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In vivo study of antipyretic activity of Sampare leaf extract (*Glochidion* sp.) from Biak-Numfor Regency

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ABSTRACT

The local people of Biak Regency use the Sampare Leaf (*Glochidion* sp.) to cure malaria and reliefe fever. This plant contains flavonoid compounds, alkaloids, saponins, and tannins that can act as antipyretics. This study aims to determine the antipyretic activity and the most effective dosage of Sampare leaf extract as an antipyretic. The research method was a laboratory experimental. The antipyretic testing method used is peptone-induced fever. A total of 30 mice were divided into 6 treatment groups. The inducing solution, peptone, is induced subcutaneously, and the test solution is administered orally. The results showed that Sampare leaf extract had a percent antipyretic power, namely at 150mg/kgBW of 30.17%, a dose of 200mg/kgBW of 49.66%, and a dose of 250mg/kgBW of 70.80%. The ANOVA test showed that the 250mg/kgBW extract treatment group and the 200mg/kgBW dose with the positive control group has no significant difference, so it can be concluded that the 250mg/kgBW extract dose is an effective dose that provides a good antipyretic effect.

Key words: antipyretic; extract; *Glochidion* sp.; Sampare

INTRODUCTION

Fever represents a physiological response or clinical manifestation associated with infection or inflammation in the body (Wright & Auwaerter, 2020). Such a condition indicates the body's thermoregulatory adjustment to an elevated internal temperature (Ludwig & Mc.Whinnie, 2019). It is typically identified by a body temperature exceeding the normal range of 36–37°C, often beginning with chills as the temperature starts to rise. After that, there is redness on the skin's surface. Fever can inhibit the growth and replication of microbes, bacteria, and viruses and increase the rate of phagocytosis (Dai *et al*., 2015).

To overcome fever conditions, antipyretics such as paracetamol (acetaminophen, N-acetyl-p-aminophenol) are the main choices (Ayoub, 2021). In addition, using non-steroidal anti-inflammatory agents (AINS) such as aspirin and ibuprofen can reduce fever (Ayoub, 2021). In the same period, concerns about the long-term side effects of paracetamol use and NSAIDs have been increasing. Initially, attention was focused on the risk of hypertension, but now it has also expanded to a variety of other health problems. The evidence regarding the effects of long-term paracetamol use is based on various cohort and observational studies. Specifically, studies show that chronic paracetamol use can increase the risk of gastrointestinal bleeding as well as slightly raise systolic blood pressure by about 4 mmHg (McCrae et al., 2018). The agents of AINS also have various side effects, such as mucosal damage to the

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gastrointestinal tract, obstruction, kidney dysfunction, and cardiovascular events (increased risk of hypertension, stroke, and heart attack) (Sovia, 2024).

Along with the increasing awareness of the side effects of synthetic drugs, people are starting to turn to herbal remedies that are considered safer and more affordable. Some medicinal plants have been shown to have antipyretic activity. For example, a study showed that ethanol extract of koro benguk (*Mucuna pruriens* L) had antipyretic activity in male rat experiments at 400mg/KgBW (Putri & Kusuma, 2024). In addition, ethanol extract of *Jatropha* leaves (*Jatropha curcas* L.) showed antipyretic activity comparable to paracetamol in male white rats (Gosal *et al*., 2020).

Papuan people are a society that still relies on traditional plants to cure diseases. The use of this traditional medicine has been carried out for generations. One of the local plants used by the Papuan people in Biak Regency is the Sampare plant. This plant is endemic. Empirically, Sampare plants have long been used by their ancestors for generations. The local people of Biak use this plant as a cure for malaria. The local community uses the medicinal plant Sampare by drinking boiled water from Sampare leaves (Chrystomo *et al*., 2016). In addition to being used to cure malaria, the local people of Biak also use Sampare leaves as a fever reducer (antipyretic). Based on interviews conducted by researchers, people use it to relieve fever by drinking a decoction of Sampare leaves.

Previous research shows the genus *Glochidion* sp.1 J.R. Forster & J.G. Forster, *Glochidion coronatum* Hook.f. and *Glochidion rubrum* Blume contains flavonoids, tannins, alkaloids, and triterpenoids (Kuncari *et al*., 2019) while the content found in Sampare leaves (*Glochidion* sp.) contains compounds of the alkaloid group, flavonoids, tannins, saponins, quinones but no triterpenoids and steroids were found (Oktalia *et al*., 2018).

