes. Hemolysis is the release of hemoglobin into the blood plasma due to breakdown of erythrocytes.

Feed containing more than 0.20% saponin would be bad for growth, feed intake and feed efficiency. Saponins in alfalfa can cause bloating in ruminants because saponins are the active agents

in producing a surface that is foaming soap. Low levels of alfalfa meal usage decreases the amount of average growth in poultry, the main effect of the saponin content is the palatability and feed intake compared to the effects of metabolism. The use of low strain increases the level of alfalfa saponins into food for growth ruminansi without degrading performance.

Fermentation is the breakdown of carbohydrates into alcohol, lactic acid, butyric acid and carbonic acid, and heat release. Protein reformed into ammonia, amino acids, amides, acetic acid, butyric acid and water. [4] that the removal of fermentation occurs anti nutritional substances that are toxic include glucoside. Further fermentation of cassava leaves by Aspergillus niger to increase protein digestibility and a decrease in the value of crude fiber [5].

2. Methods

Substrates

The substrate used was a tamarind tree parts consisting of leaves, young fruit and fruit leather. Tamarind plant parts used are taken from a plant that grows in the Munggur village District Karanganyar are often used by farmers as animal feed.

Fermentation

Fermentation is carried out by anaerobic fermentation using a urea additive with the same composition in each treatment.

Fermentation agents

Fermentation agents used are bacteria *Lactobacillus plantarum.*

Experimental plan

To find out the nutritional content and saponin content of leaves, young fruit and rind planned Completely Randomized Design. Each treatment was repeated as many as four replications to obtain 12 units of the experiment. Study material is divided into the following treatment:

D-Lp: trembesi leaf fermentation with the addition of *Lactobacillus plantarum*, B-Lp: Young fruit trembesi fermentation with the addition of *Lactobacillus plantarum*,

K-Lp: trembesi leaf fermentation with the addition of *Lactobacillus plantarum*.

Analysis Methode

Analysis of nutrient content and saponin content analysis Leaves, young fruit and tamarind pods before and after fermentation nutrient content analyzed by using proximate analysis (AOAC, 1990) and the analysis of saponin content. Data were analyzed using Analysis of Variance (ANOVA) to determine the direction of the pattern of nutrient content and saponin content. Each test was done up Duncan's Multiple Range Test (DMRT) [6].

3. Results and Discussion

This objectives research to assess the ability of *Lactobacillus plantarum* in reducing the saponin content and increase nutrient content in leaves, young fruit and tamarind pods (*Albizia saman*). Nutrient content and saponin fermented in tamarind before can be seen in Table 1.

Table 1 Nutrient Content and Saponins Trembesi

Research material	WC(%)	Ash (%)	CF (%)	CP (%)	CR (%)	Saponin (%)
D-Lp	58.59^{a}	4.41^{a}	5.24^{b}	20.12^{a}	61.40^{b}	0.89^{b}
B-Lp	59.10^{a}	4.31^{a}	5.18^{b}	48.16^{b}	33.25^{a}	0.08^{a}
K-Lp	60.58^{b}	4.88^{a}	1.57^{a}	59.79^{c}	59.79^{b}	0.89^{b}

After knowing the nutrient content and saponin in tamarind fermentation is carried out by using *Lactobacillus plantarum* as agensia. The results of microbial fermentation with the addition of tamarind can be seen in Table 2.

Table 2. Nutrient content and saponin fermented Trembesi

Part of Trembesi	WC (%)	Ash (%)	CF (%)	CP (%)	CR (%)	Saponin (%)
Leaves	51.47	3.73	0.34	7.66	76.56	1.47
Young fruit	52.73	3.82	0.29	11.81	43.87	0.95
Fruit leather	54.35	3.94	0.08	8.32	77.28	1,44

Nutrient Content

3.1 Water levels

The results showed that an increase in the water content of tamarind fermented with *Lactobacillus plantarum*. This could result from the activities of Lactobacillus plantarum to produce acids. *Lactobacillus plantarum* will produce lactic acid. With the acid will inhibit the activity of microorganisms in the decomposition of carbohydrate and protein by-product is water vapor.

