

ANALGESIC ACTIVITY TEST OF WARU (*Hibiscus tiliaceus* L.) LEAVES ETHANOL EXTRACT IN MALE MISCULES (*Mus musculus*)

NOVIDAWATI BORU SITUMORANG¹, SILVIA WIDYA NINGSIH²

Institut Kesehatan Medistra Lubuk Pakam
Sudirman Street No.38 Lubuk Pakam, Districts Deli Serdang
e-mail : novisitumorang95@gmail.com

Abstract

Herbal remedies in therapy have been used in the treatment of pain since time immemorial. Pain can express an emotional feeling as well as a sensory event that provides discomfort because of the damaged tissue. Most of the analgesics used in modern medicine have side effects on either the gastro-intestinal tract or the nervous system. Empirically waru leaves have been used as traditional medicine. The purpose of this study was to evaluate the analgesic effect of the ethanol extract of waru leaf and compare it with mefenamic acid tablets and then measured by the plantar test infra red (IR) 96 nm. Twenty five mice were divided into five groups. Three of them were treated with ethanol extract of waru leaves with doses of 100, 200, 300 mg/kgbw, 0.5% Na-CMC (negative control), and 500 mg Mefenamic Acid tablets (positive control). Infrared pain induction was performed every 10 minutes for 60 minutes. The maximum analgesic activity was indicated by a dose of 300 mg/kg body weight extract at 60 minutes which was 23.8 where the effectiveness was almost the same as the standard drug Mefenamic Acid, which was 24.3 while the dose of 200 mg/kgBB was 20.9 and 100 mg/kgBW was 19.9. The data obtained were then processed using one way ANOVA. The conclusion of the study revealed that hibiscus leaf (*Hibiscus tiliaceus* L.) has significant analgesic properties, especially in higher doses.

Keywords : *Waru Leaf, Analgesic, Plantar test infra test.*

1. INTRODUCTION

Pain arises due to mechanical or chemical stimuli, which can cause tissue damage and release certain substances called pain mediators such as bradykin, histamine, serotonin, and prostaglandins (Afriani, 2014).

The use of traditional medicine has become a habit among the community and is growing rapidly. Traditional medicine is widely used to maintain health and is widely started because the price is not too expensive and its availability is affordable for the community, especially in villages or small towns where health centers are rarely available. Compared to modern

medicine, traditional medicine has several advantages, namely relatively low side effects (Bahrudin, 2018)

Some analgesic drugs have adverse side effects. Among them the use of several analgesic drugs in the long term will experience complaints of headaches, upper gastrointestinal tract, suffer from peptic ulcers, especially gastric ulcers will experience ulcer complications which can be an alternative pain treatment. In addition, many people use traditional medicine due to the ease of obtaining raw materials that can also be grown in the surrounding environment, cheap and can be mixed by everyone themselves (Cahyaningsih, 2017).

Waru leaf (*Hibiscus tiliaceus* L.) is one of the typical Indonesian plants which is empirically used as a foam producer. Waru leaves contain active compounds of saponins, flavonoids, alkaloids, and tannins. Where hibiscus leaves are thought to be able to relieve symptoms of pain inflammation because hibiscus leaves contain flavonoids which are efficacious as analgesics whose mechanism of action is to inhibit the work of the cyclooxygenase enzyme, therefore hibiscus leaf extract helps overcome pain by inhibiting the work of prostaglandin compounds (Suryanto, 2013).

2. METHOD

This research method was carried out in an experimental laboratory with the stages of collecting materials, processing materials, and preparing experimental animals. In this study, measurements were carried out to see the effect of giving hibiscus leaf extract on male white mice that had been induced by acetic acid and with the plantar test infra red.

Materials And Tools

Waru leaves, Na CMC, 96% ethanol, aquadest, mefenamic acid, and acetic acid while the tools such as laboratory glasses, scales, blender, evaporating dish, drum of mice, oral spnde, syringe, mortar and stamper, and funnel.

Making Waru Leaf Extract

The hibiscus leaves were washed thoroughly and then drained, finely chopped and weighed to obtain a wet weight of 5 kg. then in the air at room temperature, after drying in a blender to a powder, weighed and then put into a tightly closed plastic bottle container and stored at room temperature, the results obtained will be used for phytochemical screening.

Simplicia powder was put into a maceration container as much as 500

grams, then added ethanol solvent and closed. Then left for 5 days and protected from sunlight. During the soaking process, the sambal is occasionally stirred, then squeezed. Then the macerate is vaporized or concentrated with a rotary evaporator until a thick extract is obtained.

