

# THE STUDY OF EFFECTS ETHANOL EXTRACT *Mimosa pudica* L. and *Manihot utilissima* Pohl. AS AN ANTIHYPERURICEMIC IN MALE POULTRY WITH INDUCED CHICKEN LIVER JUICE

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## Abstract

**Background.** Hyperuricemia and gout appear to be rapidly increasing worldwide and frequently cause symptom metabolic syndrome. *Mimosa pudica* L and *Manihot utilissima* Pohl have flavonoid can decreasing hyperuricemia.

**Objective.** Aim of study was investigate the effects ethanol extract *Mimosa pudica* L and *Manihot utilissima* Pohl for antihyperuricemic in poultry.

**Methods.** Extraction compounds from *Mimosa pudica* L and *Manihot utilissima* Pohl by maceration method. Identification flavonoid using spectrophotometer UV with the scan lambda max. The study were divided 20 poultry in five groups. Group I is a health control was given food and drink, group II is hyperuricemia control was given food, drink and chicken liver juice with concentration 100% orally for 2 weeks, group III is positive control was given food, drink, poultry liver juice with concentration 100% orally for 2 weeks and allopurinol 10 mg/kg BW, group IV ethanol extract *Mimosa pudica* L control was given food, drink, poultry liver juice with concentration 100% orally for 2 weeks and ethanol extract *Mimosa pudica* L 93 mg/kg BW and group V ethanol extract *Manihot utilissima* Pohl control was given food, drink, poultry liver juice with concentration 100% orally for 2 weeks and ethanol extract *Manihot utilissima* Pohl 93 mg/kg BW. Analyze data using Mann-Whitney Test and ANOVA with P 95%.

**Outcome measured.** On day 15 checked uric acid on period I 30 minutes after treatment and period II 60 minutes after treatment in using Easy Touch Glucose Cholesterol Uric Acid kit.

**Results.** The data decreasing uric acid level from ethanol extract *Mimosa pudica* L 1,70 mg/dl (22%) and ethanol extract *Manihot utilissima* Pohl 1,43 mg/dl (21%).

**Conclusion.** Oral administration of ethanol extract *Mimosa pudica* L and ethanol extract *Manihot utilissima* Pohl was be able to reduce uric acid levels in hyperuricemic poultry with no significant effects compare with allopurinol.

**Keywords :** Hyperuricemia, *Mimosa pudica* L, *Manihot utilissima* Pohl.

## INTRODUCTION

The development of modern life increasingly demanding technological advances human participation to more quickly in the activities. This creates a fully practical lifestyle including in controlling the intake of unhealthy food. Lifestyle such as this increase the occurrence of various diseases, one of which is marked by an increase of gout uric acid in the blood.

Uric acid is the substance of the final product or the nucleic acid purine metabolism in the body. Uric acid is produced from the primary metabolism of purine nucleoside purine bases hipoxantin late, xantin and guanine. When there is deviation in the process will increase levels of uric acid, called hiperurisemia conditions (Murray *et al.*, 2009).

Hiperurisemia an early sign of gout or pirai. Gout is closely linked to disorders of purine metabolism which raises the level of serum uric acid that is  $> 7.0$  mg / dl (Wells *et al.*, 2000). Hiperurisemia can give rise to kidney stones result in kidney failure. Uric acid is a risk factor for coronary heart disease. Unexpectedly uric acid crystals will damage the endothelial or vascular coroner. Based on clinic patient data Cipto Mangunkusumo Hospital (RSCM), Jakarta, patients with uric acid appears to seven percent of the patients suffering from rheumatic diseases. Hiperurisemia prevalence of approximately 2.6 to 47.2%, which varies in different populations. While the prevalence of gout varies between 1 to 15.3%. In a study obtained 4.9% incidence of gout in the blood uric acid  $> 9$  mg / dl, 0.5% at a rate of 7 to 8.9% and 0.1% at a rate of  $< 7$  mg / dl. The cumulative incidence of gout achieve up to 22% after 5 years, at the rate of uric acid  $> 9$  mg / dl (Hidayat, 2009). Increase the incidence of dementia (Herlina, 2010).

