

## **ANTIPYRETIC EFFECT OF *Sauropusandrogynus* (L.) Merr LEAVES INFUSION ON RATS (*Rattus norvegicus*)**

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### **Abstract**

*Sauropusandrogynus* (L.) Merr leaves is a traditional medicine used by the community to reduce fever. One chemical content in *Sauropusandrogynus* (L.) Merr is flavonoids. Based on the results of previous research, flavonoids had the antipyretic effect. This study aims to determine the antipyretic effect of *Sauropusandrogynus* (L.) Merr leaves infusion on rats.

This was an experimental research using Pretest-Posttest with Control Group design. The study conducted on 15 tested white rats that were divided into 3 treatment groups, i.e. negative control group, 8% leaf infusion group and positive control group. Each group consists of 5 rats. Prior to treatment, rats were febrile by injecting 20% peptone intraperitoneally. Rats got fever when the body temperature raised 1.5 °C from the initial temperature. Data was obtained from the result of measurement of the rat's temperature before the treatment and every an hour during 4 consecutive hours since the rats were undergone treatment. Data was analyzed descriptively in graphical form and statistically using one-way anova test.

The results showed that there was an effect of the treatment on rat ( $p < 0,05$ ), so it can be concluded that infusion of 8% of *Sauropusandrogynus* (L.) Merrinfusion leaves have the antipyretic effect.

**Keywords:** antipyretic, flavonoids, *Sauropusandrogynus*, infusion.

### **INTRODUCTION**

*Sauropusandrogynus* (L.) Merr leaves is a traditional medicine in Indonesia. It does not only has the benefit to increase supply of breast milk, but also used to reduce fever (Obi, 2015). To treat fever, 15-30 grams fresh leaves were boiled using 1 cup of water, and suggested to drink 2-3 times a day (Hariana, 2015). The chemical contents in *Sauropusandrogynus* (L.) Merr leaves are alkaloids, triterpenoids, saponins, tannin errors, steroids, polyphenols,

glycosides and flavonoids (Susanti et al, 2014; Ratna and Sarah, 2016).

Fever increases immune system defense of the body against infection. Fever is a symptom and not a disease (Tjay and Raharja, 2007). Increased body temperature in pathological conditions starts the release of an endogenous pyrogen substance or cytokines such as interleukins that promote excessive release of prostaglandins in the hypothalamic preoptic region (Wilmana, 2002).

According to research conducted by Adesokan et al (2008), the antipyretic effect is produced by the flavonoids in the plant through inhibition of prostaglandin synthesis. Flavonoids are polar compounds that are soluble in water (Harborne, 1987). Based on the reason, the researchers conducted the research on the antipyretic effect of Katuk leaf infusion (*Sauropusandrogynus* (L.) Merr) on Rats (*Rattus norvegicus*). The aim of this study is to determine the antipyretic effect of *Sauropusandrogynus* (L.) Merr on rats (*Rattus norvegicus*).

## METHODS

This is an experimental research in laboratory with Pretest-Posttest with Control Group design. The sample is *Sauropusandrogynus* (L.) Merr leaves.

### Sample Processing

*Sauropusandrogynus* (L.) Merr fresh leaves were taken and then dried without direct sunlight. The leaves were chopped using a grinder.

### Procedure

#### 1. Making of Infusion

Eight grams of dried leaves were weighed, then heated with 75 ml of water at 90 °C for 15 minutes, distilled and added sufficient warm water volume up to 100 ml.

#### 2. Treatment

The rats were fasted for around 8 hours before treatment. The body temperature of the rats were

measured using a thermometer, recorded as the initial temperature ( $t_a$ ). All rats were induced fever through the injection intraperitoneally of 20%-pepton solution with a dose of 2 mL/200 g BW and recorded after induction temperature ( $t_i$ ). Animals showed fever symptoms when temperature rose  $> 1.5$  °C from the initial temperature. The tested animals were divided into 3 treatment groups, consist of 5 rats each, treated orally. Each group was given treatment:

- 1) Group 1 was given aquades as negative control
- 2) Group 2 was given paracetamol suspension as positive control with a dose of 2.5 mL/ 200 g BW
- 3) Group 3 was given infusion of *Sauropusandrogynus* (L.) Merr leaves concentration of 8 % as much as 2.5 mL/200 g BW.

