ANALGETIC ACTIVITY TEST OF ETHANOL EXTRACT OF TAMARIND LEAVES (*Tamarindus Indica L.*) TO MALE MICE OF SWISS STRAIN

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Abstract

Tamarind is a medicinal plant that has benefits as an antiseptic, antipyretic and analgetic (anti-pain). Pain is an unpleasant sensory and emotional experience due to actual or potential damage. The purpose of this study is to determine the optimal analgetic and dosage activity of tamarind leaf ethanol extract on male mice of Swiss strain induced by acetic acid. The method used is analysis of results by observing the amount of stretching of mice every five minutes for an hour. The cumulative amount of stretching in mice is used to calculate the analgetic activity. The activity was obtained from the amount of stretching of mice induced by acetic acid intraperitoneally within 30 minutes after orally induced. Statistical analysis of analgetic data using Kolmogorov-Smirnov normality test, test of homogeneity of variances followed by Anova test and post hoc tests using SPSS 24.0 for Windows. Percent analgesic activity of ethanol extract of leaves tamarind dosage 5%, 10%, 20% were respectively (9,81 ± 2,24)%, (24,68 ± 2,10)% and (36,39 ± 3,06)%. Ethanol extract of leaves tamarind dosage 20% provides the most optimal analgesic activity.

Keywords: tamarind leaves, analgesic

Introduction

Tamarind leaves (*Tamarindus indica* L.) can be used as a cure for fever (antipyretics), pain relievers (analgetic) and antiseptics (Dalimartha, 2006). In previous studies it was stated that the infusion of Asam Jawa (*Tamarindus indica* L.) leaf could be used as an analgetic. Because of the content of flavonoids, the mechanism of flavonoids as an analgetic can inhibit the formation of prostaglandins so as to reduce pain (Sariana, 2011). Pain is an unpleasant sensory and emotional experience due to actual or potential tissue damage. Pain occurs with many disease processes or together with several diagnostic or

treatment examinations (Smeltzer, 2001). Utilization of tamarind leaves is expected to increase productivity value added from tamarind tree (*Tamarindus indica* L.).

Methods

Tool

Analytical scales (Satorius), Waterbath (Local), Blenders (Miyako), oral syringes (Terumo), injection syringes (Terumo), stopwatches.

Material

Glacial Acetic Acid, Acetosal, 70% ethanol, Tamarind Leaves harvested from Nguter Sukoharjo area, Coconut oil and Swiss male mice.

Stages of Research

1. Disappearance Phase

The extraction used a maceration method, with 2000 ml of 70% ethanol and 400 grams of Asam Jawa leaves powder (1: 5). then soaked and covered with plastic. Left for two days protected from the sun, while being stirred repeatedly, after two days, the juice is mixed with a flannel cloth into a glass becker, then the juice is evaporated on the waterbath until all ethanol evaporates.

2. Testing Phase

- Mice are divided into five groups, each consisting of five mice that were previously fasted for 18-24 hours while still being given a drink.
- The negative control group I was given coconut oil (25 ml / kg BW). Group II positive control was given Acetosal (65 mg / kg BW). Group III EEDAJ 20%. Group IV EEDAJ 10%. EEDAJ Group V 5%.
- Providing test preparation for each group orally,
- 30 minutes later the test animals were given acetic acid solution (100 mg / kg BW) intra-peritoneally.
- After that, it was observed and calculated the cumulative number of stretching mice every 5 minutes for 1 hour.
- Pain is characterized by the appearance of abdominal cramps and legs pulled back.
- The analgesic effect test with stretching method is determined by calculating the cumulative amount for 60 minutes

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- Pain is characterized by the appearance of abdominal cramps and legs pulled back.
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3. Data Analysis

The research data in the form of the amount of stretching in each treatment group then calculated the analgetic activity which was expressed as % analgetic activity (% DA) with the following formula:

$$= (\Sigma \text{ stretching k (-) - at stretching test}) / (\Sigma \text{ stretching k (-)}) \times 100\%$$

Information:

At stretching negative control =
number of stretching negative
controls

At stretching test = the amount of
stretching of the test material

Results and Discussion

1. Maseration results

The results of maceration in the form of thick extract as much as 52.94 g with a yield of 13.23% b / b.

2. Analgetic Activity Test Results

Variations in extract dosage used are doses of 5%, 10% and 20%.

Percentage of analgeticactivity from the variation of the extract dose will be compared with the percent of the analgeticactivity of the positive control, namely Acetosol with a dose of 65 mg / kg BW of mice and solvent control, namely coconut oil with a dose of 25 ml / kg BB. Observations were made based on the amount of stretching which is a pain reaction shown by the test animal, the observation was carried out for 1 hour with an interval of observation every 5 minutes.

This study uses Tamarind leaves (*Tamarindusindica L.*) as a test material, because the leaves of AsamJawa have chemical substances that can work to inhibit prostaglandin biosynthesis or pain mediators. Analgetic tests were carried

out because there were not many people who knew that AsamJawa leaves had efficacy as an analgetic. Analgetic is a drug used to reduce or eliminate pain or pain relief medications without eliminating awareness.