The Sampare plant belongs to the Euphorbiaceae family, similar to the Jatropha plant. Research conducted by Gosal et al., (2020) shows that jatropha plants (*J. curcas*) contain secondary metabolites in the form of flavonoids that function as fever reducers (antipyretics). Another study conducted with doses of 150 mg/kgBW, 200 mg/kgBW, and 250 mg/kgBW in antipyretic testing showed that the most effective dose of fir leaf extract as an antipyretic was a dose of 250 mg/kgBW (Abdulkadir *et al*., 2023).

Flavonoids have a wide variety of bioactivity, which has been shown to have antipyretic, analgesic, and anti-inflammatory effects (Gupta *et al*., 2013). Flavonoid compounds have been known to have anti-inflammatory effects and also antipyretic effects that work as cyclooxygenase (COX) inhibitors that trigger the formation of prostaglandins. Prostaglandins play a role in inflammatory processes and an increase in body temperature. If prostaglandins are not inhibited, there will be an increase in body temperature, which will result in fever (Suwertayasa *et al*., 2013).

Based on this description, a study was conducted to see the potential of Sampare leaves as an antipyretic using mice test animals (*Mus musculus*).

MATERIALS AND METHODS

This research was conducted at the Research Laboratory of the Department of Pharmacy, Cenderawasih University.

Equipment and Material

The equipments used in this study include animal cages (mice), scales, ovens, beaker cups, jars, stirring rods, test tubes, measuring cups, glass funnels, gloves, digital clinical thermometers, oral probes, disposable syringe 1 cc, vial bottles, mesh sieve no 60, stopwatch, water bath, blender, porcelain cups, and filter paper.

The materials used in this study are Sampare plant, paracetamol suspension 250 mg/5 mL, Na CMC 1%, pepton 10%, ethanol 96%, aquadest, sulfuric acid (H_2SO_4), potassium dichromate (K2Cr2O7), hydrochloric acid (HCl), mayer reagent, dragendroff reagent, iron (III) chloride, magnesium powder (Mg), chloroform ($CHCl_3$),

acetic acid (CH_3COOH), amyl alcohol, aluminum foil and hot water.

Experimental Animals

The experimental animal used in this study was 30 male mice (*Mus musculus*) of the Swiss Webster strain, aged 2-3 months and weighing 20-30 grams.

Procedure

Plant determination

The plant is determined to avoid sampling errors for research materials and ensure that the sample used in this study is correct Sampare leaves by matching their pharmacological characteristics.

Simplicia powder and extract preparation

Sampare leaves were collected in Waupnor, Biak Kota District, Biak Numfor Regency, Papua. The leaves taken were those slightly brownish and light green. The collected leaves were cleaned using running water and dried by aerating until half dry, then continued by drying using an oven at 50°C until they become dry simplicia (72 hours). Dried simplicia was then mashed using a blender until smooth and sifted using mesh no. 60.

Simplicia, as much as 500 g was extracted using the maceration method. The sample was soaked in 96% ethanol in a 1:3 ratio with remaceration for three days using a new solvent every 1 × 24 hours with periodic stirring. Then, the extract results were filtered using filter paper and funnels to separate the filtrate and the fiber. The obtained macerate was then concentrated using a water bath at a temperature of 60°C until a thick extract was obtained. Then, the condensed extract was calculated for its yield.

Phytochemical screening

Phytochemical screening is a separation test of natural materials that contain unknown compounds. It can provide an overview of the compounds contained in the natural materials being studied (Manongko et al., 2020). The phytochemical screening carried out includes testing of alkaloids, flavonoids, saponins, tannins, quinones, triterpenoids, and steroids.

