Potency Antiinflammatory Of Ethanol Extract Gel Of Kepok Banana Peel (Musa Balbisiana)

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ORIGINAL ARTICLE

Potency antiinflammatory of ethanol extract gel of Kepok banana peel *(Musa balbisiana)*

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ABSTRACT

Introduction: Inflammation is the body's defense response to foreign invasion, tissue damage or both. Flavonoid compounds have anti-inflammatory activity. One of the traditional medicines is Kepok banana peel *(Musa balbisiana)* contains flavonoids, saponins and triterpenoids. This study aims to determine the effective dose of ethanol extract of kepok banana peel as an anti-inflammatory.

Materials and Methods: Kepok banana peel was macerated using 70% ethanol. The extract is made in the form of a gel formulation because it has a high water content so it can moisturise the skin and spread easily when applied. This research was conducted with 25 male rats in 5 treatment groups. The gel was given 30 minutes after the rats were induced with 0.1 ml of 1% carrageenan. The rat anti-inflammatory test was observed through oedema volume data and the percentage of anti-inflammatory activity. Data analysis used the ANOVA test (p<0.05).

Results: The treatment group had an anti-inflammatory effect which was marked by a significant difference from the negative control group.

Conclusion: The effective dose of ethanol extract gel of kepok banana peel as an anti-inflammatory is 8%.

KEYWORDS:
ethanol extract gel of kepok banana peel; Musa balbisiana; antiinflammatory; medicine

INTRODUCTION

Inflammation is a vascular tissue response to infection and tissue damage by bringing cells and molecules of the body's defenses from the blood circulation to the location needed to eliminate disturbing causes. The mechanism of inflammation is the local reaction of tissues or cells to a stimulus or injury.[1] The many side effects that may be caused by steroid and non-steroidal anti-inflammatory drugs make people tend to turn to traditional medicine using plants that are thought to have antiinflammatory properties.[2] There are several plants that are trusted by the public or empirically can treat inflammation, one of which is kepok banana peel (*Musa balbisiana*).[2,3] Kepok banana peels contain flavonoids, saponins and triterpenoid compounds. The choice of banana peel as a natural ingredient in this study was due to the presence of flavonoid compounds which have potential as antioxidants. In other studies reported that banana peels contain substances that play a role in wound healing, namely saponins and flavonoids.[3] Gels are semisolid systems, which are interpenetrated by a liquid. The advantages of gel preparations are cosmetic features that are attractive to patients, non-sticky, easy to apply and wash off. Besides that, flavonoids have low solubility in water with a short filling time in the small intestine, so gel preparations are made to increase their bioavailability.[4] So that, the researchers wanted to conduct research on the potency antiinflammatory of the ethanol extract gel of kepok banana peel (*Musa balbisiana*).

MATERIALS AND METHODS

Preparation of Kepok Banana Peel Ethanol Extract Gel Formula

The sample used was kepok banana peel (*Musa balbisiana*) obtained from Batu City, East Java, Indonesia. Kepok banana peels that have been dried are blended into a blender until fine powder is formed then the powder is weighed 500 g then a maceration process is carried out with 70% ethanol solvent then evaporation is carried out until a thick extract of kepok banana peel is obtained. Then, it was prepared in a gel formula. The gel preparation formula was made with various concentrations of the ethanol extract of kepok banana peel (*Musa balbisiana*), namely 2%, 4%, and 8%. The negative control is gel base/carbopol. The positive control was anti-inflammatory drugs (diclofenac sodium gel). This research has been approved by the Health Research Ethics Commission, Faculty of Medicine, Universitas Brawijaya.

Anti-inflammatory Test

1% carrageenan was prepared as an induction inflammation.[5] The gel was administered topically. The test was carried out with the rat's right leg inserted into the plesthymometer containing liquid mercury that had been prepared until the liquid rises to the upper limit line, a number is recorded on the tool as the initial volume (Vo), namely the volume of the leg before being given the drug and induced with carrageenan solution. Each paw of the rat was injected with 0.1 ml of 1% carrageenan solution and 30 minutes later, each rat was given a suspension of the test material topically according to the group. Measurements were taken by dipping the right leg of the rat into a plesthysmometer liquid containing liquid mercury until the

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Table I: Gel dosage formula

Composition	Negative Control (K -)	Positive Control (K +)	Extract dose 1	Extract dose 2	Extract dose 3
		Gel Na diclofenac			
Ethanol extract Kepok banana peel	-		2%	4%	8%
Carbopol 940	1%		1%	1%	1%
TEA (Triethanolamine)	3%		3%	3%	3%
Glycerin	10%		10%	10%	10%
Propylene glycol	15%		15%	15%	15%
Aquades	Ad 30 ml		Ad 30 ml	Ad 30 ml	Ad 30 ml

Table II: Antiinflammation percentage

Group	% Antiinflammation
Negative control (n=5)	0
Positive control (n=5)	61.3
Extract dose 2% (n=5)	28.3
Extract dose 4% (n=5)	42.9
Extract dose 8% (n=5)	50.0

