

THE EFFECTIVENESS OF SOURSOP (*Annona muricata L*) JUICE PREPARATIONS ON REDUCING URIC ACID LEVELS IN MALE WHITE RATS (*Rattusnovergicus*).

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ABSTRAK

This study aims to determine whether there is a therapeutic effect on soursop (*Annona Muricata L*) juice in reducing uric acid levels in male white rats (*Rattusnovergicus*) and to determine what dose of bay leaf extract (*Syzygium polyanthum*) is effective in reducing acidity levels. veins in male white rats (*Rattusnovergicus*).

The method in this study used a laboratory experiment with a *post-test only control group design*. The treatment groups were group I (negative control), group II (90 ml soursop juice), group III (180 ml soursop juice), group IV (soursop juice 270 ml).

The results showed that soursop juice (*Annona Muricata L*) was positive for polyphenolic compounds. Statistical analysis of the data by KruskalWalis that 0.280 or > 0.05 means that there is a significant difference between uric acid levels before administration of soursop juice and uric acid levels after providing juice soursop fruit and continued with Duncan's analysis to see the difference in the effective dose.

Keywords: *soursop juice (Annona Muricata L), polyphenols, uric acid*

PENDAHULUAN

Healthy living is a demand for the creation of a healthy society. A healthy society means a society that is physically, mentally and socially healthy.

In Indonesia, public awareness about a healthy lifestyle is still very limited. This can be seen from the high mortality rate accompanied by diseases caused by dietary factors, obesity factors and age factors [1] The emergence of disease can be caused by various things, one of which is due to consuming unhealthy foods.

In general, unhealthy foods contain only a few substances and little fiber is needed for body development and if consumed in excess can cause various negative impacts such as inhibiting the development of the human body, reducing

the function of limb movement and causing disease and even death.

One of the most common diseases is gout, which is caused by an unhealthy lifestyle, the causative factors are diet, alcohol consumption and the habit of eating foods rich in purines [7]

Changes in traditional lifestyles to modern lifestyles are the main triggers for gout. Hyperuricemia is a condition in which a person experiences unbearable pain, such as swelling of the joints and burning sensation.

Joints in the body can be at risk of developing hyperuricemia, but the joints most commonly affected are the knees, ankles, toes and hands.

In general, hyperuricemia is more common in men than women, especially men aged over 30 years. The increase in

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patients with hyperuricemia for men occurs because of the normal condition of increasing serum hyperuricemia after puberty, while for women it occurs after menopause [11].

Uric acid is the last product of purine excretion which undergoes a process of synthesis and excretion in the body. Both of these processes are very complex and not entirely clear, especially the mechanism of excretion through urine. Elevated uric acid levels in the blood are called hyperuricemia [2]. Some of the recommended lifestyles include losing weight, eating healthy foods, exercising, and consuming enough water.

Diet modifications in obese patients are sought to achieve the ideal body mass index, but diets that are too restrictive and diets high in protein or low in these changes are avoided. Uric acid levels include age, gender, medical history, obesity, purine and alcohol consumption. Men have higher serum uric acid levels than women, which increases their risk of developing gout. The development of uric acid before the age of 30 years is more common in men than women.

However, the incidence of gout becomes the same between the sexes after the age of 60 years. The prevalence of gout in men increases with age and peaks between the ages of 75 and 84 years [26]. Women have an increased risk of gout after menopause, then the risk begins to increase at the age of 45 years with decreasing estrogen levels because estrogen has a uricosuric effect, this causes gout to be rare in young women [27].

Increasing age is an important risk factor for both men and women. This may be due to many factors, such as increased serum uric acid levels (the most common cause is decreased kidney function), increased use of diuretic drugs, and other drugs that can increase serum uric acid levels [28].

The use of diuretic drugs is a significant risk factor for the development of gout. Diuretic drugs can cause an increase in uric acid in the kidneys, thereby causing hyperuricemia. Low-dose aspirin, commonly prescribed for cardioprotection, also increases uric acid levels slightly in elderly patients [2].

In gout patients with complaints of urinary tract stones, it is recommended to fulfill two liters of water every day, and stay away from dehydration.