Antipyretic activity test

This study used test animals, namely male white mice (*Mus musculus*) aged 2-3 months and weighing 20-30 grams. Mice were divided into 6 treatment groups, namely normal control (no treatment), negative control (CMC 1%), positive control (Paracetamol 1.3 mg/20gBW mice), and three groups of suspension of Sampare leaf extract (treatment control) with concentrations in mice, namely 150 mg/kgBW, 200 mg/kgBW and 250 mg/kgBW. Before testing, mice were first acclimatized to adapt to a new environment. For 7 days, mice are adapted to the cage environment and are still given feed and drink. Before being given treatment, mice need to fast (not fed) for ± 8 hours but are still given ad libitum (as desired); then, the mice are weighed and grouped into six groups according to their weight.

Antipyretic testing begins with taking rectal temperature measurements using a digital clinical thermometer through the rectal of mice for one minute to determine the initial temperature before induction. Induction is carried out with 10% peptone subcutaneously. Then, 1 hour later, remeasure the rectal temperature of the mice. Furthermore, the mice test animals were divided into 6 groups consisting of normal treatment (no treatment), negative (Na-CMC 1% suspension), and positive (paracetamol suspension dose of 1.3 mg/20gBW mice), as well as three groups of Sampare leaf extract suspension (150 mg/kgBW, 200 mg/kgBW and 250 mg/kgBW) which were given a dosage according to the oral treatment group. Then, the rectal temperature of mice was measured again for 2.5 hours with a time interval of 0.5 hours. The temperature that has been obtained is then used to calculate the percentage of Antipyretic Power) %AP.

$$\% AP = \frac{t\,fever - tn}{t\,fever - t0} \times 100\%$$

t fever: temperature after induction
t0: pre-induction temperature
tn: temperature after induction

Data Analysis

The data that has been collected is analyzed with one-way ANOVA and continued with the Duncan Test.

RESULTS AND DISCUSSION

The Sampare plant was determined at the Materia Medica Batu Herbal Laboratory, Pasuruan Regency, Malang with letter number 000.9.3/202/102.20/2024.

Results of Sampare Leaf Extraction (*Glochidion* sp.)

The extraction method used in this study was maceration by directly extracting Sampare leaf simplicia with 96% ethanol. The maceration extraction method is selected because the procedures and equipment used are simple and in this method are not heated so that natural materials do not decompose (Nurhasnawati et al., 2017).

The selection of solvents based on their solubility and polarity facilitates the separation of the components of the active compounds in the sample. Ethanol 96% was used as a solvent in the extraction of maceration of Sampare leaves because it was based on its level of safety and ease when evaporated and its properties of being able to dissolve almost all substances, both polar, semipolar, and nonpolar (Nazilinly *et al*., 2024; Egra et al., 2019).

The results of Sampare leaf extraction were obtained with 67.2 g of extract, a percentage yield value of 13.44%. The high yield value indicates the large number of bioactive components contained in it (Dewatisari *et al*., 2018). Research conducted by Oktalia *et al*., (2018) obtained a yield of Sampare leaf extract of 21.57%. Another study also obtained a yield of Sampare leaf extract obtained of 26.67% (Khairuddin *et al*., 2023). Differences in yield values can be caused by factors such as the ratio of materials to solvents, extraction methods, extraction time, and where plants grow (Ramayani Laksmi *et al*., 2022).

Table 1. Phytochemical screening result of Sampare leaf extract.

Compound Groups	Note
Alkaloid	+
Flavonoid	+
Saponin	+
Tannin	+
Kuinon	+
Steroid	-
Triterpenoid	-

Note: (+) there are compounds, (-) no compounds

Phytochemical Screening Result

Phytochemical screening was carried out as a preliminary stage in this study to identify the content of secondary metabolites contained in Sampare leaf extract (*Glochidion* sp.).

Based on Table 4.1, phytochemical screening produced on an ethanol extract of Sampare leaves obtained secondary metabolite compounds containing alkaloids, flavonoids, saponins, tannins, and quinones. These findings are consistent with a

