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Anti-Inflammatory Effectiveness Test Of Ethanolic Extract Of Sintrong Leaves (Crassocephalum Crepidioides) On Male White Rats (Rattus Norvegicus L.)

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ABSTRACT

Inflammation is a defense mechanism of the body in response to injury or infection. Inflammation can be treated with steroidal anti-inflammatory drugs (AIS) and non-steroidal anti-inflammatory drugs (NSAIDs). One of the medicinal plants that can be used as an anti-inflammatory is sintrong leaves. Sintrong (Crassocephalum crepidioides) is a member of the Asteraceae family. Purpose: The purpose of this study was to determine whether the extract of sintrong leaves (Crassocephalum crepidioides) contains secondary metabolites that are effective as anti-inflammatory. Method: The research method was experimental, to determine the effect or relationship between independent variables and dependent variables. This study was conducted to determine the activity of ethanol extract of sintrong leaves (Crassocephalum crepidioides) as an anti-inflammatory in male white rats (Rattus norvegicus L.). Results: The results showed that the sintrong leaf simplicia did not meet the requirements for determining water content and total ash content and was negative for containing triterpenoid/steroid and glycoside compounds. Conclusion: The conclusion is that the ethanol extract of sintrong leaves (Crassocephalum crepidioides) has an anti-inflammatory effect with the higher concentration of the formula, the lower the percentage of edema produced. The lowest percentage of edema occurred in F3 at the 6th checking time with a percentage value of 3.4%.

Keywords: **Ethanol Extract of Sintrong Leaves (Crassocephalum crepidioides), Anti-inflammatory**

INTRODUCTION

Inflammation is the body's defense mechanism in response to injury or infection. Inflammation can be treated with steroidal anti-inflammatory drugs (NSAIDs) and nonsteroidal anti-inflammatory drugs (NSAIDs). Synthetic anti-inflammatory drugs have a rapid effect on reducing inflammation but can cause side effects such as stomach irritation if used long-term. Therefore, efforts are being made to find traditional medicines that are effective as anti-inflammatories, as they are considered to have fewer side effects than synthetic drugs.(1).

Indonesia has extensive tropical forests with high biodiversity, both flora and fauna. Currently, medicinal plant products are used by various segments of society worldwide, both in developed and developing countries. The World Health Organization (WHO) estimates that 80% of the population in developing countries still relies on traditional medicine for health care, and 85% of traditional medicine practices use medicinal plants.(2).

. Generally grows wild as a weed in plantation crops, abandoned land, or on roadsides at an altitude of 200 meters above sea level. In Africa, sintrong leaves are not only consumed as food but also used as a traditional medicine to treat stomach disorders, wounds, headaches, and itching. In Indonesia itself, sintrong leaves were first discovered in Medan around 1926. From Medan, it then spread throughout the archipelago. Sintrong plant growth is more fertile in humid areas up to an altitude of 2,500 meters above sea level. Many people use sintrong leaves for animal feed, sintrong leaves are also a popular cancer medicine.(3).

Extraction methods are known to affect the resulting product's physical properties and stability. The choice of extraction method must take into account the properties and characteristics of the compound to be extracted.(4)Percolation is an extraction carried out at room temperature with a fresh solvent. The working principle of percolation is that the medicinal plant is placed in a percolator and the solvent is passed from above through the medicinal plant so that the dissolved substance flows downward and is collected.(5).

Based on the results of previous research conducted by Aji Firda Lia. F with the research title Characterization of Simplisia and Sintrong Leaf Extract (Crassocephalum crepidioides) from East Kalimantan Province as Candidates for Caries Drugs and Their Antibacterial Activity in 2022, the results of phytochemical screening on sintrong leaf extract showed that sintrong leaves positively contained secondary metabolite compounds in the form of flavonoids, saponins, tannins, and phenols which are suspected to have a role as anti-inflammatory compounds.(6).

