

## Test of Effectiveness of Thorny Palm Skin (*Salacca Edulis*) and Noni Extract (*Morinda Citrifolia L*) On Decreasing the Blood Sugar Rate Of Male Mice (*Mus Musculus*)

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**Abstract:** This research is meant to know the effectiveness of thorny palm skin (*Salacca edualis*) and noni (*Morinda citrifolia L*) extract on the decrease of mice' blood sugar level (*Mus musculus L.*). The experimental animals used were male DDD strains of 2-3 months old with 27 samples. The mice were saturated with sugar solution (Sukrosa) so as hyperglycemia occurred, then the mice were divided into 9 treatment groups and 3x replicates namely; control treatment, thorny palm skin and noni extract treatment (F1) and treatment of 150, 200, 250 mg / KgBB (F2) dose. Administration of sugar solution was given for 1 week. Giving sugar solution done orally, mice were given feed in the form of pellets and drinking water 2x a day. Blood sugar taken before and after administration of the extract using a glucometer (NESCO-Multiple Check). The data obtained were then analyzed using varian analysis (Anava) and LSD test using SPSS 23. The result of the two-lane anava analysis showed that the significance level of 0,000 <0.05 which means the hypothesis test decision stated  $H_0$  rejected means that there is the effect of giving thorny palm skin extract (*Salacca edualis*) and the extract of *Morinda citrifolia L.* to decrease blood sugar level. Thorny palm skin extract has a faster effect in lowering blood sugar levels of mice with a dose of 250 mg / kgBB treatment compared with noni fruit extract, as it contains pterostilbene compounds, pterostilbene is an antidiabetic substance that plays a direct role in decreasing blood sugar levels.

**Keywords:** Thorny palm skin Extract (*Salacca edualis*), Noni Fruit Extract (*Morinda citrifolia L*), Blood Sugar Mice (*Mus musculus L.*).

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### I. Introduction

The development of the era and technology that rapidly resulted in many significant changes to the pattern of human life, especially in choosing food. At this time many foods become the cause of diseases classified as very difficult to be cured, one of which is diabetes. Diabetes is a metabolic disease characterized by high blood sugar levels (hyperglycemia), caused by impaired insulin secretion and insulin resistance or both. Other causes are due to the inability of cell receptors to respond to insulin to bring glucose into cells (Suastika in Nurlaili: 2011).

Diabetes therapy requires high cost and long term so that not all layers of society can receive accurate therapy. As an alternative to conventional therapy, people can use herbs to help neutralize blood sugar levels. Herbs that are often used are thorny palm skin and noni fruit.

Endang Dkk (2014: 2) suggests that the bark contains pterostilbene compounds, which are anti-diabetic substances that play a direct role in decreasing blood sugar levels. The results of phytochemical tests showed that thorny palm skin contains flavonoid and tannin compounds, and small amount of alkaloids while noni fruit is effective as anti-diabetes with Saponin content, Triterpen, Steroid, and Flavonoid.

Noni fruit contains bioactive components such as flavonoids, triterpenes, triterpenoids, and saponins in significant amounts. Flavonoids contained in noni fruit proved to be able to prevent the occurrence of cancer (Lemmens and Bunya in Fitriani 2011: 4). In addition, the noni fruit contains saponin, routine, and triterpen compounds that are suspected to have hypoglycemic effects that have been proven through several studies. Therefore, noni is often used as a diabetes drug (Nayak in Fitriani 2011: 4).

Blood sugar is a sugar content dissolved in the blood. Normal blood sugar levels are 4-8 mmol / l or 60-140 mg / dl. Glucose levels in normal male mice ranges from 66 to 132 mg / dl.

## II. Research Methodology

The study was conducted in Nglayang Village, Jenang Sub-district, Ponorogo District, March to July 2016. The experiment was conducted using experimental approach with Completely Randomized Design (RAL) with 9 treatment groups and 3 replications. The experimental animals were male mice (*Mus musculus L*) around 2-3 months old with weight between 25-35 gr from DDY strain, as many as 27 samples.