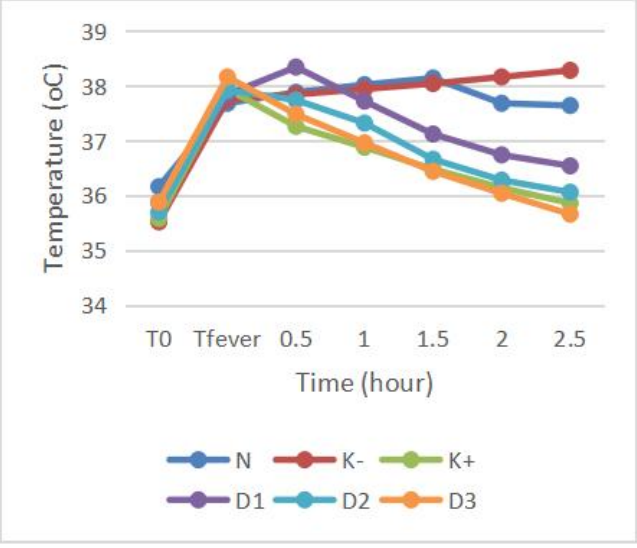

Figure 1. The average decrease in mouse temperature.

previous study reporting that the ethanol extract of Sampare leaves (*Glochidion* sp.) contained alkaloids, flavonoids, tannins, saponins, and quinones, while triterpenoids and steroids were not detected (Oktalia *et al*., 2018). Similarly, Khairuddin *et al*. (2023) also reported that Sampare extract contained alkaloids, flavonoids, tannins, saponins, and quinones.

Antipyretic Activity Test Results

In this study, there were 6 groups consisting of normal (no treatment), negative (1% Na-CMC suspension), and positive (paracetamol suspension dose of 1.3 mg/20gBW in mice), as well as three groups of Sampare leaf extract suspension with doses of 150 mg/kgBW, 200 mg/kgBW, and 250 mg/kgBW respectively. Temperature measurements were carried out before peptone induction, 1 hour after induction, and every 30 minutes for 2.5 hours. The results of the average measurement of temperature decrease in treated rats are presented in Table 2. The average temperature data of mice was used to calculate the percentage of Antipyretic Power (%AP). The results of %AP are presented in Table 3. The graph of the average temperature decrease in mice is presented in Figure 1.

Table 2. indicates that the normal body temperature of mice ranges from 35-36°C. The normal temperature in mice is around 36-38°C. The tested animals were considered to have a fever if there was an increase in body temperature exceeding 0.6 °C above normal (Sujana *et al*., 2021). The temperature increase occurred in the normal treatment group due to peptone being given. Pepton functions by stimulating the hypothalamus so that the synthesis of prostaglandins in it can increase, so that it can induce an increase in body temperature. This caused an increase in temperature, but in the 2nd hour, it had decreased (Widyasari et al., 2018). In the negative control group, Na-CMC did not experience a decrease in temperature or showed a constant increase in temperature for 2.5 hours because Na-CMC did not have an antipyretic effect that functions as a suspending agent so that the fever temperature in mice did not decrease (Wijaya & Lina, 2023). The positive control group showed a constant decrease in temperature because paracetamol is an antipyretic compound that works by blocking the formation of prostaglandins in the central nervous system (Mallet *et al*., 2023). Furthermore, according to Wilmana & Gunawan (2008), acetaminophen compounds interfere with the work of cyclooxygenase, so the process of converting arachidonic acid into prostaglandins is inhibited. The same is also shown in the graph Figure 1. Figure 1 It showed that the positive control and extract treatment groups showed a greater temperature drop than the normal and negative control groups.

In treating the ethanol extract group of leaves at 150 mg/kg BW, half an hour at the time of action showed increased body temperature (Table 1). This may be due to the predominance of the pyrogenic effect of peptone over the antipyretic

Table 2. Average temperature of mice.

Test animal group	Average rectal temperature of mice (°C) ± SD						
	T_0	T fever	0.5 hours	1 hours	1.5 hours	2 hours	2.5 hours
N	36.16 ±0.59	37.68±0.29	37.88±0.28	38.02±0.30	38.14±0.19	37.68±0.16	37.64 ±0.17
K-	35.52 ±0.55	37.75±0.13	37.84±0.26	37.94±0.29	38.04±0.22	38.16±0.22	38.28±0.23
K+	35.58 ±0.83	37.94±0.50	37.26±0.44	36.88±0.50	36.48±0.54	36.14±0.64	35.86±0.73
D1	35.88 ±0.65	37.84±0.29	38.34±0.27	37.72±0.38	37.12±0.30	36.74±0.38	36.54±0.35
D2	35.70 ±0.66	37.92±0.36	37.74±0.54	37.32±0.59	36.66±0.51	36.28±0.64	36.06±0.74
D3	35.88 ±0.55	38.16±0.21	37.48±0.22	36.96±0.22	36.44±0.27	36.04±0.27	35.66±0.29

Note : N : no treatment, K(-) : Negative Control (Na-CMC 1%), K(+) : Positive Control (Paracetamol), D1 : Dose 1 (150 mg/kgBW), D2 : Dose 2 (200 mg/kg BW), D3 : Dose 3 (250 mg/kgBW).

