

## Test The Difference in the Effectiveness of Squeezing Left Leaves (Chromolaena Odorata) and Soursop Leaves (Annona Muricata L.) Against the Mortality of Hair Lice (Pediculus Humanus Capitis)

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### ABSTRACT

Vectors such as head lice (*Pediculus humanus capitis*) play a role as the cause of *Pediculosis capitis* which is still a public health problem. Therefore, effective control efforts are needed using safe natural materials such as kirinyuh leaves (*Chromolaena odorata*) and soursop leaves (*Annona muricata* L.) which contains active compounds that have the potential to be a hair lice killer. The purpose of this study is to distinguish the effectiveness of squeezing kirinyuh leaves and soursop leaves on hair lice mortality.

The type of research uses a quasi-experimental design with a complete random design (RAL). The sample consisted of 190 adult stage head lice. Hair lice were given a pinch of kirinyuh leaves and soursop leaves with concentrations of 32%, 40%, and 48% with 3 repetitions and observed for 30 minutes. Data analysis was conducted using the ANOVA, Kruskal-Wallis and Mann-Whitney One-Way tests.

The results showed that the highest mortality of head lice in left leaves was at a concentration of 48% of 90%, and the highest mortality of head lice in soursop leaves was at a concentration of 48% of 80%.

In conclusion, there was no difference in the effectiveness of squeezing left leaves and soursop leaves on hair lice mortality ( $p$ -value = 0.100). The public is advised to use the juice of kirinyuh leaves and soursop leaves as environmentally friendly head lice control.

### INTRODUCTION

*Pediculosis capitis* is a disease of head lice (*Pediculus humanus capitis*) that is still a public health problem, especially in children and cohabitation environments (Noersyamsidar, 2022). According to Sutanto *et al.*, (2022) Transmission can occur through direct contact or the shared use of personal items such as combs, towels, pillows, and head coverings. Hair lice infestations can cause itching, sleep disturbances, scratches, as well as decreased concentration of learning and daily activities.

In Indonesia, the prevalence of *pediculosis capitis* reaches around 20% and is higher in densely populated environments such as Islamic boarding schools and orphanages. Previous research showed that the incidence of *pediculosis capitis* in students at Islamic boarding schools reached 57.7% (Sutanto *et al.*, 2022), while in orphanage children in Gorontalo City, 81.5% were found to be positively infected with *Pediculus humanus capitis* (May *et al.*, 2026).

According to Hayati & Balqis, (2020) Hair lice control generally uses chemical insecticides such as permethrin and malathion. However, repeated use of chemical insecticides can cause negative effects such as scalp irritation, burning, dry scalp, and insect resistance. Therefore, a safer and more environmentally friendly control alternative using plant-based insecticides is needed (Kusumawati, 2022).

Kirinyuh leaves (*Chromolaena odorata*) and soursop leaves (*Annona muricata* L.) are plants that have the potential to be vegetable insecticides because they contain active compounds such as flavonoids, saponins, alkaloids, tannins, and acetogenins (Sunani & Hendriani, 2023). The compound works by disrupting the nervous

system, respiratory system, and digestive system of insects so that it can cause the death of head lice (Thamrin *et al.*, 2020).

Previous research has shown that the juice of kirinyuh leaves and soursop leaves has a killing effect on head lice. Research by Suhirman (2022) states that kirinyuh leaf extract is effective as a natural insecticide for head lice, while research by Pradana *et al.* (2023) showed that soursop leaves have potential as a natural pediculoid against *Pediculus humanus capitis*. However, it is not known directly the difference in effectiveness between the two natural ingredients on hair lice mortality. Therefore, this study aims to analyze the difference in the effectiveness of squeezing left leaves (*Chromolaena odorata*) and soursop leaves (*Annona muricata L.*) on the mortality of head lice (*Pediculus humanus capitis*).