The results showed that the addition of *Lactobacillus plantarum* did not affect the elevated levels of real tamarind water, but the addition of mi-

crobes in fermentation tamarind pods can significantly increase moisture content than the water content of leaves and young fruit tamarind. This can be caused by moisture tamarind pods that are higher than the young tamarind leaves and fruit. Also can be caused because the skin of the fruit has a thicker texture than the leaves and young fruit, on the other hand that many plants contain cellulose, hemicellulose and lignin. Possible rind contains more cellulose and hemicellulose are carbohydrates as shown in Table 2. Fermentation of carbohydrates to produce acids and water by product. With more and more carbs overhauled by microbes then the higher the water produced.

3.2 Ash

The addition of *Lactobacillus plantarum* in the fermentation were able to improve on trembesi ash content. The increase in ash content is an indication of an increase in mineral content in trembesi. From Table 2. show that the addition of *Lactobacillus plantarum* in the fermentation trembesi not significantly affect the ash content increased in leaves, young fruit, and the fruit fermented trembesi.

Ash content in leaves, young fruit and the fruit did not differ significantly, but the fruit has the highest ash content compared to leaves and young fruit. This indicates that the skin of the fruit trembesi has the highest mineral content compared with young leaves and fruit.

3.3 Fat

Crude fat content of tamarind has increased after the addition of fermented with *Lactobacillus plantarum*. Fat in plants that are more modest fat (Widodo, 2005). Fats are a heterogeneous group of compounds related to both actual and potential with fatty acids. In the body, fat serves as an efficient source of energy directly and potential when stored in adipose tissue.

The results showed that the addition of *Lactobacillus plantarum* did not affect the increase in crude fat content of real tamarind, but the addition of *Lactobacillus plantarum* in the fermented young tamarind leaves and fruit can increase the crude fat content of the fat content significantly compared rough tamarind fruit skin.

Simple Fat is an ester of fatty acids with various alcohols. Simple fat consists of fat and wax [3]. This suggests that fat and wax in the leaves and young fruit is higher than the skin of the fruit.

3.4 Protein

Treatment fermentation turns provides increased crude protein content is quite large tamarind. The addition of *Lactobacillus plantarum* in the fermentation is also effective in increasing the crude protein content of tamarind.

Table 2. showed that the addition of *Lactobacillus plantarum* was able to increase the crude protein with considerable sequence rind, young fruit and the smallest is the tamarind leaves. The content of protein in the diet will increase the feed palatability. With its high palatability it will increase the consumption of cattle on feed, which is ultimately expected to increase produksitivitas livestock.

Lactobacillus plantarum can increase the crude protein content of the tamarind, this can be caused by bacteria *Lactobacillus plantarum* is a lactic acid-producing bacteria also produce bacteriocins. Bacteriocins are protein compounds that are bactericidal [7].

3.5 Carbohydrate

Carbohydrates fermented tamarind tamarind decreased compared with unfermented. Carbohydrates in a material composed of crude fiber and nitrogen free extract. Although not a certainty but the decline could be an indication of carbohydrate reduction in crude fiber. Table 1. showed that the carbohydrate content in the leaves and rough rind significantly greater than carbohydrate rough on young fruit. This could result in young fruit of a plant that contains a lot of protein compared to carbohydrates and lipids [8].

Carbohydrates will contribute as a source of energy in animal feed rations. It could be said that by fermentation using *Lactobacillus plantarum* can lower carbohydrate content trembesi rugged but still retain rough carbohydrates in circumstances quite high on the leaves and fruit leather. It is expected that reduced fiber fermentation is rough. Feed with a low crude fiber digestibility will increase the value of a feed [9].

3.6 Saponin Content

The content of saponin treatment decreased with tamarind fermentation using *Lactobacillus plantarum*. This is in accordance with the opinion [4] which states that the removal of an anti-fermentation happens toxic nutrients such as glucosides. [3] states that a saponin glycosides, when hydrolyzed then produce sugar (glikon) and sapogenin (aglycone).

The results showed that the saponin content of young fruit significantly different saponin content of leaves and tamarind pods. [3] stated that the anti-nutrient highest glycosides found in the leaves.

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4. Conclusion

This study concluded that fermentation using *Lactobacillus plantarum* can lower saponin content and increase nutrient content, especially the content of crude protein tamarind tamarind.

Suggestion undertake research to see the digestibility of fermented with *Lactobacillus plantarum* trembesi so uncertain suitability as animal feed.

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