Table 3. Percentage of antipyretic power.

No	Test animal group	% AP
1.	N	-30.55
2.	K-	-18.78
3.	K+	60.95
4.	D1	30.17
5.	D2	49.66
6.	D3	70.80

effect of Sampare extract. The results in the group given Sampare leaf ethanol extract at a dose of 200 mg/kgBW and Sampare leaf ethanol extract at 250 mg/kgBW, there was a constant temperature drop for 2.5 hours as well as positive control (paracetamol). This finding showed that a higher dose of ethanol extract of Sampare leaves is associated with a greater reduction in body temperature in mice.

Table 3. shows that all extract test groups can be antipyretic where the size of the extract dose affects the result of the percentage of antipyretic power, which reaches 70.80% for Sampare leaf extract at a dose of 250 mg/kgBW, which exceeds the percentage of positive control antipyretic power which is 60.95%. The results of the ANOVA test showed a significant value of $p < 0.05$. The follow-up test, the Duncan test, showed no difference between the positive control and treatment groups with a dose of 250 mg/kgBW.

Flavonoid compounds function as antipyretics due to their mechanism as cyclooxygenase (COX-2) inhibitors (Nhung & Quoc, 2023). Most antipyretic agents inhibit fever through a central mechanism by inhibiting PGE2 in the hypothalamus (Javed *et al*., 2020). This decrease in the prostaglandin process causes a decrease in the setpoint of the body thermostat in the hypothalamus, lowering body temperature and reducing fever. The same mechanism is demonstrated by tannin compounds in lowering fever by inhibiting the synthesis of prostaglandin E_2 (PGE_2) through the cyclooxygenase pathway in the hypothalamus. PGE_2 is the main mediator in the fever response (Aryal *et al*., 2019; Yemitan & Adeyemi, 2017). Saponin compounds have an antipyretic effect by inhibiting cyclooxygenase activity, thereby inhibiting the synthesis of prostaglandins (Shah *et al*., 2017). Alkaloids have antipyretic properties that function through the mechanism of inhibition of the activity of the cyclooxygenase, which decreases prostaglandin synthesis and causes a decrease in body temperature (Nurmalasari *et al*., 2019). The mechanism of inhibition of prostaglandins will lower the body's thermostat point in the hypothalamus so that the fever decreases (Gosal *et al*., 2020).

CONCLUSION

Ethanol extract of Sampare leaves (*Glochidion* sp.) has antipyretic activity that can reduce body temperature in mice (*Mus musculus*) at doses of 150 mg/kgBW, 200 mg/kgBW, and 250 mg/kgBW. The 250mg/kgBW extract dose is an effective dose that provides a good antipyretic effect.

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REFERENCES

Abdulkadir, W.S., J. Akuba, E.N. Djuwarno, D.R. Papeo, & A.I. Haryanto. 2023. In vivo testing of antipyretic leaves of fence (*Jatropha curcas* L.) origin Gorontalo. *International Journal of Health Science & Medical Research*. 2(2): 111–132.

Aryal, S., B. Adhikari, K. Panthi, P. Aryal, S.K. Mallik, R.P. Bhusal, B. Salehi, W.N. Setzer, J. Sharifi-Rad, & N. Koirala. 2019. Antipyretic, antinociceptive, and anti-inflammatory activities from *Pogostemon benghalensis* leaf extract in experimental Wister rats. *Medicines*. 6(4): 96.

Ayoub, S.S. 2021. Paracetamol (acetaminophen): A familiar drug with an unexplained mechanism of action. *Temperature*. 8(4): 351–371.

Chrystomo, L.Y., A.K. Karim, N.N. Antari, S. Dwa, Y. Wona, & A. Pongtiku. 2016. *Tumbuhan obat tradisional Papua berdasarkan kearifan lokal masyarakat*. Nulis Buku Jendela Dunia. Papua.