For gout patients, it is better to exercise like light exercise, because it is feared that it can cause joint pain [21].

The prevalence of gout in Indonesia is increasing. According to Riskesdas 2018, the prevalence of gout based on the diagnosis of health workers in Indonesia is 11.9% and based on diagnosis or symptoms 24.7% when viewed from age characteristics, the prevalence is high at age 75 years (54.8%).

There are also more women (8.46%) than men (6.13%) [14].

The World Health Organization (WHO) reports that the prevalence of gout has doubled between 1990-2010.

In adults in the United States gout has increased and affects 8.3 million (4%) people. Gout is estimated to occur in 840 people out of every 100,000 people [13].

An epidemiological survey conducted in Central Java in collaboration with WHO on 4,683 samples aged between 15-45 years, the prevalence of gout arthritis was 24.3%.

Based on a report from the Central Java Provincial Health Office, the proportion of cases of hyperuricemia from year to year has increased compared to cases of other non-communicable diseases.

The results of the recapitulation carried out by the Medical Record section at Kardinah Hospital, Tegal City during 2008 were 40% of 1068 patients, both inpatients and outpatients who had uric

acid levels checked, suffered from hyperuricemia [5]. Based on statistical data in Gorontalo, the number of patients with hyperuricemia obtained in 2016 in the Gorontalo area was 263.8% people, Bualemo 39.26%, Pohuwato 0.09%, Bone Bolango 129.6%, North Gorontalo 0.12% people, Gorontalo City 56.4% people, Gorontalo Province 17.45% people.

From the data obtained in the working area of the Tilango Health Center, Gorontalo Regency, the number of gout is 229 people, and 30 suffer from hyperuricemia. Treatment of gout usually uses synthetic drugs, while synthetic drugs can cause unwanted side effects on the body.

To avoid the occurrence of unwanted side effects, namely by non-pharmacological treatment, non-pharmacological therapy is a natural therapy, including herbs.

The type of herbal therapy that can be used to reduce pain in gout sufferers is soursop fruit. The fruit contains fructose, fat, protein, calcium, phosphorus, iron, vitamin A and vitamin B and vitamin C compounds.

The secondary metabolites contained therein are polyphenol group compounds. Compounds that are often used are polyphenol compounds, resins that are able to overcome joint pain in gout [1]

Consumption of soursop can facilitate the secretion of uric acid through urine so that uric acid in the blood is reduced [18]

Empirically soursop fruit has been widely used to reduce uric acid and lower blood pressure [11] Various benefits of soursop for therapy include the treatment of gallstones, anti-constipation, gout, and increase appetite [17].

The prevalence of vascular acid disease in Indonesia continues to be facing an increase. For Riskesdas 2018, the prevalence of vascular acid disease is based on the diagnosis of health services in Indonesia, 11.9% and comes from an

assessment or indication of 24.7% when viewed from the characteristics of age, a large habit at the age of 75 years (54.8%). There are also more women (8, 46%) than men (6.13%).

The use of soursop fruit as a gout treatment has been carried out in Brazil, this can be understood because soursop fruit has a high polyphenol content and it is stated that soursop fruit can be used as new natural medicines for the treatment of gout [11].

Based on research conducted by Prasetyo in 2014 in a journal entitled the activities of various soursop fruit preparations (*Annona muricata* L) in reducing uric acid levels in Sprague-

Dawley white rats, it was concluded from the preparation of fruit juice, preparations of ethyl acetate extract and ethanol extract of soursop fruit, in get a greater yield of fruit juice preparations compared to the preparations of the two extracts.

Soursop is a plant originating from the tropics of the Americas, namely the Amazon (South America), the Caribbean and Central America. The entry of soursop plants in Indonesia is thought to have been brought by the Dutch in the 19th century. This plant in fact thrives and develops well because Indonesia's tropical climate is suitable for soursop plants. Natural ingredients have been widely used as an alternative treatment for gout, one of which is the soursop plant (*Annona muricata* L) which has been used by the public as a medicine for acne, ulcers, nausea, diarrhea, hepatitis, cough, rheumatism, and hypertension.

