

## Decreased blood uric acid levels after drinking *Annona muricata* linn (soursop leaf) extract: study in elderly with hyperuricemia

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### ABSTRACT

**Introduction:** Gout is a degenerative disease that often attacks joints, especially in older adults. This disease is caused by the buildup of uric acid crystals in the joints, which causes inflammation and severe pain. The pain caused by this disease often dramatically interferes with the sufferer's daily activities.

**Objectives:** Research to determine the effectiveness of *A. Muricata* leaf extract in reducing uric acid levels in older adults with hyperuricemia. **Methods:** Quantitative research, using a quasi-experimental type with Pre-test, Post-test design with control group design, with a sample size of 30 older adults, sampling technique using random sampling carried out for one week consuming one day three times. **Results:** The paired t-test showed a p-value of 0.0001, indicating a significant difference between the average uric acid levels before and after *Annona muricata* leaf extract administration. Soursop leaves contain flavonoid and tannin compounds, where flavonoids can inhibit the production of the enzyme xanthine oxidase. By inhibiting this enzyme, the process of forming hypoxanthine into xanthine is also hampered, thereby reducing excess uric acid production. Apart from reducing uric acid levels in the blood, soursop leaves can also reduce pain in people with gouty arthritis thanks to the tannin, resin and Agostini content, which can relieve pain and reduce swelling and pain. **Conclusions:** Administration of *A. Muricata* leaf extract has proven effective in reducing uric acid levels in older adults with hyperuricemia.

## Introduction

Uric acid (uric acid): According to research conducted by Sangging in 2017, it is known that uric acid is formed as the end product of the purine metabolism process. Purine itself is an essential component in the structure of DNA, which plays a vital role in the genetic process. When DNA cells are damaged or broken down, their purines will be broken down into uric acid. The process of removing uric acid from the body occurs through two main routes, namely through the kidneys, where uric acid will be excreted with urine, and a small portion will be excreted through the digestive tract (Sangging et al., 2017).

Under normal conditions, the body can regulate uric acid levels to remain within safe limits. However, if there is an increase in uric acid levels in the blood, this condition is called hyperuricemia. If this hyperuricemia is not treated correctly, it can develop into gout or what is also known as gout. One factor that can increase the risk of hyperuricemia is consuming foods with high purine content. Some types of food include offal, red meat and several types of fish. When uric acid levels in the blood increase, the uric acid can crystallize and accumulate in the joints, which then causes pain and inflammation, characteristic of gout. Therefore, people need to



pay attention to their food intake, especially regarding purine content, to avoid the risk of increasing uric acid levels in the blood, which can lead to more severe health conditions (Dungga, 2022).

Gout, known in medical terms as gout, is a degenerative disease that generally attacks older individuals, especially the elderly. This disease occurs due to the buildup of uric acid crystals in the joints, which causes inflammation and intense pain. This condition is usually found in joints such as the fingers, ankles and knees. One of the main signs that indicates someone is suffering from gout is when the results of measuring the uric acid level in their blood exceed average values. In men, the high level is more than 7.0 milligrams per deciliter (mg/dL), while in women, the figure is more than 5.7 mg/dL. The pain caused by this disease often dramatically interferes with the sufferer's daily activities (Nadira et al., 2023).

Based on global research recognized by the World Health Organization (WHO) (2019), it is estimated that around 20% of the world's population, or approximately 335 million people, have arthritis, including gouty arthritis. The distribution of this disease in various parts of the world is uneven and tends to be found more often in women than men. The age group most susceptible to this disease is those in the 45 to 65 year age range. From available data, the prevalence of gouty arthritis in a population ranges from 0.5% to 1%. This fact shows that although not all older adults will experience gout, the risk of developing this disease increases. Prevention and appropriate management are the keys to reducing the risk and impact of this disease on the quality of life of the elderly (Cahyani et al., 2019).