METHODS

This research is an experimental study, aimed at determining the influence or relationship between the independent and dependent variables. This study was conducted to determine the anti-inflammatory activity of ethanol extract of sintrong leaves (Crassocephalum crepidioides) in male white rats (Rattus norvegicus L.).

RESULT

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Sample Preparation Results

Table 1. Data on the results of Sintrong Leaf Simplisia (*Crassocephalum crepidioides)*

No	Sample	Sample Wet Weight (g)	Sample Dry Weight (g)	Drying Loss
1	Sintrong Leaves	7000 g	758 g	10.8%

Results of Characteristics of Simple Powder

Table 2. Results of the Characteristics of Sintrong Leaf Simples (*Crassocephalum crepidioides)*

No	Parameter	Results (%)	Characteristic Requirements for Simple Drugs According to Herbal Pharmacopoeia Volume II (%)
1	Water content	0.99	≤ 10
2	Water Soluble Essence Content	0.99	≥ 17.8
3	Ethanol Soluble Essence Level	1.95	≥ 15.0
4	Total Ash Content	0.99	≤ 4.6
5	Acid Insoluble Ash Content	2.77	≤ 0.5

Phytochemical Screening Results

Table 3. Phytochemical Screening Results of Sintrong Leaves (*Crassocephalum crepidioides)*

No	Secondary Metabolites	Results
1	Alkaloid	+
2	Flavonoid	+
3	Tannin	+
4	Saponin	+
5	Triterpenoids/Steroids	-
6	Glycosides	-

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Anti-inflammatory Activity Test Results