Various benefits of soursop for therapy include the treatment of gallstones, anti-constipation, gout and increase appetite. Common names of soursop are Graviola (Brazil), Soursop (England), Guanabana (Spain), Jackfruit sabrang or jackfruit Dutch (Java), jackfruit walanda or soursop (Sunda) [18].

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Empirically soursop fruit has been widely used to lower uric acid and lower blood pressure. According to [31] soursop fruit extract has significant antioxidants as antihyperuricemia and it is stated that soursop fruit can be used as new natural medicines.

Treatment of gout, also known as hyperuricemia, is a metabolic disease characterized by deposits of joint veins so that arthritis joints feel painful. This disease is caused by excess uric acid production, underexcretion of uric acid or both and the presence of other diseases that cause an increase in uric acid in the body [29].

In this study, researchers used fruit juice. Fruit juice is one of the processed fruit products that has long been known. Its high nutritional content, refreshing taste and the emergence of public awareness of the importance of health have encouraged the development of the fruit juice industry as a substitute for soft drinks, coffee, or tea. The tropical fruit juice industry has grown rapidly in recent years at a rate of up to 20% per year [30].

Fruit juice is the result of pressing or extracting fruit that has been filtered. The production of fruit juice is mainly aimed at increasing the shelf life and usability of fruits. Making fruit juice from each type of fruit although there are slight differences, but the principle is the same. Fruit juice is made by crushing the flesh of the fruit and then pressing it to get the juice.

Sugar is added for sweetness. Preservatives can be added to extend shelf life. Furthermore, the liquid is filtered, bottled, then pasteurized to make it last longer. Purification of fruit juice aims to remove the remaining fibers from the fruit by filtering, settling or centrifugation at high speed which can separate the juice from the fibers based on differences in density. Unrefined fruit juice will result in

precipitation at the bottom of the bottle. In this study using fruit juice from soursop f

Then in the test to decrease uric acid levels, it was found that soursop juice was more effective in reducing uric acid levels compared to the two extracts.

So that the effective dose can reduce blood uric acid levels in male rats for fruit juice preparations, all doses given can reduce uric acid levels, while for ethanol extract doses 2 (535.8 mg) and dose 3 (803.7 mg) and ethyl acetate extract only dose 3 (77.4 mg).

Uric acid is formed from the end result of purine catabolism assisted by the enzyme xanthine oxidase.

In the process of formation of uric acid, xanthine oxidase has an important role in catalyzing hypoxanthine successively into xanthine and then into uric acid.

If the purine level in the body increases, it will trigger the work of the xanthine enzyme to form uric acid, so that uric acid in the body will increase [3].

The uric acid-lowering activity of soursop fruit is related to the content of vitamin C and polyphenolic compounds which have antioxidant activity that can reduce uric acid levels because they have a molecular structure that can donate electrons to free radical molecules [7].

The activity of these antioxidant compounds can inhibit the work of xanthine oxidase through competitive inhibition with xanthine substrates [4].

The xanthine oxidase enzyme functions to catalyze the conversion of purines to uric acid. With the inhibition of the xanthine oxidase enzyme, the formation of uric acid will also be inhibited.

RESEARCH METHODS

The type and design of the research was carried out by means of laboratory experiments using a quantitative descriptive approach which was intended

to identify the content of hyperuricemia in experimental animals after being given soursop fruit extract.

The design of this study used the Post Test Only Control Group Design, which was to compare the final results of the study between the treatment group and the control group

The data collection technique used in this study is the tool used is analytical balance, blender, chemical cup, cup measuring tool, horn spatula and stirring rod as well as Easy Touch GCU uric acid measuring equipment, mortar and pestle

The materials needed for the study were soursop fruit flesh (*Annona muricata* L), mask, handscoon, chicken liver, allopurinol 100 mg, Aquades, uric acid test strip, rat sonde, aluminum foil, pet food pellet, watch glass, alcohol swab, blood lancet. , 3 cc syringe.

In this research, research planning begins with preparing a complete rat cage with a place for feeding and drinking, preparing experimental animals, namely male white rats for 12 years and adapting them into the cage for each treatment, weighing the animals' initial body weight, and preparing soursop fruit extract for treatment mice.