Treatment chemically expensive and take a long time and side effects of medicines gout (eg intoxication acute kolkisin, gastritis on NSAID's (Non Steroid Antiinflammation Drugs), dermatitis allergic to probenecid) (Katzung,

2002) make the community look for drug alternative. Indonesian nation ancestors leverage available in the natural plant as medicine. Plants used traditionally to reduce the levels of uric acid is the daughter of shame and yam leaves. Mimosin contains compounds shy daughter, pipekolinat acid, tannins, alkaloids, saponins, triterpenoids, sterols, polyphenols, and flavonoids. Meanwhile yam leaves contain flavonoids (Anonymous, 2000a).

According to the Coss *et al.* (1998), several flavonoid and alkaloid compounds can inhibit oxidase xantin work so as to inhibit the formation of uric acid in the body. Susanti study (2006) showed that plants contain flavonoids inhibited oxidase activity xantin work can decrease levels of uric acid in the blood. Research Anderson *et al.* (2001) etanolik fractions containing flavonoids chysin shy daughter, apigenin, luteolin, kaempferol, galangin, quercetin, rhamnetin, myricetin, gossypetin.

Based on the theoretical background and above, it can be concluded that the hypothesis of ethanol extracts of herbs giving daughter embarrassed and ethanol extracts of leaves of sweet potatoes can lower uric acid induced chicken liver juice. Provide alternative information for gout particularly shy daughter herba and cassava leaves. Enriched scientific data on the benefits of traditional medicinal herbs daughter particularly shy and cassava leaves on gout treatment in order to develop herbal medicine.

## METHODS

### Material

Reagent needed include: Powder shy daughter herbs and leaves yams, ethanol extracts of herbs and shy daughter yams leaf ethanol extract, ethanol, diethyl ether, anhydrous  $\text{Na}_2\text{SO}_4$ , male chickens with body weight 1.5 kg, chicken liver juice, 100 mg allopurinol with potential.

## Tool

Research tools needed include: analytical scales to weigh the powder material simplicia (OHAUS), glass ware, magnetic strirrer, rotary evaporator, reflux, filter paper, container form squares, Buchner funnel, porcelain mug, animal weighing test, oral spuit 10 ml, uric acid plumb Easy Touch GCU (Glucose Cholesterol Uric Acid), lancette needle, alcohol as a cleaner, gout strip, UV spectrophotometer.

## Extract Proces

Extracts made by dipping respective shy daughter of herbal powder and yam leaves with ethanol extractor squares as possible using a container with magnetic stirring strirrer. Extraction is done until all flavonoids extracted by using FeCl<sub>3</sub> checked. Filtrate obtained filtered using filter paper with a Buchner funnel and vacuum relief. Dioven then dried, dry powder is calculated as the yield. Once the powder is dried and direfluks dikerik for 1 hour and dievaporasi use rotar evaporator to make it a thick liquid, then evaporated on a waterbath to extract thick

## Pharmacological Test

Experimental animals used in this study were male chickens weighing 1.5 kg. experimental animals first adapted to the environment for 7 days. Chicken uric acid increased (made hiperucemia) by way of chicken liver juice for 14 days 2 times a day for peroral and on the 15th day is done checking uric acid increased and given medication. The checking is done of uric acid in the II period. Period I made a check at 30 minutes after treatment and period II performed at 60 minutes after treatment. Experimental design was used with the group treated with the negative control group and comparing the levels of uric acid was treated before and after being given treatment.

## Induction Juice Chicken Liver

Used chicken liver juice concentrate 100% 5 ml / kg body weight morning and evening for 2 weeks.

## Data Analysis

Difference form of the data obtained decrease levels of uric acid. statistical test data with the Mann-Whitney test and ANOVA. Results and discussion determination of group.