The measurement of body temperature was made in every hour for four consecutive hours, recorded after treatment temperature ( $t_1, t_2, t_3, t_4$ ).

## RESULT

The results of antipyretic effect test of infusion of *Sauropusandrogynus* (L.) Merr leaves on rats' temperature are as follows.

Table 1. Rats' Body Temperature Before and After Treatment

Treatment Groups	No. of Rats	Rats body temperature (°C)					
		t <sub>a</sub>	t <sub>i</sub>	t <sub>1</sub>	t <sub>2</sub>	t <sub>3</sub>	t <sub>4</sub>
8 % leaves infusion	1	36.10	38.00	37.30	36.90	36.3	35.1
	2	35.50	37.00	37.00	36.80	35.9	35.3
	3	35.20	37.10	37.10	36.60	36.1	34.6
	4	35.40	37.00	37.20	36.30	35.6	35.3
	5	35.60	37.90	37.80	37.60	36.6	35.2
	<b>Average</b>	35.56	37.40	37.28	36.84	36.10	35.10
Positive control (Paracetamol)	1	35.70	37.30	36.50	36.10	35.80	35.70
	2	35.00	36.70	36.20	36.10	35.50	34.70
	3	35.30	37.00	36.90	36.80	35.80	35.10
	4	35.30	37.60	36.70	36.00	35.80	34.80
	5	34.90	37.10	36.90	35.70	35.20	34.40
	<b>Average</b>	35.24	37.14	36.64	36.14	35.62	34.94
Negative control	1	35.20	37.50	37.60	38.50	37.90	36.90
	2	35.20	37.20	37.50	38.00	37.10	37.60
	3	34.60	36.20	37.40	38.00	37.20	36.40
	4	35.00	36.00	36.00	37.10	36.40	36.10
	5	35.20	36.30	36.70	37.60	36.20	35.60
	<b>Average</b>	35.04	36.62	37.04	37.84	36.96	36.52

Table 2. Percentage of Rats' Body Temperature Before and After Treatment

Treatment Groups	Nu. of Rats	Percentage of Rats Body Temperature (%)					
		t <sub>a</sub>	t <sub>i</sub>	t <sub>1</sub>	t <sub>2</sub>	t <sub>3</sub>	t <sub>4</sub>
8 % leaves infusion	1	95.00	100	98.15	97.10	95.52	92.36
	2	95.94	100	100.00	99.45	97.02	95.40
	3	94.87	100	100.00	98.65	97.30	93.26
	4	95.67	100	100.54	98.10	96.21	95.40
	5	93.93	100	99.73	99.20	96.57	92.87
	<b>Average</b>	95.08	100	99.68	98.50	96.52	93.86
Positive control (Paracetamol)	1	95.71	100	97.85	96.78	95.98	95.71
	2	95.36	100	98.63	98.36	96.73	94.55
	3	95.41	100	99.73	99.46	96.75	94.86
	4	93.88	100	97.60	95.74	95.21	92.55
	5	94.07	100	99.46	96.22	94.88	92.72
	<b>Average</b>	94.89	100	98.65	97.31	95.91	94.08
Negative control	1	93.86	100	100.26	102.66	101.06	98.40
	2	94.62	100	100.80	102.15	99.73	101.07
	3	95.58	100	103.31	104.97	102.76	100.55
	4	97.22	100	100.00	103.05	101.11	100.27
	5	96.96	100	101.10	103.58	99.72	98.07
	<b>Average</b>	95.65	100	101.09	103.28	100.88	99.67

The data of rats' body temperature in Table 2 can be seen in the graph below.