Sampling technique The sample in the form of illustration in the form of soursop fruit (*Annona muricata* L) was obtained from North Isimu Hamlet, Kab. Gorontalo, Kec. Arrived.

The illustration is washed to remove dirt (watery sorting), then tried to slaughter the soursop fruit illustration after that it is pureed using a blender and squeezed out the fruit extract using a cotton cloth.

The dose of chicken liver which is considered to be able to increase uric acid levels based on the results of research conducted by Nasrullah et al, 2015 is 5 ml/200gr BW.

A total of 20 grams of fresh chicken liver washed and mashed using a blender.

Chicken liver has a very high purine concentration, which is 243 mg/100g chicken liver. The use of chicken liver juice as an ingredient to increase uric acid. Administration was done orally using an oral probe for 14 days of treatment. Giving chicken liver juice is able to increase the concentration of uric acid to double the original hyperuricemia concentration.

1. In test sample 1 used soursop fruit juice (*Annona muricata* L) as much as 90 mg.
2. In test sample 2 used soursop juice (*Annona muricata* L) as much as 180 mg.
3. In test sample 3 used soursop juice (*Annona muricata* L) as much as 270 mg.

The dose of allopurinol in humans is 100 mg / 70 kg of human body weight and the dose to be given to experimental animals is 1.8 mg for 200 g of male white rats.

This research will be carried out for 14 days with the following treatment: before the treatment (giving chicken inner juice and extract) it is first tested to measure the acid content of the blood vessels.

Next on day 1-3 experimental animals in each group will be induced with chicken inner juice to increase the vascular acid content, after that it is tested for the second vascular acid content.

Giving chicken liver juice will be given twice or a day with a dose of 2.5 ml, namely at 08:00 and 14:00.

Then on the 10th day the rats will have their uric acid content measured and considered as the third vessel acid content.

On day 4-10 the rats will be given treatment using Allopurinol as a positive control and soursop fruit extract as an experimental treatment.

Normal uric acid levels in white male rats of the Wistar strain were 4.37 mg/dl, while in female rats it was 2.92 mg/dl [7].

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Technical analysis of data obtained from SPSS statistics.

Where the initial hyperuricemia in each positive group was tested for homogeneity and normality experiments (One-sample Kolmogoro-Smirnov Test).

If the two experimental conditions are packed for the next one-way ANOVA test and experiment F to determine the significant effect between the administration and if there is a comparison between the treatment groups, the LSD method is continued with the LSD method.

However, if there is one or both experiments, it is not crowded until the analysis is tried with the Kruskal Wallis test

RESEARCH RESULT

Phytochemical Screening

Experiments of polyphenols on soursop fruit extract (*Annona muricata* L) using FeCl₃ as a solvent, proving that the change in color to dark green can be observed in Chart 1.

Table 1. Phytochemical screening results

Compound	Method	Test results	description
Polyphenol	1 ml FeCl ₃	Greenish Black	(+)

Source: Data processed (2021)

Measurement of the initial level of uric Acid

Based on early measurements of the acid content of the vessels of white rats, the results shown in chart 2 with different weights of white rats were obtained.

Table 2. Measurement results before giving chicken liver juice

Group	Repetition	BB Mouse (gr)	Results of Uric Acid Levels (mg/dL)
1 (Positive Control)	1	200	4,1
	2	190	4,7
	3	190	7,1
	4	200	9,2
2 (soursop)	1	260	5,8
	2	200	9,7

juice 90 mg)	3	160	6,5
	4	190	5,0
3 (soursop)	1	200	10,9
	2	200	12,4
juice 180 mg)	3	120	5,0
	4	190	10,1
4 (soursop)	1	180	7,0
	2	160	5,7
juice 270 mg)	3	150	6,0
	4	180	11,6

Sumber: Data processed (2021)

Giving Chicken Liver Juice

The provision of chicken inner juice was matched with the body weight of each white rat illustration, so that the results of the vascular acid content showed that each white rat experienced an increase in the vascular acid content. This can be seen in chart 3.