Dai, Y.T., S.H. Lu, Y.C. Chen, & W.J. Ko. 2015. Correlation

btween body temperature and survival rate in patients with hospital-acquired bacteremia: A prospective observational study. *Biological Research for Nursing*. 17(5): 469–477.

Dewatisari, W.F., L. Rumiyanti, & I. Rakhmawati. 2018. Rendemen and phytochemical screening using leaf extract of *Sansevieria* sp. *Jurnal Penelitian Pertanian Terapan*. 17(3): 197–202.

Egra, S., Mardhiana, M. Rofin, M. Adiwena, N. Jannah, H. Kuspradini, & T. Mitsunaga. 2019. Aktivitas antimikroba ekstrak bakau (*Rhizophora mucronata*) dalam menghambat pertumbuhan *Ralstonia solanacearum* penyebab penyakit layu. *Agrovigor: Jurnal Agroekoteknologi*. 12(1): 26.

Gosal, A.T., E. de Queljoe, & E.J. Suoth. 2020. Uji aktivitas antipiretik ekstrak etanol daun jarak pagar (*Jatropha curcas* L.) pada tikus putih jantan (*Rattus norvegicus*) galur Wistar yang diinduksi vaksin DPT. *Pharmacon*. 9(3): 342.

Gupta, M., D. Banerjee, & A. Mukherjee. 2013. Studies of anti inflammatory, atipyretic and analgesic effects of aqueous extract of traditional herbal drug on rodents. *International Research Journal of Pharmacy*. 4(3): 113–120.

Javed, F., Q. Jabeen, N. Aslam, & A.M. Awan. 2020. Pharmacological evaluation of analgesic, anti-inflammatory and antipyretic activities of ethanolic extract of *Indigofera argentea* Burm. F. *Journal of Ethnopharmacology*. 259: 112966.

Ludwig, J., & H. Mc.Whinnie. 2019. Antipyretic drugs in patients with fever and infection: Literature review. *British Journal of Nursing*. 28: 610–618.

Khairuddin, Y.P. Utami, & M.A.Y. Ardi. 2023. Antimalarial activity of ethanol extract of sampare leaves (*Glochidion* sp var. Biak) against *Plasmodium falciparum* in vitro. *Indonesian Journal of Pharmaceutical Science and Technology*. 10(1): 10–18.

Kuncari, E.S., T. Nasional, G. Leuser, & A. Tenggara. 2019. Tinjauan pemanfaatan tradisional dan potensi medis *Glochidion* sp. di Ketambe, Taman Nasional Gunung Leuser, Aceh Tenggara. Prosiding Pokjanas Toi. pp: 9–15.

Mallet, C., J. Desmeules, R. Pegahi, & A. Eschalier. 2023. An updated review on the metabolite (AM404)-mediated central mechanism of action of paracetamol (acetaminophen): Experimental evidence and potential clinical impact. *Journal of Pain Research*. 16: 1081–1094.

Manongko, P.S., M.S. Sangi, & L.I. Momuat. 2020. Uji senyawa fitokimia dan ativitas antioksidan tanaman patah tulang (*Euphorbia tirucalli* L.). *Jurnal MIPA*. 9(2): 64.

McCrae, J.C., E.E. Morrison, I.M. MacIntyre, J.W. Dear, & D.J. WeBW. 2018. Long-term adverse effects of paracetamol – A review. *British Journal of Clinical Pharmacology*. 84(10): 2218–2230.

Nazilinly, F., L. Permatasari, & N. Hasbi. 2024. Antibacterial activity of ethyl asetate fraction of *Centella asiatica* against clinical isolates of *Pseudomonas aeruginosa*. *Jurnal Biologi Tropis*. 24(3): 680–691.

Nhung, T.T.P., & L.P.T. Quoc. 2023. Analgesic and antipyretic activities of ethanol extract of *Gardenia jasminoides* Ellis fruits in mice. *Tropical Journal of Natural Product Research*. 7(10): 4902–4907.