Identification is done to prove that the powder used in this study is shy daughter herbal powder and leaves yams. Microscopic identification is done in Laboratory Faculty of Biology University of Ahmad Dahlan. Based on the results obtained that the identification of the powder used in this study are herbal shy daughter (*Mimosa pudica* L.) and cassava leaves (*Manihot utilissima* Pohl.).

## Extract Yield

Manufacture of ethanol extracts of herbs and leaves shy daughter performed in laboratory yams Phytochemistry Faculty of Pharmacy University of Ahmad Dahlan. Obtained extract is made using maceration method ie with stirring and soaking liquid extractor rhizome powder that is 96% ethanol. Ethanol to semipolar compounds have properties that can be extracted semipolar nature. A part from that mold and bacteria grow in the privacy of 20% ethanol, ethanol can be mixed with water in a variety of comparisons, as well as a good solvent for hydrophilic and lipophilic compounds. Extraction method used is maceration. This method is done by soaking the plant material that has been refined / milled in the selected solvent, and then stored in a certain period in a dark place. Gain maceration method is simple, and cheap. Maceration method that is also a lack of a long time (Kiranmai *et al.*, 2011). Extracts tested qualitatively using UV spectrophotometer to perform a scan on the lambda max produced from the extract.

**Measurement of uric acid**

After administration of ethanol extracts of herbs and leaves shy daughter yams, do check levels of uric acid. Effect of ethanol extracts of herbs and leaves shy daughter yams seen from a decrease levels of uric acid. I average yield reduction of uric acid period after administration of ethanol extracts of herbs and leaves of yam shy daughter on oral test animals can be seen in Table I and Figure 1.

Analysis of the data with the Kolmogorov-Smirnov test showed that the distribution of long data retention mice in this

the six groups are not homogeneous. From the results of the tests of normality and homogeneity, then for subsequent data analysis using non-parametric analysis Kruskal Wallis and Mann-Whitney test. Kruskal Wallis test results show that there is no significant difference in the decrease in uric acid group mice between 3 and 4, 3 and 5, 4 and 5. This is indicated by the value of significance ( $p > 0,05$ ). Then performed Mann-Whitney test to compare differences between groups long retention results can be seen in Table II.

Based on the results of statistical tests in

**Table I. Uric acid reduction of the period I**

Group	Dose (mg/kg body weight)	Average Uric Acid mg/dl ± SD		
		Uric Acid Level	Reduction Of Uric Acid	Margin decline
Normal	-	3,16±0,51	2,90±0,45	0,26±0,05
Sick	-	8,73±3,25	8,40±3,30	0,30±0,05
Allopurinol	10	7,73±0,66	2,80±0,17	4,93±0,83
Shy daughter herba	93	7,43±2,11	5,90±2,16	1,53±0,71
Cassava leaves	93	6,56±2,10	5,00±1,68	1,43±0,61

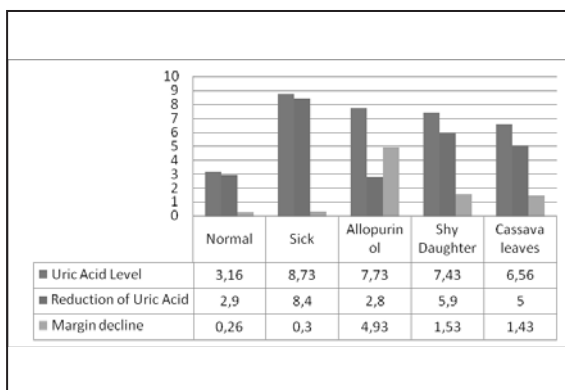


Figure 1. Histogram purata decrease uric acid period I

study is not normal. This is demonstrated by the significant value of  $p = 0.000$  ( $p < 0.05$ ) for the six groups. Test of homogeneity (Levene test) also showed the value of  $p = 0.000$  ( $p < 0.05$ ) which means that the distribution of the data to

healthy controls compared with the control group of drugs (allopurinol), control herbaceous shy daughter and gained control of cassava leaf significance  $< 0.05$ , which means there is a significant difference in lowering uric acid to the group. Whereas in the control group with the control group herbal medicines shy daughter gained significance  $> 0.05$ , which means there is no significant difference in lowering uric acid in both groups. Control the drug can lower uric acid by 4.93 mg / dl (63%), ethanol extract shy daughter herb can lower uric acid by 1.53 mg / dl (21%).