Table 3. Measurement results after giving chicken liver juice

Group	Repetition	BB Mouse (gr)	Amount of Chicken Liver Juice (ml)	Results of Uric Acid Levels (mg/dL)
1 (Positive Control)	1	200	5	8,6
	2	190	4,75	8,5
	3	190	4,75	8,7
	4	200	5	5,3
2 (soursop juice 90 mg)	1	269	6,5	6,2
	2	200	5	15,4
	3	160	4	10,8
	4	190	4,75	7,1
3 (soursop juice 180 mg)	1	200	5	15,1
	2	200	5	13,4
	3	120	3	8,3
	4	160	4	14,1
4 (soursop juice 270 mg)	1	180	4,5	10,8
	2	160	4	7,1
	3	150	3,75	11,1
	4	180	4,5	15,4

Sumber: Data processed (2021)

Giving Soursop Fruit Juice (*Annona Muricata* L)

In table 4 it can be concluded that there is an important effect of soursop fruit extract (*Annona muricata* L) on the reduction of vascular acid levels.

This is indicated by a significance number of $p \leq 0.005$, which means that there is an important comparison between the uric acid content before giving the peaceful leaf extract and the vascular acid content after the soursop juice was given.

Table 4. Effect of soursop juice (*Annona Muricata* L)

Group	Repetition	Results of Uric Acid Levels (mg/dL)	Results of Uric Acid Levels After (mg/dL)	Drop Amount Gout (mg/dL)	Sig (p)
1 (Positive Control)	1	8,6	5,2	↓	0,003
	2	8,5	5,4	↑	
	3	8,7	6,2	↓	
	4	5,3	4,1	↓	
2 (soursop juice 90 mg)	1	6,2	5,4	↓	
	2	15,4	7,1	↓	
	3	10,8	4,6	↓	
	4	7,1	5,1	↓	
3 (soursop juice 180 mg)	1	15,1	4,4	↓	
	2	13,4	5,2	↓	
	3	8,3	4,1	↓	
	4	14,1	3,5	↓	
4 (soursop juice 270 mg)	1	10,8	5,9	↓	
	2	7,1	4,2	↓	
	3	11,1	5,7	↓	
	4	15,4	5,1	↓	

Sumber: Data processed (2021)

DISCUSSION

This study aims to determine whether soursop juice preparations have the potential to reduce uric acid levels in male white rats (*Rattus Novergicus*) and to determine what dose of soursop juice is effective in reducing uric acid levels in male white rats (*Rattus Novergicus*).

Soursop is a plant originating from the tropics of the Americas, namely the Amazon forest (South America), the Caribbean and Central America.

Empirically soursop fruit has been widely used to lower uric acid and lower blood pressure.

Soursop fruit has significant antioxidants as anti-urecemia and it is stated that soursop fruit can be used as natural medicines.

The uric acid-lowering activity of soursop fruit is related to the content of vitamin C and polyphenolic compounds that have antioxidant activity that can reduce uric acid levels because they have a molecular structure that can donate electrons to free radical molecules [9].

Gout is a metabolic disease associated with a high-purine diet and alcoholic beverages.

The accumulation of monosodium urate (MSU) crystals in joints and soft tissues is the main trigger for inflammation or inflammation in gouty arthritis [22].

Gout is the third most common type of arthritis after osteoarthritis and the group of external rheumatism (disorders of joint supporting components, inflammation, overuse) [23].

This disease interferes with the quality of life of the sufferer. Increased levels of uric acid in the blood is a major factor in the occurrence of hyperuricemia [24].

Problems will arise if monosodium urate (MSU) crystals form in the joints and surrounding tissues.

These needle-shaped crystals cause an inflammatory reaction that, if continued, causes severe pain that often accompanies a gout attack [25].

Gout is a disease that is often found and spread throughout the world. Gout, also known as gouty arthritis, is a heterogeneous group of diseases as a result of the deposition of monosodium urate crystals in tissues or due to supersaturation of uric acid in the extracellular fluid. The metabolic disorder underlying uric acid is hyperuricemia

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which is defined as an increase in urate level of more than 7.0 ml/dl for men and 6.0 ml/dl for women [14].

While another definition, gout is a metabolic disease that often affects adult men and postmenopausal women.

This is caused by increased levels of uric acid in the blood (hyperuricemia) and is characterized by episodes of acute and chronic gouty arthritis.