**Table 1:** Treatment Combination.

Dose	F0	F1	F2
D1	F0D1	F1D1	F2D1
D2	F0D2	F1D2	F2D2
D3	F0D3	F1D3	F2D3

Information:

D1: Treatment dose of 150 mg

D2: Treatment dose of 200 mg

D3: Treatment dose of 250 mg

F0: Without treatment (Ordinary Water)

F1: Provision of thorny palm skin extract (*Salacca edualis*)

F2: Giving of noni fruit extract (*Morinda citrifolia L*)

## III. Data Collection And Analysis Method

Blood sampling through the mice vein using a glucometer (Nesco Multiple-Check). Mice blood collection is done once every 1 week. Data collection of mice blood sugar level (*Mus musculus L*) are done when:

1. Before the treatment is given, blood sampling is first done to determine the normal condition of the mice's blood.
2. After administration of sugar solution (sucrose), to know the condition of diabet hyperglycemia.
3. After being given treatment of thorny palm skin extracts and noni fruit extract.  
Experimental data were analyzed using two path Anava with SPSS version 23 and 95% confidence degree ( $\alpha = 0.05$ ). If there is any difference will be tested through LSD.

## Tools and Materials Research

The tools used during the research were cages of mice (plastic material with size P x L x T = 20 x 15 x 10 cm) of 27 pieces, analytical balance of OHAUS Scout SPSS202F, glukometer (NESCO MULTIPLE-Check), knit gloves, paper labels, wrap paper, plastic, 2-spout wello vol. 3 ml, 2 inject spears one med vol.1 cc, plastic jars, solder, scissors, razor blades, soles, spoons, trays, blenders, strainers and cameras. The materials used are water, pellets, thorny palm skin (*Salacca edualis*), Noni fruit (*Morinda citrifolia L*), rice husks and tissue.

## Research procedure

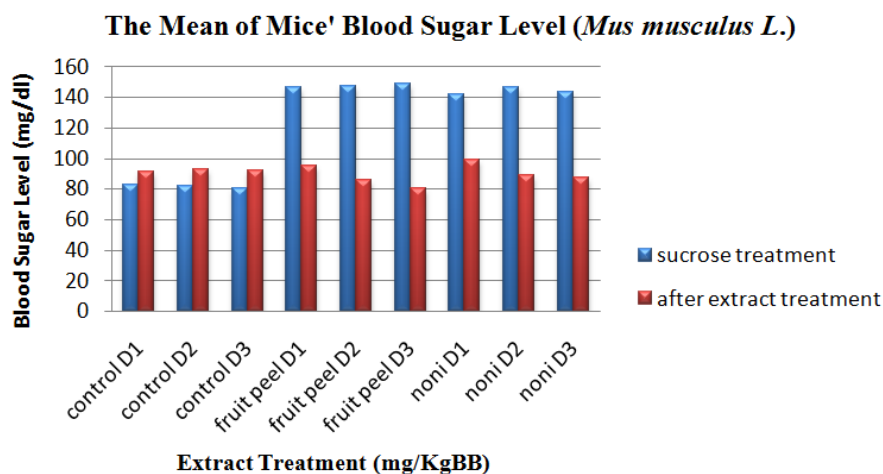
1. Stage of preparation of experimental animals (Acclimatization). Mice were acclimatized for one week, by placing the mice in a cage that had been given rice husks and given water and standard feed in the form of pellets twice a day.
2. Intake of blood through the tail vein of mice to determine the normal levels of early blood sugar.
3. Grouping stages. The animals were grouped into 3 groups of treatment namely; F0, F1, and F2.
4. Producing phase and administration of sugar solution (Sucrose). The dosage of sugar water used was 0.18 g / BB of mice which then dissolved in 1 ml of aquadest. The dose given to the mice weighing 25 grams was 0.003 grams / BB and was given in each mice daily for 7 days until blood sugar level of the mice reached > 132 mg / dl.
5. The phase of blood intake through the tail vein of mice to determine the increase in mice sugar levels.
6. Determination of dosage and graft extract of peel and mengkudu.
  - a. Determination of Dose of thorny palm fruit peel Extract (*Salacca edualis*). Salak leather extract obtained from 200 grams of thorny palm fruit peel that has been washed clean added 50 ml of water blended. Then given to the mice at a dose of 150 mg / kgBW, 200 mg / kgBW and 250 mg / kg body weight daily for 7 days.
  - b. Determination Dose of Noni fruit extract (*Morinda citrifolia L*). Noni fruit extract obtained from 200 grams of clean ripe noni plus 50 ml of water blended. Then given to mice with dose 150 mg / kgBB, 200 mg / kgBB and 250 mg / kgBB for 7 days.
7. The final blood glucose measurement using a glucometer (NESCO Multiple Chek).