Making Of Waru Leaf Ethanol Extract (EEDW) Suspension

Weighed as much as 100 mg, 200 mg, 300 mg, ethanol extract of waru leaves. Each was ground with the addition of 0.5% Na CMC suspension until homogeneous, put into a 10 ml volumetric flask, filled with 0.5% Na CMC suspension until it reached the mark line.

Analgesic Effect Testing Process

Experimental animals were fasted to eat for \pm 18 hours, drinking was still given. Experimental animals were weighed, divided into a negative control group and a test group. Each control group of 5 mice. For the negative control group, 0.5% Na_CMC was given as much as 0.2 ml/20 g body weight orally. After giving the test substance, the test animal was put into the plantar test chamber which had determined the amount of infrared intensity was measured in mice 10, 20, 30, 40, 50, 60. Then the plantar infrared instrument was positioned under the chamber. movement of the test animal, the plantar instrument will stop and the plantar instrument will indicate when some of the test animals are hot and moving.

Data Analysis

The data obtained were analyzed by the Kolmogrov Smirnov test to see the distribution of the data and analyzed by the Levene test to see the homogeneity of the data. If the data is normally distributed and homogeneous, it is continued with the one-way Analysis Of Vrience (ANOVA) test with 95% confidence so that it can be seen whether

the difference obtained is significant or not. If there is a significant difference, continue to perform the Least Square Difference (LSD) test to see if the difference between the treatment groups is significant or not. The test used if the data is not normally distributed is a non-parametric statistical test, namely Kruskal Wallis, then the Post Hoc Test is carried out to see a significant difference. This analysis uses the SPSS (Statistical Product and Service Solution) program).

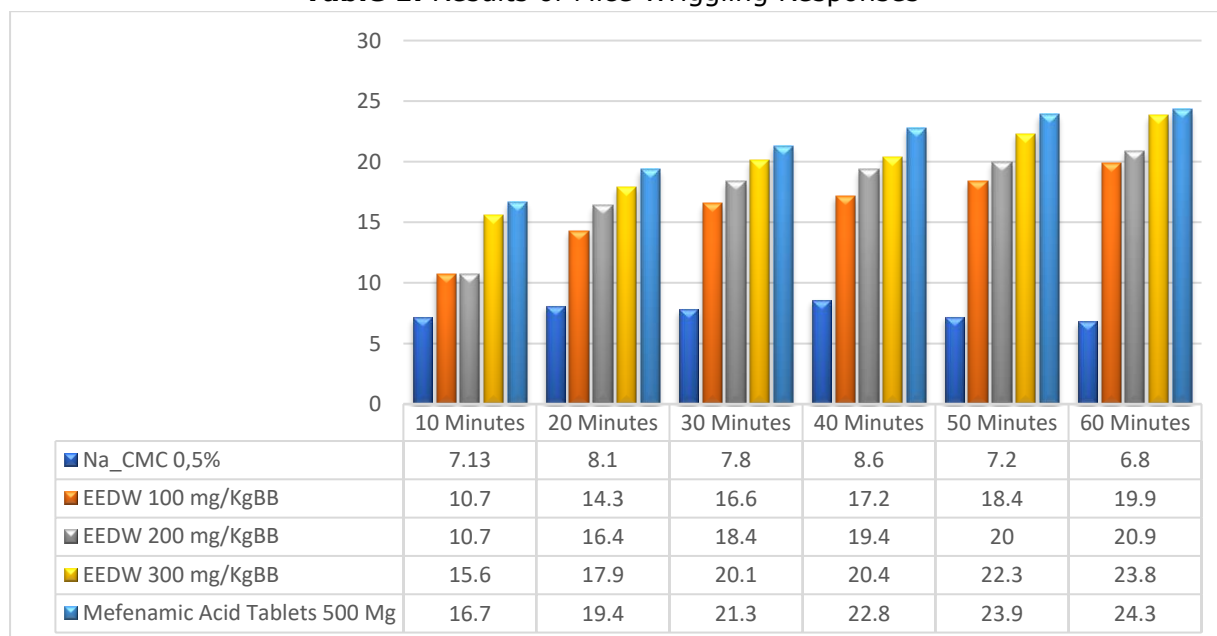
3. RESULTS AND DISCUSSION

EEDW phytochemical screening results showed that hibiscus leaves contain secondary metabolites of alkaloids, saponins, tannins, and flavonoids. The presence of secondary metabolites in the form of tannins, saponins, and flavonoids found in hibiscus leaves, it is possible that hibiscus leaves have effectiveness that

can provide analgesic or pain effects. As in the research that has been done on Ifora (2018) extracts containing flavonoid compounds, alkaloids, tannins, and saponins can be useful as anti-pain. The plantar test infra red (IR) method used in this experiment is one of the methods of testing analgesics, why the use of three different doses is that there is a relationship between the dose and the effect of the experimental results. If a test material provides a dose-effect relationship, it means that the larger the dose given, the more effects will be obtained.