On drug control group with the control group gained significance cassava leaves  $> 0.05$ , which means there is no significant difference in lowering uric acid in both groups. Control medication (allopurinol) can lower uric acid by

Table II. Mann-Whitney test results decreased uric acid period I

Compared Group	Significancy	Results	Mean
1 vs 2	0,197	No significant	1 = 2
1 vs 3	0,046	Significant	1 < 3
1 vs 4	0,046	Significant	1 < 4
1 vs 5	0,046	Significant	1 < 5
2 vs 3	0,046	Significant	2 < 3
2 vs 4	0,046	Significant	2 < 4
2 vs 5	0,046	Significant	2 < 5
3 vs 4	0,050	No Significant	3 = 4
3 vs 5	0,050	No Significant	3 = 5

4.93 mg / dl (63%), ethanol extract of cassava leaves can lower uric acid of 1.43 mg / dl (21%).

Based on the results of statistical tests in healthy controls compared with the control group of drugs (allopurinol), control herbaceous shy daughter and gained control of cassava leaf significance <0.05, which means there is a significant difference in lowering uric acid to the group. Whereas in the control group with the control group herbal medicines shy daughter gained significance > 0.05, which means there is no significant difference in lowering uric acid in both groups. Control the drug can lower uric acid by 4.93 mg / dl (63%), ethanol extract shy daughter herb can lower uric acid by 1.53 mg / dl (21%). On drug control group with the control group gained significance cassava leaves > 0.05,

which means there is no significant difference in lowering uric acid in both groups. Control medication (allopurinol) can lower uric acid by 4.93 mg / dl (63%), ethanol extract of cassava leaves can lower uric acid of 1.43 mg / dl (21%).

Hyperuricemia control group with the control group cassava leaves gained significance > 0.05, which means there is a significant difference in lowering uric acid in both groups. Control of herbal extracts shy daughter can lower uric acid by 1.53 mg / dl (21%), ethanol extract of cassava leaves can lower uric acid of 1.43 mg / dl (21%). Qualitative test results generated from scans lambda max in ethanol herb extract shy daughter and cassava leaves indicate the presence of flavonoid compounds. Ability to reduce uric acid produced

Table III. decreasement uric acid period II

Group	Dose (mg/kgBW)	Average Uric Acid mg/dl ± SD		
		Uric Acid Level	Reduction Of Uric Acid	Margin decline
Normal	-	3,43±0,15	2,86±0,34	0,56±0,05
Sick	-	8,53±3,05	7,90±3,03	0,60±0,05
Allopurinol	10	7,73±0,66	2,36±0,32	5,36±0,40
Shy Daughter Herbs	93	7,43±2,11	5,73±2,24	1,70±0,60
Cassava Leaves	93	6,80±2,51	5,36±2,46	1,43±0,30

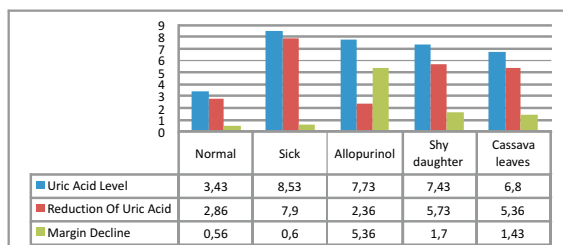


Figure 3. Histogram purata period II decreased uric acid

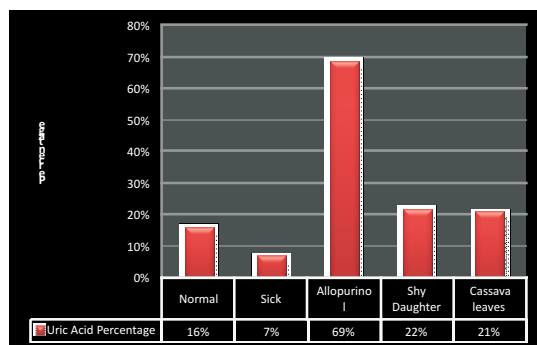


Figure 4. Histogram of the percentage difference in uric acid decreased during the period of II