Based on Riskesdas' research in 2018 in Indonesia, it is known that gout cases in the elderly are in third place. The elderly are divided into three age groups, namely 55-64 years, with a prevalence of 15.5%; 65-74 years, with 18.6%; and over 75 years, with 18.9%, where the age group over 75 years shows a higher prevalence. Higher uric acid (Kemenkes RI, 2018, as quoted in Aditya, 2020). This can be seen from the number of gout sufferers who exist, and the majority are from 45 years to 74 years of age, with the pre-elderly and elderly categories having excessive uric acid levels (Aditya et al., 2020). This can be seen from the number of gout sufferers who exist, and the majority are from 45 years to 74 years of age, with the pre-elderly and elderly categories having excessive uric acid levels (Nursoleha et al., 2019).

Another method that can also be used to reduce uric acid levels in the elderly is by changing diet and lifestyle. Eating foods that are low in purines, such as fruit, vegetables and whole grains and avoiding foods that are high in purines, such as red meat, seafood, and alcohol, can help prevent an increase in uric acid levels in the blood. Regular physical activity such as walking, gymnastics and cycling can also increase the body's metabolism and help excrete uric acid through sweat and urine. The importance of education and counselling for the elderly and their families regarding ways to prevent and manage gout cannot be ignored. Through integrated health programs at Posyandu for the Elderly, it is hoped that the elderly can better understand their health condition and take appropriate steps to maintain their health. Support from local governments and health institutions in providing adequate facilities and resources is also essential to deal with the problem of gout in the elderly comprehensively and sustainably (Fitriani et al., 2021).

In order to understand the health conditions and knowledge related to alternative medicine among the elderly in Badean Village, Banyuwangi District, more deeply, researchers conducted a preliminary survey through a series of in-depth interviews. This survey involved three older adults who had been diagnosed with gout, a condition common among the elderly population. From the results of this interview, the surprising fact was revealed that the elderly in Badean Village do not have knowledge or information regarding alternative herbal treatments that can be used to reduce uric acid levels in the body, including the use of soursop leaf decoction, which



is known to have properties, for these conditions. For years, when they felt symptoms of illness or health problems, the step usually taken by these older adults was to go straight to the nearest community health centre to get medical treatment. This shows a high dependence on the formal health system and pharmaceutical drugs. Furthermore, when asked about their experience in using herbal therapy to reduce uric acid levels, the three older adults uniformly stated that they had never tried or even considered using this alternative treatment method. They only know and consume the drug allopurinol, which is the standard drug for treating gout, which health workers give at the Community Health Center.

Information from this preliminary survey indicates a gap in knowledge about alternative herbal medicines that may help reduce symptoms or uric acid levels, especially among the elderly in Badean Village. This opens up opportunities for researchers and health practitioners to educate and provide further information about the benefits and ways of using herbal therapy as an alternative or complement to conventional treatment for the elderly in the village. Based on the background above, researchers are interested in reducing blood uric acid levels more after drinking *Annona muricata* linn (soursop leaf) extract: a study in older adults with hyperuricemia.

## Method

This research uses quantitative research methods with an experimental approach. This type of research is a quasi-experiment with a pre-test-post-test design with a control group. In this design, two groups are selected randomly, where each individual has the same chance of being selected; then, a pre-test is given to determine the initial conditions and see whether there are differences between the experimental and control groups. Pre-test results are considered good if the scores of the experimental group and control group are not significantly different (Sugiono, 2019). The population in this study was 30 people, and the sampling technique used was total sampling. The instruments used in this research include a questionnaire regarding checking uric acid levels before and after the study, history of gout in the elderly, sample code, age, gender, observation sheet, analytical scales, GCU tool, and measuring cup.

Data processing in this research included editing, coding, processing, and cleaning data. The editing process aims to ensure that the data collected is complete and in accordance with the desired format. Coding classifies data into certain categories to make analysis easier. Data processing includes inputting data into statistical software, while data cleaning is necessary to remove or correct invalid or inconsistent data, and ethical permission for this research No: 765/KEPK/STIKES-BWI.