The activity of these antioxidant compounds can inhibit the work of xanthine oxidase through competitive inhibition with xanthine substrates [4].

The xanthine oxidase enzyme functions to catalyze the conversion of purines to uric acid. With the inhibition of the xanthine oxidase enzyme, the formation of uric acid will also be inhibited

Examination by qualitative analysis with phytochemical screening test that in soursop juice (*Annona muricata L*) positive contains polyphenol compounds. Based on research conducted by Harismah and Chusniatun 2016 that the main compounds contained in soursop fruit (*Annona muricata L*) are polyphenol compounds.

The dose of soursop fruit which is considered effective in reducing uric acid levels based on empirical experience is 10 kg/70 kg human body weight, so the dose of soursop juice to be given to rats is 0.18 ml or 180 ml/200 g body weight male white rats.

In this study, the sample used was soursop fruit which was taken directly in Dunggala village, Tibawa district, Gorontalo district.

The sample was washed to remove dirt (wet sorting), then cut the soursop fruit sample then puree using a blender and squeezed the juice using a batik cloth.

At the beginning of the experiment, mice were placed in cages according to their groups for 2 weeks. After two weeks of time for adaptation, then the uric acid level was measured as the initial uric acid level.

Normal blood uric acid levels are 4.37-7 mg/100 ml in males and 2.5-6 mg/100 ml in females.

The test animals used in this study were male white rats of healthy wistar strain aged 2-3 months with a body weight of 120-185 grams.

White rats (*Rattus norvegicus*) are mammals that have an impact on a treatment because they are not much different from other mammals.

White rats as experimental animals are relatively resistant to infection and tend to gather with each other not too large so that they are easier to make as experimental animals.

A total of 16 tails were divided into 4 groups with different treatments. Each group consisted of 4 rats.

Judge 2002 stated that the test animal which has similarities with humans in terms of anatomy, nutrition, pathology and metabolism with humans is the treatment animal, namely the white rat (*Rattus norvegicus*).

The use of male white rats with the type of Wistar strain because it can provide more stable research results because it is not influenced by the estrus cycle and pregnancy.

The rats were easier to control their intake and physical activity, thereby reducing the occurrence of bias during the study.

The hormone estrogen can reduce uric acid levels through the kidneys which are excreted in the urine so that researchers prefer male rats over female rats.

The reason for choosing the wistar strain rat is because it has a relatively fast metabolic ability so it is more sensitive when used in research related to body meta

After measuring uric acid levels in normal experimental rats, the experimental rats were induced to increase their uric acid levels by injecting orally 5 ml/200g bw of chicken liver juice daily to 16 white rats.

Chicken liver is a food that contains high purine protein, so that purine metabolism will produce uric acid levels in the blood.

The dose of chicken liver which is considered to be able to increase uric acid

levels based on the results of research conducted by Nasrullah et al, 2015 is 5 ml/200 g body weight.

A total of 20 grams of fresh chicken liver washed and mashed using a blender.

Before being induced by chicken liver juice, 16 rats were first measured the blood uric acid levels of the rats with the aim of knowing the initial uric acid levels before the rats were converted into uric acid.

Induction was carried out for 7 days orally given 2 times/day at a dose of 2.5 ml/200 g BW/day.

The purpose of induction is to condition rats to become uric acid before being given treatment.

Hyperuricemia levels for test animals before being given purine-containing food reached 10.9 mg/dL, then after being induced by chicken liver juice, which has the potential to cause hyperuricemia because chicken liver juice is rapidly excreted.

On the 7th day, uric acid levels in white rats experienced a high increase of 15.1 mg/dL.

For the 8th day the rats were induced with soursop juice (*Annona muricata* L) until the 14th day the administration was adjusted to the rat's body weight, namely the dose of 90 gr/bb 200 rat, dose 180gr/bb 200 rat, and dose 270 gr/bb 200 BB mice.

Measurement of uric acid levels in white rats was carried out 3 times, namely before being induced by chicken liver juice, after being induced by chicken liver juice, and after being induced with soursop juice (*Annona muricata* L).

Rats were divided into 4 treatment groups with a total of 16 rats.