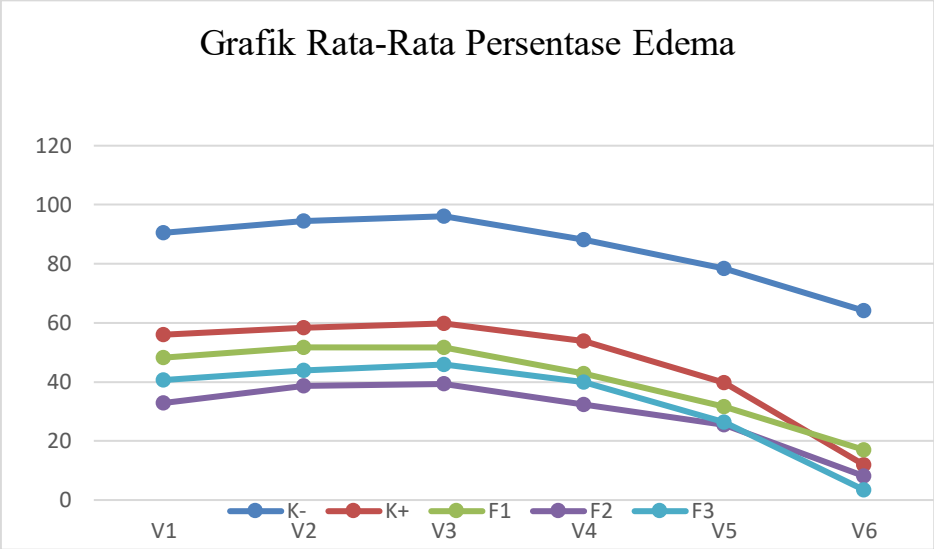

Figure 1. Graph of Average Edema Percentage

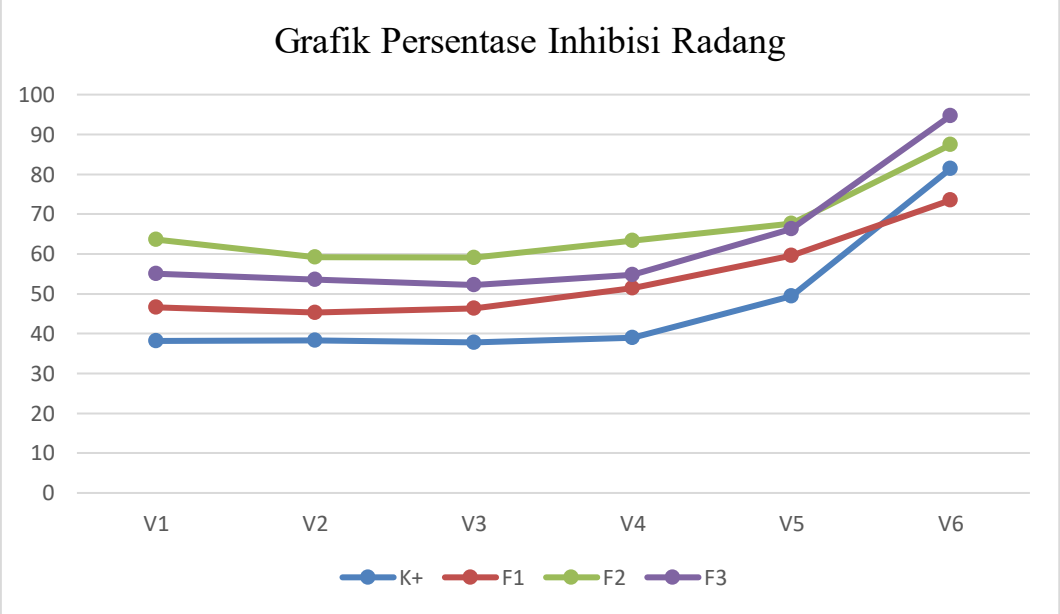

Figure 2. Graph of Inflammatory Inhibition Percentage

Data Analysis Results

ANOVA Test Results

Table 4. ANOVA Test Data Average Value Percentage of Edema

Formula	Shapiro-Wilk Data Normality Test (sig.)	Homogeneity Test	ANOVA (sig.)
K-	0.235		
K+	0.031		
F1	0.163	0.785	0,000
F2	0.135		
F3	0.055		

Table 5. ANOVA Test Data Percentage Value of Inflammation Inhibition

Formula	Shapiro-Wilk Data Normality Test (sig.)	Homogeneity Test	ANOVA (sig.)
K+	0.002		
F1	0.084	0.721	0.110
F2	0.020		
F3	0.008		

Tukey HSD Post Hoc Test Results

Table 6. Test*Post Hoc Tukey HSD Mean Percentage of Edema*

(I) Formula	(J) Formula	Mean Difference (IJ)	Std. Error	Sig.	Lower Limit	Upper Limit
K-	K+	38.71667	8.45765	.001	13.8776	63.5557
	F1	44.76667	8.45765	.000	19.9276	69.6057
	F2	55.85000	8.45765	.000	31.0110	80.6890
	F3	51.95000	8.45765	.000	27.1110	76.7890
K+	K-	-38.71667	8.45765	.001	-63.5557	-13.8776
	F1	6.05000	8.45765	.951	-18.7890	30.8890
	F2	17.13333	8.45765	.283	-7.7057	41.9724
	F3	13.23333	8.45765	.532	-11.6057	38.0724
F1	K-	-44.76667	8.45765	.000	-69.6057	-19.9276
	K+	-6.05000	8.45765	.951	-30.8890	18.7890
	F2	11.08333	8.45765	.687	-13.7557	35.9224

(I) Formula	(J) Formula	Mean Difference (IJ)	Std. Error	Sig.	Lower Limit	Upper Limit
	F3	7.18333	8.45765	.912	-17.6557	32.0224
F2	K-	-55.85000	8.45765	.000	-80.6890	-31.0110
	K+	-17.13333	8.45765	.283	-41.9724	7,7057
	F1	-11.08333	8.45765	.687	-35.9224	13.7557
	F3	-3.90000	8.45765	.990	-28.7390	20.9390
F3	K-	-51.95000	8.45765	.000	-76.7890	-27.1110
	K+	-13.23333	8.45765	.532	-38.0724	11,6057
	F1	-7.18333	8.45765	.912	-32.0224	17.6557
	F2	3.90000	8.45765	.990	-20.9390	28.7390

DISCUSSION

Phytochemical Screening

Based on the results of phytochemical screening conducted by researchers can be seen in table 4.3. shows that the positive (+) ethanol extract contains secondary metabolite compounds in the form of alkaloids, flavonoids, tannins and saponins. Based on the results of the alkaloid compound test, it is stated positive if a precipitate is formed after being added with Mayer, Bouchardat and Dragendorf reagents, the results of the flavonoid compound test are stated positive in this study the formation of an orange color, the results of the tannin compound test are stated positive in this study the formation of a blackish green color, the results of the saponin compound test in this study the formation of stable foam for approximately 7 minutes.