Data analysis was carried out using a paired sample t-test to determine uric acid levels before and after intervention in the experimental group. This test helps assess the intervention's effectiveness by comparing pre-test and post-test results in the same group. Meanwhile, to determine the difference in the effectiveness of giving boiled soursop leaves between the experimental group and the control group, the independent t-test was used. This test compares results between two groups to determine whether the intervention had a significant effect. Good results are indicated by a significance value of  $<0.05$ , which is analyzed using SPSS software, showing that the results did not occur by chance and have a high confidence level.

## Result

### Univariate Analysis (respondent characteristics)

Table 1 Gender frequency distribution of intervention and control group respondents at posyandu for the elderly in Badean Village, Banyuwangi, in 2024 (n1:n2)



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No	Gender	Frequency	percentage
Intervention group amount	Man	3	20 %
	Woman	12	80 %
amount		15	100 %
Control group amount	Man	5	33 %
	Woman	10	67%
amount		15	15

Table 1 shows that of the 15 respondents in the intervention group, the majority were female, 12 respondents or 80.0%, while the remaining were male, namely three respondents or 20.0%. For the control group, the majority were female, ten respondents or 67%, while the remainder were male, five respondents or 33%

Table 2 Age frequency distribution of intervention and control group respondents at posyandu for the elderly in Badean Village, Banyuwangi, in 2024 (n1:n2)

No	Age	Frequency	percentage
Intervention group amount	45-59 years old	6	40 %
	60-74 years old	9	60 %
amount		15	100 %
Control group amount	45-59 years old	7	44 %
	60-74 years old	8	56%
amount		15	15

Table 2 shows that of the 15 respondents in the research sample, most of the intervention group and the control group were aged 60 - 74 years, nine people (60%). Meanwhile, the remaining six people aged 45 - 59 years (40%). Meanwhile, for the control group, it shows that of the 15 control group respondents in the research sample, the majority of respondents were aged 60 -74 years, namely eight people (56%). While the rest are aged 45 - 59 years, namely seven people (44%)

Table 3 Descriptive analysis of uric acid levels (pre) intervention and control at the elderly posyandu in Badean Village, Banyuwangi, in 2024 (n1:n2=15)

Measurement	Mean	Median	SD	Min-Max
Intervention group (pre)	8.9635	8.300	1.76636	7.00-12.70
Control group (pre)	9.4876	8.700	1.53356	6.90-12.70

Table 3 above shows that the mean value of the results of checking uric acid levels before being given soursop leaf extract in the intervention group was 8.9635, the median value was 8.300, and the standard deviation was 17.663. The measurement in the control group on the first day was 9.4876, the median value was 8.700, and the standard deviation was 15.3356.

Table 4 Descriptive analysis of uric acid levels (post) intervention and control at posyandu for the elderly in Badean Village, Banyuwangi, in 2024 (n1:n2=15)

Measurement	Mean	Median	SD	Min-Max
Intervention group (post)	6.0743	6.000	0.78762	5.00-7.80
Control group (post)	9.1433	9.000	1.42062	6.50-12.10

Table 3 above shows that the mean value of checking uric acid levels after being given soursop leaf extract in the intervention group was 6.0743, and the median value was 6.000, with

a standard deviation of 7.8762. The measurement in the control group on the seventh day was 9.1433, the median value was 9.000, with a standard deviation of 14.2062.

Table 5 Paired T-test for intervention and control groups

Group	Mean		Difference	95%CI	T	df	P-Value
	Pre	Post					
Intervention				19.102			
Pre-Post	9.793	6.543	3.250	- 44.087	5.423	14	0.000
Control				-0.5044			
Pre-Post	8.346	8.560	-213	- 0.0367	-1.847	14	0.087

\* Significant at  $\alpha < 0.05$  with paired T-Test

Based on the Paired Sample Test results table in Table 5 above, it can be seen that the uric acid level in the elderly intervention group before treatment was 9,793. After treatment, the value was 6,543, with a difference between pre-and post-values of 3,250 and an interval coefficient of 19,102 to 44,087, also known as t. The calculated value is 5.423. Then, the Sig (2-tailed) value is 0.000, which means it is less than  $<0.05$ , so it can be concluded that there is an average difference between the uric acid level at the pre-test and the average uric acid level at the post-test. In the intervention group, the conclusion from the paired test sample t-test was that giving soursop leaf extract had an effect on reducing uric acid levels in the blood of the elderly at the elderly posyandu in Badean Village, Banyuwangi.