Group 1 is a positive control using 4 rats with allopurinol administration of 100 mg/70 Kg BW which is converted to 1.8 mg BW for 200 gram rats.

The Geriatric Dosage Handbook 16th Edition states that the drug dose of

Allopurinol 100 mg is correct and the maximum dose of Allopurinol drug taken is 300 mg/day, because Allopurinol is the first-line drug that can cure hyperuricemia.

Group 2 used 4 rats with a dose of 90 ml/200 gram of fruit juice, group 3 used 4 rats with a dose of fruit juice of 180 mg/BW of 200 grams of fruit juice, and group 4 used 4 rats with a dose of fruit juice of 270 mg/ww of 200 rats. grams.

The results showed that soursop juice (*Annona muricata* L) can be used in reducing hyperuricemia so that it can be used.

The decrease that occurred in groups 2,3, and 4 showed the therapeutic effect of soursop juice (*Annona muricata* L) as a drug to reduce uric acid levels.

However, it can be seen from table 4 that the number of decreases in uric acid that experienced a higher decrease was in group 3 with a dose of 180 mg fruit juice as much as 10.7 mg/dL.

The decrease in uric acid levels occurs due to the presence of vitamin C and polyphenolic compounds that have antioxidant activity that can reduce uric acid levels because they have a molecular structure that can donate electrons to free radical molecules.

The activity of these antioxidant compounds can inhibit the work of xanthine oxidase through competitive inhibition with xanthine substrates.

In this study, it can be seen that soursop fruit (*Annona muricata* L) can reduce uric acid levels in male white rats (*Rattus novergicus*), because soursop fruit has polyphenolic compounds that function to inhibit the work of the xanthine oxidase enzyme so that the formation of uric acid in the body is inhibited.

In this study, there are shortcomings, namely in test animals, the researchers in each group should have used 5 animals, but due to changes in body weight,

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climate and new acclimatization sites, this caused the mice to die.

CONCLUSION

Based on the results of research and discussion, it can be concluded that there is an effect of giving soursop juice (*Annona muricata* L) to decrease uric acid levels in male white rats (Wistar strain).

The effective dose in this study was the treatment in group 3 with a dose of 180 ml soursop juice, but according to the Duncan test results, there was no difference in each dose.

Based on this research, it is suggested by the researcher to conduct further research, namely the toxicity test of soursop juice. It is also necessary to conduct further research to test the antibacterial activity and formulation of soursop juice (*Annona muricata*

DAFTAR PUSTAKA

- [1] Ahmad, N. 2011. *Cara Mencegah dan Mengobati Asam Urat dan Hipertensi*. Jakarta: RinekaCipta.
- [2] Darmansjah, I. 2002. *Koran Indonesia Sehat* Jakarta: Medical Articles Category: Rationaldruguse.
- [3] Darussalam, Miftafu dan Rukmi, Dwi Kartika. 2016. Peran Air Rebusan Daun Salam (*Syzygium polyanthum*) Dalam Menurunkan Kadar Asam Urat. *Jurnal Ilmu Kesehatan* Vol.5(2).
- [4] Hidayat, A.A. 2007, *Metode Penelitian Keperawatan dan teknik Analisa Data*,. Penerbit Salemba medika
- [5] Hidayat R. 2009. *Gout dan Hiperurisemia*. *Medicinus*; Vol.22: 1-5
- [6] Kumar V, Abbas AK, Fausto N, 2006, *Robbins and Cotran pathologic Basis of Disease*, 7th edn, saunders, Philadelphia, 1311.
- [7] Mardiana, L. 2012. *Ramuan dan khasiat sirsak*.(B. P. W., Ed.) Jakarta: Penebar Swadaya.
- [8] Muniroh et al 2010, *Minyak Atsiri Kunyit Sebagai Anti Radang Pada Penderita Gout Arthritis Dengan Diet Tinggi Purin*, Makara-Kesehatan, Vol. 14, No. 2, pp. 58
- [9] Mardiana, L. 2012. *Ramuan dan khasiat sirsak*.(B. P. W., Ed.) Jakarta: Penebar Swadaya.
- [10] Nainggolan, O 2009, *Prevalensi dan Determinan Penyakit Rematik di Indonesia*, *Majalah Kedokteran Indonesia*, Vol. 59, No 12, pp. 589
- [11] Nuki G, Simkin PA. 2006, *A Concise History of Gout and Hyperuricemia and Their Treatment*, *Arthritis Research and Therapy*, diakses 4 Agustus 2013,
- [12] Taylor. 2002. *Introduction to Marine Engineering*. Elsevier Science Ltd, Oxford
- [13] Tjokroprawiro, 2015, *Buku Ajar Ilmu Penyakit Dalam*, Fakultas Kedokteran Universitas Airlangga, Edisi 2, Penerbit Airlangga University Press, Surabaya
- [14] Tehupeior, ES 2006, *Arthritis Gout dalam Buku Ajar Ilmu Penyakit Dalam*, FKUI, Jakarta pp. 1208-1210
- [15] Wirahmadi. 2013. *Pengaruh Rebusan Daun Sirsak Terhadap Nyeri Pada Penderita Gout Di Kelurahan Genuk Barat Kecamatan Ungaran Barat Kabupaten Semarang*. *Jurnal Nursing Science*. Vol. 1. No. 2
- [16] World Health Organization (WHO). 2015. *Prevalence of Gout*.
- [17] Kemenkes RI. 2013. *Riset Kesehatan Dasar; RISKESDAS*. Jakarta: Balitbang Kemenkes Ri
- [18] Queisha, NL. 2010. *Cegah Asam Urat Dengan Vitamin C*. cegah-asamurat-