In phytochemical screening, the principle used to identify secondary metabolites in the form of alkaloids is precipitation, which occurs due to ligand replacement. Nitrogen atoms, which have lone electron pairs in alkaloids, can replace iodine ions in Mayer, Bouchardat, and Dragendorf reagents. This results in the formation of precipitates when Mayer, Bouchardat, and Dragendorf reagents are added to the test solution of sintrong leaf extract used.(14).

In testing flavonoid compounds using Mg powder and concentrated HCl, the flavonoid compound content is indicated by a color change to red, yellow or orange after the test solution is added with HCl (p) and magnesium powder. Reduction of the flavonoid

compounds contained in the extract with Mg2+ and concentrated HCl will form a complex [Mg(Oar)6]4- so that in this study an orange color is formed.(15).

In the tannin compound test, FeCl3 is added. This addition will produce a blackish-blue color for hydrolyzed tannins, while condensed tannins will produce a blackish-green color. This color change occurs when the addition of FeCl3 reacts with one of the hydroxyl groups in the tannin compound (14).

In saponin compound testing, saponin compounds contain glycosyl groups that act as polar groups, as well as steroid and triterpenoid groups that function as nonpolar groups. In this study, sintrong leaf extract was used.(Crassocephalum crepidioides) negative (-) contains triterpenoid/steroid and glycoside compounds where during the triterpenoid/steroid test no bluish green color is formed where the formation of this color indicates the presence of steroid compounds and no brownish or violet ring is formed which is a sign of the presence of triterpenoid compounds and during the glycoside compound test no blue or green color is formed in the test solution of the sintrong leaf extract used.

Anti-inflammatory Activity Testing

Based on the results of the anti-inflammatory activity test conducted by the researcher, it can be seen that the table shows the data on the percentage of edema in the feet of mice with the administration of the five formulas, namely K+, K-, F1, F2 and F3. Based on the table, it can be seen that the mice given the negative control (K-) did not experience a decrease in edema to normal conditions. This means that the negative control (K-) used did not contain compounds that could reduce inflammation in the feet of mice or in other words, the negative control (K-) used did not have anti-inflammatory activity. Meanwhile, when given the positive control (K+) using Na. Diclofenac, F1, F2 and F3, it can be seen that the percentage of edema decreased.

Based on the results of the ANOVA test, it shows that the percentage data on inflammation inhibition in the rat's paws shows no significant difference in the percentage results obtained, which is indicated by a sig. (P-value) of 0.110, where this value is > 0.05 and does not meet the requirements of the ANOVA test. The requirement for the ANOVA test is if the data has a significant difference, indicated by a sig. (P-value) < 0.05.

CONCLUSION

Based on the results of the research that has been done, it can be concluded: Ethanol extract of sintrong leaves (Crassocephalum crepidioides) contains secondary metabolites that

are effective as anti-inflammatory such as alkaloids, tannins, flavonoids, saponins. Ethanol extract of sintrong leaves (Crassocephalum crepidioides) has an anti-inflammatory effect with the higher concentration of the formula, the lower the percentage of edema produced. The lowest percentage of edema occurred in F3 (300mg/gBB) with the first checking time of 40.6%, the second checking of 43.9% and the third checking of 45.9%.

Suggestion

It is recommended that future researchers test the effectiveness of sintrong leaves (Crassocephalum crepidioides) as an anti-inflammatory but in the form of pharmaceutical preparations that are used topically, such as ointments, creams or gels.

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