The method of extraction used is maceration with 70% solvent, because almost all the compounds in the plant are soluble in ethanol 70% -80% (Fong et al, 1978). 70% ethanol is very effective in producing optimal amounts of active ingredients, where impurity is only on a small scale participating in the extracting liquid (Voight, 1995), besides that 70% Ethanol can easily enter the cell membrane of plant material and has lower toxicity compared with methanol (Tiwari et al, 2011).

Table 1. Effect of Test Preparations on Acetat Acid-Induced Mice Stretching

Treatment	No	Amount of Stretching	Mean $\pm$ SEM (%)	Analgesic Activity (%)	Mean $\pm$ SEM (%)
Coconut Oil Dose 25 ml/kg BB	I	61	63,2 $\pm$ 0,74	0	0
	II	58			
	III	64			
	IV	67			
	V	66			
Acetosol Doe 65 mg/kg BB	I	31	37 $\pm$ 0,44	50,95	41,46 $\pm$ 2,60
	II	38		39,87	
	III	37		41,46	
	IV	38		39,87	
	V	41		35,13	
Ethanol Extract of Tamarind Dose Leaves 20%	I	43	40,2 $\pm$ 0,50	31,96	36,39 $\pm$ 3,06
	II	38		39,87	
	III	35		44,62	
	IV	46		27,22	
	V	39		38,29	
Ethanol Extract of Tamarind Dose Leaves 10%	I	49	47,6 $\pm$ 0,59	22,47	24,68 $\pm$ 2,10
	II	51		19,30	
	III	49		22,47	
	IV	44		30,38	
	V	45		28,80	
Ethanol Extract of Tamarind Dose Leaves 5%	I	53	57 $\pm$ 0,51	16,14	9,81 $\pm$ 2,24
	II	57		9,81	
	III	59		6,65	
	IV	61		3,48	
	V	55		12,97	

Maseration is an extraction which is done by soaking the simplicia powder in the liquid and is the easy and simplest method to do with stirring to speed up the process of extraction. The analgetic method used is a chemical stimulation method, which is induced by acetic acid as a pain stimulator because Acetic Acid causes pain in the tissue so that it can cause stretching in mice as a sign of pain, which is to pull both of its hind legs. Acetic acid that is used is Glacial Acetic Acid, because it has the properties of water soluble, not oxidized and not photosensitized (Parmar and Prakash, 2006).

This study uses mice test animals, because the induction of intraperitoneal chemicals in mice will cause irritation to the stomach and result in stretching effects (Parmar and Prakash, 2006). Mice

also have genes that are similar to humans, have the ability to breed high. In addition, handling for mice is easy, because the small form that causes the drug used is relatively quickly manifested. Mice used are male mice, because they have a stable biological condition than female mice, because they are affected by the estrus cycle or reproductive cycle.

Based on the orientation of acetic acid doses that have been carried out, researchers used acetic acid at a dose of 100 mg / kg BB. The dosage is used based on the consideration of the number of squirming mice caused by mice after induced acetic acid at a dose of 300 mg / kg BB raises too high cumulative stretching. In the orientation of the administration of acetic acid researchers used 30.

Figure 2. Graph of the relationship between time intervals and acetat-induced mouse stretching of mice

Figure 3. Cumulative Amount Stretching Acetic Acid Induced Mice

Coconut oil has the highest average amount of stretching, because coconut oil does not have analgetic activity, then Acetosol has the least amount of stretching because Acetosol has a strong analgetic activity. For the ethanol extract

of Asam Jawa leaves, the smaller the dose, the more stretching is generated and the higher the dose, the less stretching is generated which means that the extract has analgetic activity. This is because the dose of 20% can be absorbed in the

digestive tract more than the dose of 5% or 10%.

Figure 4. Percentage of the Activity of Test Preparation for Mice Induced by Acetic Acid

It can be seen that the average amount of analgetic activity for ethanol extract of Asam Jawa leaves is 20% which is close to positive control (Acetosal) compared to doses of 5% and 10%. This shows that a dose of 20% has an analgetic effect which is more than the dose of 5% and 10%. Because at a dose of 20% contains more active substances than doses of 5% and 10% so that it gives more therapeutic effect.

3. Statistics Test Results

The results of the data obtained from analgetic testing were then statistically analyzed by ANOVA test to find out whether there was a significant difference in the presence or absence of analgetic from the OnewayAnova test, based on the test results the probability value obtained was $0.000 < 0.05$, H_0 was rejected, there was a significant difference between percent of analgetic activity of ethanol extract of Asam Jawa leaves.

Conclusion

Based on the results of the study, ethanol extract of Asam Jawa leaves had analgetic activity against mice. The dose of Ethanol extract of Asam Jawa leaves (EEDAJ) which has the most optimal analgetic activity is at a dose of 20% obtaining an average percent of analgetic activity of $(36.39 \pm 3.06)\%$, because it approaches the average percent

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