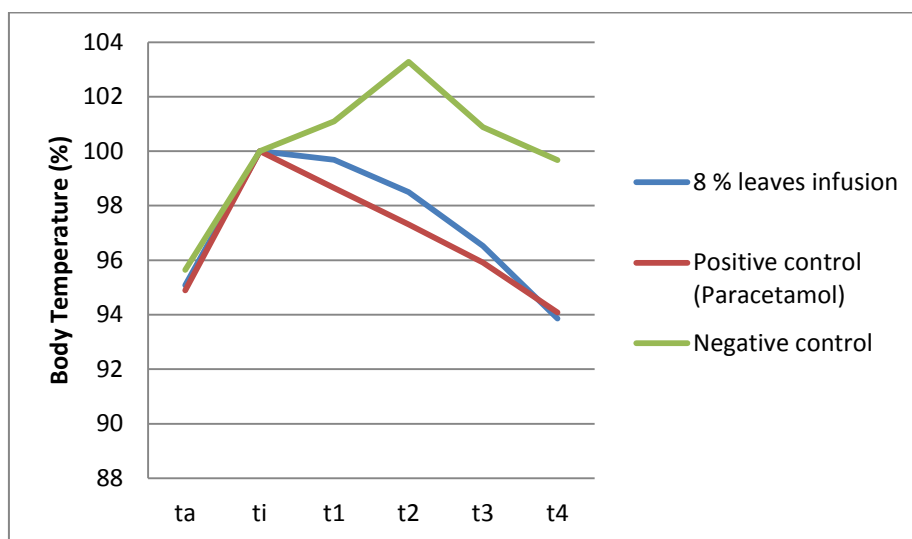


Figure 1. Percentage of Rats' Body Temperature Before and After Treatment

## DISCUSSION

After the rats were given *Sauropusandrogynus* (L.) Merr leaves, the temperature of the tested rats was regularly reduced by 2,3 °C from the first to the fourth hour after treatment. The decrease of rats' body temperature was caused by the content of flavonoid compounds which mechanism works similar to paracetamol that inhibits the formation of prostaglandins which is the mediator of fever.

Positive control group showed a decrease in temperature from the first to the fourth hour with a decrease of 2.2 °C. Paracetamol was chosen as the

positive control because of its antipyretic effects with a working mechanism inhibiting prostaglandin synthesis and having a half-life of 1 to 4 hours.

Negative control group given plain water (aquades) showed a temperature rise at t1 of 0.42 °C and t2 of 0.80 °C then began to decrease at t3 to t4 of 1.32 °C. The differences in antipyretic effects among all treatment groups were statistically analyzed using one way anova test. The results of the one way anova test can be seen in table 3.

Table 3. The results of one way anova test analysis

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	636.462	17	37.439	33.71	.000
Within Groups	79.820	72	1.109		

Total	716.282	89
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Based on the results of one way anova test with a significant level of 0.05 indicates there is an effect of treatment

on rats (p <0.05). The result of statistical test before and after treatment can be seen on table 4.

Table 4. The results of statistical test before and after treatment

	Before treatment	After treatment	Sig.
8 % leaves infusion	Infusion t0	Infusion t1	1.000
		Infusion t2	.713
		Infusion t3	.000
		Infusions t4	.000
Positive control	Control (+) t0	Control (+) t1	.849
		Control (+) t2	.014
		Control (+) t3	.000
		Control (+) t4	.000
Negative control	Control (-) t0	Control (-) t1	.971
		Control (-) t2	.001
		Control (-) t3	.997
		Control (-) t4	1.000

Based on the result of statistical test, there was a significant difference of temperature before and after treatment (p <0,05) at t3 and t4. In the positive control group, there was no significant difference (p <0.05) in the negative control group (p <0.05) at t2, t3 and t4, whereas in the negative control group there was no significant difference (p> 0,05).

**CONCLUSION**

Based on the results of this research, it can be concluded that 8% *Sauropusandrogynus* (L.) Merr leaves infusion have the antipyretic effect.

**SUGGESTION**

1. It still needs further study to determine the content of *Sauropusandrogynus* (L.) Merr leaves that has the antipyretic effect.
2. It is recommended to use the antipyretic compounds in *Sauropusandrogynus* (L.) Merr leaves

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