In the control group, which was not given soursop leaves, the mean result on the first day was 8,346, and on the seventh day of examination, it was 8,560, and the difference from the mean was -213 with an interval coefficient of -0.5044 to 0.0367. It is also known that the t value was -0.5044 to 0.0367. 1.847 and the resulting Sig value. (2-tailed) is 0.087, which means it is smaller  $>$  than 0.05, so the conclusion from the paired t-test results is that there is no decrease in uric acid levels in the blood.

Bivariate Analysis (difference between the intervention group and control group)

Table 6 Paired T-test for intervention and control groups

Group	sig. (2-tailed) value
Intervention group	0.000
Control group	0.645

\* values have a difference of  $<0.05$  using the independent T-test

Based on the results from Table 6, the significance value for the intervention group is 0.000, and the significance value for the control group is 0.645. From these results, the values for the intervention and control groups are different; where the intervention group is smaller than  $<0.05$  and the control group is more significant than  $>0.05$ , it can mean that there is a difference between the intervention group and the control group.

## Discussion

### 1. Univariate Analysis (respondent characteristics)

#### a. Gender



Based on the research results, the majority of gender characteristics occur in women. There were 12 people (80%) in each intervention group and 10 (67%) in the control group. For the male gender, there were only three respondents in the intervention group (20%) and five people (33%) in the control group.

This research's results align with the research conducted by Linda, 2020, which explained that almost all of the ten respondents who experienced gout were female, eight elderly (80%) and two elderly (20%) male. The theory that supports the research results is that women who have experienced menopause are more susceptible to gouty arthritis. Women who have experienced menopause and are elderly will experience gout problems after menopause and other diseases, such as high blood pressure, which can cause kidney problems. Increasing age, significantly those aged 40 years and over, will increase the risk of developing gouty arthritis. The hormone estrogen excretes uric acid through the kidneys. This hormone level will decrease with increasing age. During menopause, the body's control over excreting uric acid decreases, resulting in a buildup/crystallization of uric acid in the joints, which causes pain. Pain occurs repeatedly in the morning and at night (Noormindhawati, 2013). Other symptoms of acute gout are fever, chills, feeling unwell, fast heartbeat. Gout tends to be more severe in sufferers under 30 years of age. Usually, in men, gout appears in middle age, while in women, it appears post-menopause. According to research, soursop leaves do not have dangerous side effects. Consuming boiled soursop leaves can reduce pain in people with gouty arthritis without any side effects because they do not contain dangerous chemicals (Lina & Juwita, 2014).

#### b. Age

The research conducted on 30 respondents found that most were aged 60 - 74. The intervention group was nine people (60%), and the control group aged 60 - 74 years was eight people (56%). In this study, the respondents were mostly elderly, aged 65.

The results of this research align with research conducted by (Linda, 2020) with the results of the majority of respondents aged 60 - 74 years, as many as ten respondents or (100%). 74 years old. According to Theodore Fields, MD, professor and joint expert, the theory is that the older a person is, the greater the risk of suffering from gout because ageing means reduced kidney function. This results in increased uric acid levels (Ikafah, 2017). According to researchers' assumptions, as people get older, they will increasingly experience a decline in body function, such as a decrease in kidney function, due to the mechanical processes in the work of a person's body. For example, premenopausal people aged 45-59 years will experience a natural decline in ovarian function, and eating patterns that are not maintained, such as consuming foods high in purine, will increase the occurrence of gout and can also experience recurrence. It will even accumulate more in the elderly.

It can be concluded that the factors that cause gout are not only lifestyle and hereditary, but age can also influence the occurrence of gout due to a decrease in the body's function in the elderly. Increasing age is a significant risk factor in men and women. This is likely due to many factors, such as increased serum uric acid levels (the most common cause is decreased kidney function).