## RESEARCH METHODS

This study used a quasi-experiment design with a complete random design (RAL). The study sample consisted of 190 adult stage head lice (*Pediculus humanus capitis*). Squeeze of kirinyuh leaves (*Chromolaena odorata*) and soursop leaves (*Annona muricata L.*) was given in three concentration variations, namely 32%, 40%, and 48% with three repetitions. Observation of head lice mortality was carried out for 30 minutes. Data were analyzed using the One-Way ANOVA, Kruskal-Wallis, and Mann-Whitney Test with the help of SPSS.

## RESULTS

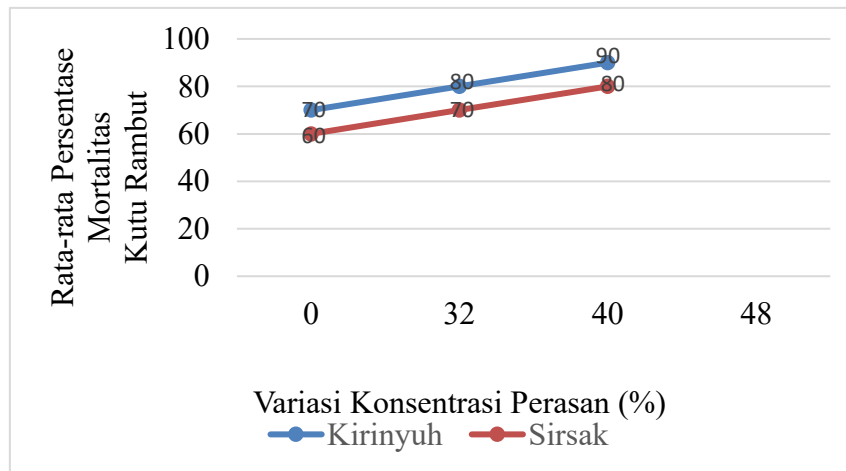
**Table 1.** Mortality of Hair Lice (*Pediculus humanus capitis*) Using Lefty Leaves (*Chromolaena odorata*) and Soursop Leaves (*Annona muricata L.*) Mortality of head lice after the application of left leaves and soursop leaves.

Notice	Concentration (%)	Quantity Lice (Tail)	Number of Mortality Lice			Average	
			PI	PII	PIII	n	%
Leaves of the Left	0	10	0	0	0	0	0,0
	32%	10	6	7	7	7	70,0
	40%	10	8	7	8	8	80,0
	48%	10	9	8	9	9	90,0
Soursop Leaves	0	10	0	0	0	0	0,0
	32%	10	5	6	6	6	60,0
	40%	10	7	7	7	7	70,0
	48%	10	7	8	8	8	80,0

Remarks : PI = First Repetition  
: PII = Second Repetition  
: PIII = Third Repetition

Source: Primary Data, 2026

Based on Table 1, the results were obtained that the extraction of left leaves (*Chromolaena odorata*) descriptively showed a higher percentage of mortality compared to the extraction of soursop leaves (*Annona muricata L.*). This is because Kirinyuh leaf juice at a concentration of 40% is able to cause mortality in test head lice (80% effectiveness rate) and 48% concentration is able to cause mortality in test head lice (90% effectiveness rate), while at a concentration of 48% soursop leaf (*Annona muricata L.*) has not been able to cause mortality in the overall test (80% effectiveness rate).



Source: Primary Data, 2026  
Figure 19 Hair Lice Mortality Graph

Based on figure 1, it shows that the mortality of head lice is directly proportional to the concentration of the juice of left leaves (*Chromolaena odorata*) and soursop leaves (*Annona muricata L.*), namely the higher the concentration of the juice of the two leaves, the percentage of mortality also increases.

**Table 2.** Analysis of the difference in the effectiveness of squeezing left leaves (*Chromolaena odorata*) and soursop squeezing (*Annona muricata L.*) against the mortality of head lice.