Nurhasnawati, H., S. Sukarmi, & F. Handayani. 2017. Perbandingan metode ekstraksi maserasi dan sokletasi terhadap aktivitas antioksidan ekstrak etanol daun jambu bol (*Syzygium malaccense* L.). *Jurnal Ilmiah Manuntung*. 3(1): 91–95.

Nurmalasari, K., Tjandrakirana, & N. Kuswanti. 2019. Uji antipiretik rebusan semanggi (*Marsilea crenata*) terhadap suhu tubuh tikus putih (*Rattus norvegicus* L.) yang diinduksi vaksin pentabio (DTP-HB-Hib). *Lentera Bio*. 7(2): 142–147.

Oktalia, G., L.Y. Chrystomo, & A.K. Karim. 2018. Uji aktivitas sitotoksik dan analisis fitokimia ekstrak etanol daun sampare (*Glochidion* sp.). *Jurnal Biologi Papua*. 9(2): 49–54.

Putri, A.A.S., & E.W. Kusuma. 2024. Uji efek antipiretik ekstrak etanol biji koro benguk (*Mucuna pruriens* L.) dengan metode sokhletasi pada tikus putih jantan galur Wistar (*Rattus norvegicus* L.). *Jurnal Riset Kefarmasian Indonesia*. 6(1): 97–110.

Laksmi, R.S., F. Rohmawati, & Y.R. Salvira. 2022. Pengaruh rasio bahan dan pelarut terhadap kadar flavonoid dan aktivitas penangkapan radikal bebas ekstrak daun mengkudu. *Jurnal Jamu Indonesia*. 7(2): 56–61.

Shah, M., Z. Parveen, & M.R. Khan. 2017. Evaluation of antioxidant, anti-inflammatory, analgesic and antipyretic activities of the stem bark of *Sapindus mukorossi*. *BMC Complementary and Alternative Medicine*. 17(1): 1–16.

Sovia, E. 2024. Edukasi penggunaan obat analgetik dan antipiretik secara rasional. *Jurnal Abdimas Kartika Wijayakusuma*. 5(2): 363–370.

Sujana, D., D.M. Hasyim, H.T. Ramdani, S.N. Fadilah, S. Yuliasari, & M. Arismawati. 2021. Efek antipiretik dari perasan, infusa, dan dekokta kunyit (*Curcuma domestica* Val.) pada mencit yang diinduksi larutan pepton. *Pharma Xplore Jurnal Ilmiah Farmasi*. 6(2): 27–35.

Suwertayasa, I.M.P., W. Bodhy, & H.J. Edy. 2013. Uji efek antipiretik ekstrak etanol daun tembelekan (*Lantana camara* L.) pada tikus putih jantan galur Wistar. *Pharmacon: Jurnal Ilmiah Farmasi-UNSRAT*. 2(03): 45–49.

Widyasari, R., D. Yuspitasari, A. Masykuroh, & W. Tahuhiddah. 2018. Uji aktivitas antipiretik ekstrak daun sisik naga (*Pyrrosia piloselloides* (L.) M.G. Price) pada tikus putih (*Rattus norvegicus*) jantan galur Wistar yang diinduksi pepton 5%. *Jurnal Ilmu Farmasi dan Klinik*. 15(1): 22–28.

Wijaya, H.M., & R.N. Lina. 2023. Efektivitas antipiretik kombinasi ekstrak etanol daun kelor (*Moringa oleifera* lam.) dan daun pare (*Momordica charantia* L.) pada mencit jantan yang diinduksi pepton 5%. *Cendekia Journal of Pharmacy*. 7(1): 37–45.

Wilmana, P.F. & S.G. Gunawan. 2008. *Analgesik-antipiretik, analgesik antiinflamasi nonsteroid, dan obat gngguan sendi lainnya.* Departemen Farmakologi dan Terapeutik Fakultas Kedokteran Universitas Indonesia. Jakarta.

Wright, W.F., & AuwaerterP.G. 2020. Fever and fever of

unknown origin: Review, recent advances, and lingering dogma. *Open Forum Infectious Diseases.* 7(5): 1–12.

Yemitan, O.K., & O.O. Adeyemi. 2017. Mechanistic assessment of the analgesic, anti-inflammatory and antipyretic actions of *Dalbergia saxatilis* in animal models. *Pharmaceutical Biology*. 55(1): 898–905.