#### c. Characteristics of pre and post-uric acid levels in the intervention and control groups

##### 1) Pre uric acid levels

The research's results were based on 30 respondents who were divided into two groups. For the results of measuring pre-test uric acid levels, the treatment or intervention group showed that of the 15 respondents in the research sample, the lowest uric acid level during the pre-test was 7.0, and the highest uric acid level was 12.7. Respondents' average uric acid level during the pre-test was 8.9635, with a standard deviation of 1.76636.



Based on the research results for measuring uric acid levels in the group that was not given treatment or the control group, it shows that of the 15 respondents in the research sample, the lowest uric acid level during the pre-test was 6.90, and the highest uric acid level was 12.7. The average uric acid level of respondents during the pre-test was 9.4876, with a standard deviation of 1.53356.

The theory explains that the increase in uric acid production occurs due to an increase in the speed of purine biosynthesis from amino acids to form DNA and RNA cell nuclei. Around 90% of gout sufferers experience kidney problems in eliminating uric acid. Sufferers will excrete 40% less uric acid than ordinary people. The combination mechanism of the two occurs in fructose intolerance disorders, which are deficiencies of specific enzymes, namely glucose 6-phosphate (Suirakoa, 2012, Dalam Linda, 2020). According to research assumptions based on high uric acid values, it is a problem that must be addressed because if uric acid is left without action, it will become chronic and, over time, will cause pain until the elderly are unable to carry out activities because they are unable to walk and do activities. Gout in the elderly where is said to be gout if the uric acid level in men is 7.2 and in women 6.0. If the respondent's uric acid value is high, soursop leaf extract will be given according to the research criteria.

## 2) Post uric acid levels

The results of the research were based on 30 respondents who were divided into two groups. For the results of measuring post-test uric acid levels, the treatment or intervention group showed that of the 15 respondents in the research sample, the lowest uric acid level at the post-test was 5.0, and the highest uric acid level was 7.8. The average uric acid level of respondents at the post-test test was 6.0733 with a standard deviation of 0.76762, while the post-test for the control group had the lowest uric acid level of 6.50 and the highest uric acid value of 12.10. The average uric acid level of respondents during the post-test for the control group was 9.1333, with a standard deviation of 1.43062.

Based on research from (Najib et al, 2023) shows that soursop leaves contain flavonoids and tannins. The flavonoid content plays an active role in reducing uric acid levels, which has antioxidant properties that can inhibit the work of the Xanthine oxidase enzyme so that the formation of uric acid is inhibited and reduced. Another theory says that each ingredient in soursop leaves has its role in reducing uric acid levels, namely that tannin has a complex biological role, ranging from protein precipitants to metal binders. Tannins can also function as biological antioxidants, which work by donating one electron to compounds that are oxidants so that the activity of these oxidant compounds can be inhibited (Handayani et al, 2015)

The research assumption is that giving soursop leaves is effective in reducing uric acid levels in the elderly. The reason is that uric acid can increase quickly, partly due to consuming foods with high purine levels. The internal factor is a metabolic deviation process, generally related to age (seniors) at significant risk of developing gout. The mechanism by which soursop leaf boiled water can reduce uric acid levels is because it contains flavonoids and acetogenin. Flavonoids act as antioxidants and inhibit the formation of the enzyme xanthine oxidase, which ultimately becomes uric acid.

The conclusion was that after measuring on the seventh day in the elderly, there was a decrease in the intervention group because the content of soursop leaves, one of which is flavonoids, is an antioxidant so that it can reduce uric acid levels.

## 3) Pre and post uric acid levels

This research shows differences in uric acid levels after soursop leaf extract therapy. Based on the analysis, research after being given soursop leaf extract therapy showed a decrease in uric acid levels between before therapy and after soursop leaf extract therapy. The uric acid level in the elderly intervention group before treatment was 9,793. After treatment, the value was 6,543



with a difference between pre and post-values of 3,250 with an interval coefficient of 19,102 to 44,087. It is also known that the t count was 5,423. Then, the Sig (2-tailed) value was obtained. 0.000, which means less than 0.05, so it can be concluded that there is an average difference between the uric acid levels at the pre-test and the average uric acid levels at the post-test in the intervention group so that the conclusion from the paired sample t-test is that there is The effect of soursop leaf extract on reducing uric acid levels in the blood of the elderly at the elderly posyandu in Badean Village, Banyuwangi.