Variable	<i>p</i> -value
Concentrations of 32%, 40% and 48% in the leaves of the left ( <i>Chromolaena odorata</i> )	0,100
Concentrations of 32%, 40% and 48% in soursop leaf juice ( <i>Annona muricata L.</i> Düssel)	0,100

Source: Primary Data, 2026

Based on Table 2, the  $p\text{-value} = 0.100 > 0.05$  was obtained on the squeeze of kirinyuh leaves (*Chromolaena odorata*) and soursop leaves (*Annona muricata L.*). Although descriptively there is a difference in hair lice mortality which states that left leaves are more effective at killing head lice by 90% at a concentration of 48% while in soursop leaves the mortality of head lice is 80% at a concentration of 48%. However, when viewed statistically, there is no significant difference between the concentration of 32%, 40%, and 48% of head lice mortality.

## DISCUSSION

### Differences in the Effectiveness of Squeezing Left Leaves (*Chromolaena odorata*) and Soursop Leaves (*Annona muricata L.*) against Hair Lice Mortality.

Based on the results of the study, the highest mortality of head lice is in the left leaf juice with a concentration of 48%, which reaches 90% with the average mortality of head lice in the treatment of left leaves is 80% while in soursop leaf extraction, the highest mortality of head lice is at a concentration of 48%, which reaches 80% with the average mortality of head lice in the treatment of soursop leaf juice is 70%. Descriptively, the data showed that left leaf juice had a higher average mortality value compared to soursop leaf extraction, this was due to technical factors during the research process, especially at the screening stage. The filtering process carried out can affect the quality and purity of the juice produced, where the left leaf juice has a clearer and more homogeneous filtrate so that the active compounds are more optimal in working. On the other hand, soursop leaf juice tends to have a thicker texture or contain more suspended particles, which can inhibit the process of diffusion of active compounds into the body of ticks (T. M. Sari & Savera, 2020).

However, based on the results of the statistical test using the *Mann-Whitney test*, the significance value of Exact (Sig. 2-tailed) was obtained as ( $p\text{-value} = 0.100 > 0.05$ ). This means that there is no significant difference in effectiveness between left-leaf juice and soursop leaf juice on head lice mortality. Although descriptively there is an average difference of 10%, the difference is not statistically strong enough to be statistically significant. According to Putra *et al.*, (2022) this is influenced by the relatively small number of samples. A small sample size can affect the *statistical power*, so the chances of detecting the actual difference are lower. Therefore, the two leaves can be said to have the same potential in having an effect on the research object (Putri *et al.*, 2022).

The effectiveness of left leaf juice in killing head lice is thought to be related to the content of secondary metabolite compounds, such as flavonoids, saponins, acetogenin and tannins. Flavonoid compounds are known to disrupt the respiratory system and nervous system of insects, while saponins can damage cell membranes and cause cell lysis, tannins play a role in inhibiting the activity of insect digestive enzymes, thereby disrupting metabolism and causing death. This mechanism allows for an increase in hair lice mortality in the treatment of left leaves (Suhirman, 2022).

Meanwhile, soursop leaf juice also shows the ability to cause the death of head lice with an average mortality of 70%. Soursop leaves are known to contain acetogenin, alkaloids, and flavonoids that are natural insecticides. Acetogenin works by inhibiting energy production in the mitochondria of insect cells thereby causing metabolic disorders and death. This suggests that both types of leaves have potential as natural pediculoid alternatives (Pradana *et al.*, 2023).

This is in line with research Scarlett, (2021) which shows that some plant extract treatments do not provide statistically significant differences even though there is a descriptive difference in mortality values.

Thus, it can be concluded that both types of leaves have relatively comparable effectiveness in killing head lice. This study shows that both kirinyuh leaf juice and soursop leaf juice have the potential to be an alternative natural ingredient in hair lice control, although there is no significant difference between the two.

## CONCLUSION

There is no significant difference between the leaves of the left (*Chromolaena odorata*) and the leaves of soursop (*Annona muricata L.*) as a vegetable insecticide against head lice mortality ( $p\text{-value} = 0.100 > 0.05$ ).

**ADVICE**

For the next researcher, to be able to further develop this research by utilizing the stems, roots and flowers of kirinyuh and soursop plants as a vegetable insecticide against hair lice mortality.

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