- dengan-vitamin-c-2/.diakses tanggal 28 Maret 2011.
- [19] Soeroso, J. dan Algristian, H. Asam Urat. Cetakan I. Depok, Indonesia: Penebar Plus. 2011. Halaman : 14-15
- [20] Taylor. 2002. *Introduction to Marine Engineering*. Elsevier Science Ltd, Oxford
- [21] Jordan et al. 2007, *Rheumatology Guideline for the Management of Gout*, The British Society for Rheumatology, Khanna et al. 2012, *Guidelines for Management of Gout*. Part 1: Systematic Nonpharmacologic and Pharmacologic Therapeutic Approaches to Hyperuricemia, American College of Rheumatology, Vol. 64, No. 10, pp. 1431- 1446
- [22] Nuki G, Simkin PA. 2006, *A Concise History of Gout and Hyperuricemia and Their Treatment*, *Arthritis Research and Therapy*, diakses 4 Agustus 2013,
- [23] Nainggolan, O 2009, Prevalensi dan Determinan Penyakit Rematik di Indonesia, *Majalah Kedokteran Indonesia*, Vol. 59, No 12, pp. 589
- [24] Doherty, M. (2010). *Epidemiology of Gout*. 12(6).
- [25] Carter, MA 2006, *Gout dalam Patofisiologi: Konsep Klinis Proses-proses Penyakit*, EGC, Jakarta pp. 1402-1405
- Cronstein BN, Terkeltaub R 2006, *The Inflammatory Process of Gout and Its Treatment*, *Arthritis Research and Therapy*, diakses 5 Agustus 2013.
- [26] Weaver, AL 2008, *Epidemiology of Gout*, *Cleveland Clinic Journal of Medicine*, Vol. 75, No. 5, pp. S9-S10
- [27] Roddy, E., & Doherty, M. (2010). *Epidemiology of Gout*. 12(6).
- [28] Doherty, M. (2009). *New Insights Into The Epidemiology of Gout*. 48(2).
- [29] Kowalak, Welsh & Mayer. (2011). *Buku Ajar Patofisiologi*. Jakarta : EGC. Kuo dkk, 2010, *Gout: An Independent Risk Factor for Allcause and Cardiovascular Mortality*, *Rheumatology Oxford*, Vol. 49, No. 1, pp. 141-146
- [30] Iriani, F., & Ninawati. (2005). *Gambaran Kesejahteraan Psikologis pada Dewasa*. *Muda Ditinjau Dari Pola Attachment*. *Jurnal Psikologi*, 3, 44-64.
- [31] Paramita. 2011. *Nursing :Memahami Berbagai Macam Penyakit*. Jakarta : PT. Indeks.