In the control group, which was not given soursop leaves, the mean result on the first day was 8,346, and on the seventh day of examination, it was 8,560, and the difference from the mean was -213 with an interval coefficient of -0.5044 to 0.0367. It is also known that the t value was -0.5044 to 0.0367. 1.847 and the resulting Sig value. (2-tailed) is 0.087, which means it is more significant than 0.05. Hence, the paired t-test results conclude that there is no decrease in uric acid levels in the blood at the elderly posyandu and the elderly posyandu in Badean Village, Banyuwangi. The effect of giving soursop leaf extract therapy was carried out using statistical tests using the paired sample t-test with the help of SPSS.

## 2. Bivariate analysis (difference in uric acid levels in the intervention group and control group)

Based on the results of statistical tests with the independent T-test for the significance value in the intervention group, namely 0.000 and the significance value for the control group, namely 0.645, these results, the values for the intervention group and the control group are different, where the intervention group is smaller than  $<0.05$ , and the control group is more significant.  $A > 0.05$  can mean that there is a difference between the intervention group and the control group.

The results of this research are in line with research conducted by (Ikafah, 2017) on "Effectiveness of Soursop Leaves in Reducing Uric Acid Values and Pain Complaints in Gout Sufferers in Tamalanrea Makasar Subdistrict."

The results of this research are also supported by the theory that the content of acetogenin and flavonoid compounds influences changes in uric acid levels in the blood in soursop leaf extract. Acetogenin itself can act as an antioxidant, which can reduce the formation of uric acid by inhibiting the enzyme xanthine oxidase. Meanwhile, the flavonoid compound content itself has a similar mechanism to allopurinol, namely by inhibiting the xanthine oxidase enzyme, which plays a role in the process of changing hypoxanthine to xanthine and ultimately to uric acid (Artini et al, 2014).

Soursop leaves contain phenolic compounds, which are also flavonoid compounds. This flavonoid compound has antioxidant properties and has bioactivity as a medicine. With the content of flavonoid compounds in soursop leaves, supplements from boiled soursop leaves are highly recommended because flavonoid compounds can inhibit the production of the xanthine oxidase enzyme. By inhibiting the production of the oxidase enzyme, the process of forming hypoxanthine into xanthine is also hampered, so excess uric acid production can be inhibited using the content contained in soursop leaves. Apart from reducing uric acid levels in the blood, soursop leaves can also reduce the impact of pain for gout arthritis sufferers because they contain tannin, resin and Agostini compounds, which function to relieve gout pain, reduce swelling and pain (Aqila, 2015).

Soursop leaves are known to contain acetogenin and phenolic compounds that are responsible for being antioxidants. The phenolic compounds that have the highest antioxidant activity are flavonoids. The antioxidant properties of the soursop fruit can slow or prevent the formation of uric acid by inhibiting the action of the xanthine oxidase enzyme, which plays a role in changing hypoxanthine to xanthine and then to uric acid (Wijaya, 2015).

Soursop leaves are used as an alternative treatment for cancer treatment, namely by consuming boiled water from soursop leaves. Soursop leaves contain anti-cancer substances





called acetogenins, which can kill cancer cells without disturbing healthy cells in the human body (Sumantri et al, 2014). Apart from treating cancer, the soursop plant is also used to treat gout, fever, diarrhoea, anti-seizures, anti-fungal, anti-parasitic, anti-microbial, back pain, gout, itching, boils, flu, and others. Soursop leaves have the potential to be antihypertensive, antispasmodic, pain reliever, hypoglycemic, anti-cancer, emetic (causes vomiting), and vermifuge (worm exterminator) (Aqila, 2015). Soursop leaves contain tannin, resin and crystallizable magostine compounds, which can treat joint pain in gout. The compounds contained in soursop leaves function as a potent analgesic (pain reliever) and act as antioxidants. Combining analgesic and anti-inflammatory properties can reduce gout pain (Shabella, 2015).