The analysis was carried out by comparing the time required for test animals to withstand the induction of acetic acid and 96 nm infrared heat, after administration of ethanol extract of hibiscus leaves and Na_CMC. The time can be recorded for 60 minutes can be seen in the Table 1.

Table 1. Results of Mice Wriggling Responses



From the observation of the time of holding pain induction for 60 minutes in Figure 1.1 EEDW at a dose of 300mg/kgbw has the highest peak of analgesic effect at the 60th minute which is 23.8, EEDW at a dose of 200mg/kgbw

is 20.9 and EEDW at a dose of 100mg/kgbw is 19.9 . Of the three concentrations of ethanol extract of hibiscus leaves have analgesic power against mice. The higher the concentration of EEDW dose, the higher

the analgesic power in mice, because the higher the dose of EEDW, the more secondary metabolites contained in EEDW.

The flavonoid content in hibiscus leaves is a compound that can protect membranes from damage and inhibit the cyclooxygenase enzyme which is the first pathway for signaling pain mediators such as prostaglandins. While the alkaloids and flavonoids. Flavonoids have the potential to reduce pain by inhibiting the action of the cyclooxygenase enzyme (Endah, 2020).

The parameter measured in pain induction is reaction time, which is the time span between induction and the occurrence of pain in experimental animals. This time span is usually extended by giving analgesic drugs, extending this reaction time span is used as a measure in evaluating analgesic activity. Based on static analysis using the Kolmogorov-Smirnov test of all treatments, a significant value of $p > 0.05$ was obtained, which means that the data was declared normal and homogeneous. Because the requirement to perform the ANOVA test is that the data must be homogeneous and normal. From the results of the ANOVA test, p value = 0.000 ($p < 0.05$) from each treatment, which means that there is a difference between treatments. To see which group has a significant value, it is continued with the post hoc(LSD) test.

4. CONCLUSION

Ethanol extract of hibiscus leaf (*Hibiscus tiliaceus* L.) can provide analgesic effect on male white mice. It can be proven from the results obtained at the time of the study using an infrared plantar test tool with different dose variants.

BIBLIOGRAPHY

- Afriani S., Idiawati N., Destiarti L., dan Arianie L. 2014. *Uji Aktivitas Antioksidan Daging Buah Paya (Eleiodoxa conferta burret) Dengan metode Dpph dan Tiosionat*. Jakarta, Volum 3(1), halaman 49-56.
- Bahrudin, M. 2018. *Patofisiologi Nyeri (Pain)*. Sainatika Medika, 13 (1), 7-13. <https://doi.org/10.22219/sm.v13i1.5449>.
- Cahyaningsih E., Suwarni E. 2017. *Uji Efek Analgesik Infusa Daun Kayu Putih (Melaleuca trichostachya L.) Pada Mencit Jantan (Mus Musculus L.)* Jurnal Medicine; 3(1)7-11.
- Endah, et al. 2020. The flavonoid content in hibiscus leaves is a compound that can protect membranes from damage and inhibit the cyclooxygenase enzyme which is the first pathway for signaling pain mediators such as prostaglandins. While the alkaloids and flavonoids. Flavonoids have the potential to reduce pain by inhibiting the action of the cyclooxygenase enzyme.
- Ifora, et al. 2018. *Aktivitas Antiinflamasi Ekstrak Etanol Herbal Genjer (Linnucaris flava L.) Pada Tikus Putih Jantan*. Jurnal Farmasi Higea. Volume 10.
- Suryanto, 2013. *Aktivitas Antioksidan Ekstrak Etanol Daun Kerehau (Callicarpa longifolia Lamk.) Dengan Metode Penangkal Radikal DPPH (2,2- Difenil 1-Pikrihidrazil)*. Karya Tulis Ilmiah. Samarinda : Akademia Farmasi.