by the ethanol extract of herbs and shy daughter cassava leaves made possible due to the activity of the flavonoid compounds.

### Results Uric Acid Measurement Period II

Uric acid measurement period II performed at 60 minutes after treatment meant to know are there any decrease in uric acid levels after the first period at the time of 60 minutes.

Kolmogorov-Smirnov test results data is the difference in reduction of uric acid in this study are normally distributed with ( $p > 0.05$ ), whereas the acquired Levene test ( $p > 0.05$ ). Subsequent data analysis using parametric analysis one way ANOVA post hoc test followed

SLD. In the ANOVA significance value of 0.000 ( $p < 0.05$ ), which means that there are significant differences in the numbers purata difference between groups decreased uric acid. LSD test is then performed to determine differences in error rate of each rat kelompok. Hasil LSD test are shown in Table IV.

Based on the results of statistical tests in healthy controls compared with the control group of drugs (allopurinol), control herbaceous shy daughter and gained control of cassava leaf significance  $< 0.05$ , which means there is a significant difference in lowering uric acid to the group. Whereas in the control group with the control group herbal medicines shy daughter gained significance  $< 0.05$ , which means there is a significant difference in lowering uric acid in both groups. Control the drug can lower uric acid by 5.36 mg / dl (69%), ethanol extract shy daughter herb can lower uric acid by 1.70 mg / dl (22%).

On drug control group with the control group gained significance cassava leaves  $< 0.05$ , which means there is a significant difference in lowering uric acid in both groups. Control the drug can lower uric acid by 5.36 mg / dl (69%), ethanol extract of cassava leaves can lower uric acid of 1.43 mg / dl (21%).

Hyperuricemia control group with the control group cassava leaves gained significance  $> 0.05$ , which means that each contained a significant difference in lowering uric acid in both groups. Control of herbal extracts shy daughter can lower uric acid by 1.70 mg / dl (22%), ethanol extract of cassava leaves can lower uric acid of 1.43 mg / dl (21%).

Qualitative test results generated from scans lambda max in ethanol herb extract shy daughter and cassava leaves indicate the presence of flavonoid compounds.

Ability to reduce uric acid produced by the ethanol extract of herbs and shy daughter cassava

Table IV. LSD test results difference decreased uric acid period II

Compared Group	Significancy	Results	Mean
1 vs 2	0,822	No significant	1 = 2
1 vs 3	0,000	Significant	1 < 3
1 vs 4	0,003	Significant	1 < 4
1 vs 5	0,013	Significant	1 < 5
2 vs 3	0,000	Significant	2 < 3
2 vs 4	0,004	Significant	2 < 4
2 vs 5	0,020	Significant	2 < 5
3 vs 4	0,000	Significant	3 > 4
3 vs 5	0,000	Significant	3 > 5
4 vs 5	0,377	No Significant	4 = 5

leaves made possible due to the activity of the flavonoid compounds.

## CONCLUSION

Based on the results of this study concluded that:

1. Ethanol extract herbal shy daughter dose 93 mg / kg and ethanol extract of leaves of cassava dose 93 mg / kg body weight can lower uric acid induced in chicken liver chicken juice.
2. Purata decrease uric acid levels obtained by the ethanol extract herbal shy daughter dose 93 mg / kg by 1.70 mg / dl (22%), cassava leaves ethanol extract dose 93 mg / kg BW of 1.43 mg / dl (21%)

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