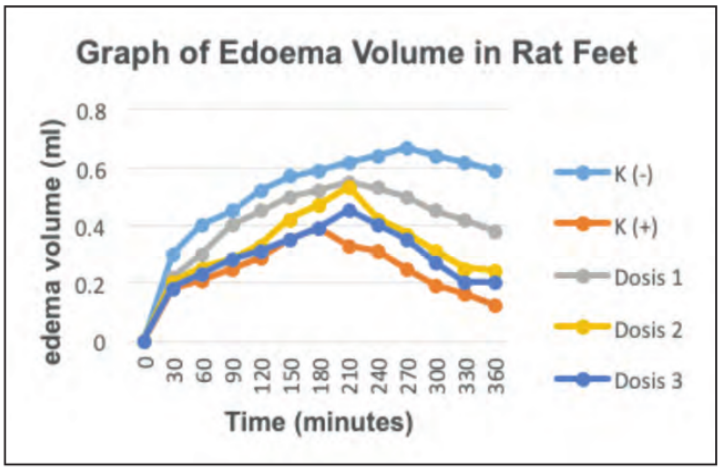

Fig. 1: Graph of Oedema volume in rat feet

solution reached the upper limit of the rat's right leg and recorded the numbers obtained.6 Changes in the inflammatory volume of the rat feet per unit time to administration of banana peel gel were calculated as the percentage of inflammation with the following equation:

$$\% \text{ Anti Inflammation} = \frac{Vt - V0}{Vo} \times 100\%$$

Vt = Inflammatory volume of rat foot per unit time
Vo = Initial Leg Volume of rat

RESULTS

500 g of kepok banana peel simplicia was macerated using 70% ethanol solvent and the results of the viscous extract were 17.5 g and the percent extract yield was 3.48%. The viscous extract obtained was subjected to antiinflammatory testing which was carried out using rats and then divided into five groups with the number of male rats in each group amounting to five rats (Table I). The method that used was an antiinflammatory activity test is plesthysmometer filled with mercury.[7] The oedema values that have been obtained were carried out statistical tests to find out the data that differed significantly between groups. The results of the statistical analysis of each group through normality and homogeneity tests were $p>0.05$, meaning that the data was normally distributed and homogeneous. Then, proceed with the One Way ANOVA test. The results showed that the three dose groups differed significantly from the negative control ($p<0.05$), so that the three dose groups had anti-inflammatory effects. The 2% and 4% doses were not significantly different from the positive control ($p>0.05$) while the 8% dose was significantly different from the positive control group ($p<0.05$).

DISCUSSION

Based on Figure 1, it shows that the volume of oedema in the negative control is the largest volume compared to the positive control group, dose 1, dose 2 and dose 3. The graph above shows that there was a continuous increase in oedema volume from the 30 minutes to the 210 minutes in the positive group, dose 1, dose 2 and dose 3. In the negative control group, the oedema volume still showed the greatest volume until minute 270. Its caused by the release of inflammatory mediators such as prostaglandins, histamine, bradykinin and serotonin in the tissue after being induced by carrageenan. The decrease in the positive control group occurred in the 210 minutes. Dose 1, dose 2, and dose 3 occurred at 240 to 360 minutes. There was inhibition of prostaglandin synthesis into the tissues. So that, the group that can provide an anti-inflammatory effect is the positive control group, dose 1, dose 2, and dose 3, especially at 240 to 360 minutes, whereas the negative control group does not give this effect.

The highest percent antiinflammatory value was the positive control group, which was 61.3%, followed by the 3rd dose group of 50%, and the 2nd dose group of 42,9%, and the 1st dose group of 28.3% percent (Table II). The antiinflammatory closest to the positive control was the dose 3 group that had the most effective potential to inhibit inflammation. The anti-inflammatory effect of the ethanol extract of kepok banana peel is thought to be due to the presence of flavonoid compounds. Flavonoids have anti-inflammatory activity by inhibiting the production of pro-inflammatory cytokines such as IL-1β, IL-6, and TNF-α insilico.[7] Flavonoid compounds also have activity in inhibiting NO production. Nitric oxide (NO) is a gaseous free radical produced by phagocytes, which are equipped with inducible nitric oxide synthase (iNOS), activated by interferon-gamma (IFN-γ) or tumour necrosis factor (TNF). Transforming growth factor-beta (TGF-β) as a strong inhibitor and interleukin-4 (IL-4), IL-10 as a weak inhibitor of iNOS. NO will cause blood vasodilation and inflammation.[5,6,7]

CONCLUSION

Kepok banana peel (Musa balbisiana) ethanol extract gel has anti-inflammatory activity. Kepok banana peel (Musa balbisiana) ethanol extract gel concentration of 8% has anti-inflammatory power by 50%. This research requires further research because it still uses experimental animals as research subjects, so clinical trials are needed in humans to determine the dosage and effectiveness of kepok banana peel as an anti-inflammatory.

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