Various leading institutions have tested the efficacy of the soursop plant. The National Cancer Institute (US) conducted laboratory tests in 1976, which were then continued by several leading pharmaceutical companies and universities. The results show that extracts from soursop leaves are efficacious for treating cancer. After further research, soursop plant extract was also effective in treating other diseases. This is proven by many countries' widespread use of soursop plants as traditional medicine. Scientific evidence also shows that soursop plant extract has been proven to be able to overcome diseases caused by bacteria, diabetes, hypertension and many other types of diseases. All parts of the soursop fruit have properties for curing disease, including the soursop leaf. Soursop leaves contain many compounds, including acetogenins, annocatin, annocatalin, annohexocin, annonacin, annomuricin, annomurine, ananol, caclourine, gentisic acid, gigantetronin, linoleic acid, and muricapentocin (Artini et al., 2014). Apart from that, the most important compounds are tannin, resin and crystallizable magazine, which can treat joint pain in gout. The compounds contained in soursop leaves function as a potent analgesic (pain reliever) and act as antioxidants. The antioxidant properties contained in soursop leaves can reduce the formation of uric acid by inhibiting the production of the xanthine oxidase enzyme. Combining analgesic (pain-reducing) and anti-inflammatory (anti-inflammatory) properties can reduce gout. Without sufficient antioxidants, adverse reactions caused by free radicals can damage or destroy the entire body (Shabella, 2015).

Based on the description above, the researcher assumes that someone who has reached the age of pre-elderly or elderly has a greater risk of developing gout because the organs in the elderly have begun to decline, so it is necessary to monitor uric acid by giving boiled soursop leaves as a therapy to increase uric acid levels. Seniors are short. The research results show that soursop leaf extract reduces uric acid levels in the elderly. The effectiveness of soursop leaf extract has been proven in the intervention group that was given treatment.

## Conclusion

Based on research that has been carried out carefully and with a strict methodology, it was found that the results of statistical tests carried out using relevant analytical techniques showed a p-value of 0.000. This p-value is crucial because it indicates how significant the results obtained from this research are. A p-value smaller than 0.05 indicates a significant effect in a statistical context. Therefore, with a p-value that is much smaller than this threshold, namely 0.000, we can firmly conclude that the null hypothesis (H<sub>0</sub>), which states that there is no effect of giving soursop leaf extract on reducing uric acid levels, must be rejected.

On the other hand, the alternative hypothesis (H<sub>A</sub>), which states that there is a significant effect of giving soursop leaf extract on reducing uric acid levels in the elderly, was accepted. This means, based on the data and analysis that has been carried out, there is strong evidence to support the claim that soursop leaf extract positively reduces uric acid levels in the elderly group. This discovery paves the way for further research regarding the potential of soursop leaf extract



as an alternative natural treatment for treating gout problems, especially in the elderly population who often experience this condition.

### Suggestion

The research carried out has high hopes of providing significant benefits to communities facing gout problems. This research revealed that applying soursop leaf extract therapy every morning after eating can be an effective alternative treatment. The main aim of this therapy is to intervene and change purine levels in the body, which is one of the leading causes of increased uric acid levels. This can occur through the working mechanism of the acetogenin content and flavonoid compounds contained in the soursop leaf extract. These two compounds can inhibit the activity of the xanthine oxidase enzyme, which plays a role in the body's conversion of purines into uric acid. Thus, inhibition of this enzyme may contribute to a decrease in uric acid levels.

Considering the effectiveness of soursop leaf extract therapy, this research will provide helpful information for those struggling with gout. This natural therapy is seen as a promising alternative method for managing and reducing uric acid levels and providing a solution for those looking for a more natural treatment with minimal side effects. Thus, this research contributes to the development of knowledge about the benefits of soursop leaf extract in the treatment of gout and provides new hope for those who need an effective solution to overcome their health condition.

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