#### IV. Results And Discussion

##### Research result

Two- Path Anava Test of Blood Sugar Level of male mice (*Mus musculus L.*) showed that the significance level of  $0.000 < 0.05$ .  $H_0$  rejected means there is influence of thorny palm fruit peel extract (*Salacca edualis*) and extract of noni fruit (*Morinda citrifolia L.*) to decrease blood sugar level of male mouse (*Mus musculus L.*). LSD (Least Significant Differences) was tested at 5% as follows: the control treatment was significantly different with the treatment of thorny palm fruit peel extract (*Salacca edualis*) and was not significantly different with the treatment of *Morinda citrifolia L.* extract. Treatment D1 has a real difference with D2, and D3. D1 has the smallest real difference which is -6.0000 and D3 has the biggest real difference which is 12.2222, where the higher dosage treatment will accelerate the decrease in blood sugar levels of mice (*Mus musculus L.*). Otherwise, the dose of treatment will slow the decrease in blood sugar levels of male mice (*Mus musculus L.*).

#### V. Discussion



**Figure 1:** Histogram Mean Data Blood Sugar Level of Mice (*Mus musculus L.*)

From figure 1, it can be seen that the control treatment has increased sugar levels of 9-11mg / dl. This is due to the daily feeding and drinking factors that involve the fattening of the body of mice during the experimental time. Treatment of thorny palm fruit peel extract (*Salacca edualis*) decreased sugar level of 50-68 mg / dl. Provision of thorny palm fruit peel extract with a dose of 250 mg / KgBB has a faster effect in lowering blood sugar levels compared to a dose of 150 mg / KgBB and 200 mg / KgBB. This is due to the content of pterostilbene compounds in the thorny palm fruit pee. Pterostilbene is an anti-diabetic substance that play a direct role in the decline of blood sugar levels.

Treatment of noni fruit extract (*Morinda citrifolia L.*) also gives effect of decreasing blood sugar level in mice by 42-57 mg / dl. Noni Fruit extract with dosage of 200 mg / KgBB has a faster effect in lowering blood sugar levels compared to the dosage of 150 mg / KgBB and 250 mg / KgBB. Based on Figure 1, it can be seen that a significant difference between the control treatment, the provision of thorny palm fruit peel extract (*Salacca edualis*) and the treatment of Noni fruit extract (*Morinda citrifolia L.*). Mice which given the extract of noni fruit (*Morinda citrifolia L.*) has a decrease in sugar content lower than the treatment of thorny palm fruit peel extract (*Salacca edualis*). Blood sugar levels of mice given the treatment of thorny palm fruit peel extract (*Salacca edualis*) have a decrease in sugar content higher than the treatment of extract of noni fruit (*Morinda citrifolia L.*) This shows that the thorny palm fruit peel extract (*Salacca edualis*) has an effect in decreasing the Blood sugar levels of mice larger than the noni fruit extract. The content of flavonoids in the thorny palm fruit peel has an important role in reducing blood sugar levels of mice. Flavonoid compounds can lower blood sugar levels of mice by stimulating  $\beta$ -pancreatic cells to produce more insulin (Suarsana in Muharli, 2009). Thorny palm fruit peel also contains Ferulic Acid compounds and prolinecompound that encourages the formation of collagen and elastin, Cinnamic acid derivavites compounds that promote epithelial cell regeneration. Both of these substances play an important role in the process of repairing the pancreas (Setyo, 2012: 1-2). The effect of dosage interaction with thorny palm fruit peel extract (*Salacca edualis*) and noni fruit extract (*Morinda citrifolia L.*) with higher dosage will decreasing the blood sugar level in the mice faster.

## VI. Conclusion

1. Thorny palm fruit peel extract (*Salacca edulis*) and noni fruit extract (*Morinda citrifolia* L.) have an influence in decreasing blood sugar levels of male mice (*Mus musculus* L.)
2. Thorny palm fruit peelis proved to be more effective in reducing blood sugar levels of male mice compared to *Morinda citrifolia* L extract because thorny palm fruit peel contains pterostilbene compounds, which is an antidiabetic substance that plays a direct role in the decrease of blood sugar level .

## VII. Suggestion

Further research should also analyze the effect of giving extract of thorny palm fruit peel and noni fruit extract to decrease blood sugar level by observing the anatomy and physiology of liver, kidney and pancreas in mice.

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