
COMPARISON OF ANTI-DIARRHEAL ACTIVITY OF METHANOL AND ETHANOL EXTRACTS OF WATERMELON RIND (*CITRULLUS LANATUS L.*) IN WHITE MICE (*MUSMUSCULUS*)

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ABSTRACT

Watermelon (*Citrulluslanatus L.*) is one of Indonesia's most abundant fruit-producing plants. Watermelon is generally only consumed on the red flesh, while the rind is less desirable so it becomes waste. The purpose of this study was to the comparison of the anti-diarrheal activity of methanol and 70% ethanol extracts of watermelon rind (*Citrulluslanatus L.*) in white mice (*Musmusculus*). This study used a protection method with the induction of MgSO₄ (Magnesium Sulfate) by calculating the frequency of diarrhea, changes in stool consistency, and stool weight. The data obtained from the activity test results of the watermelon rind methanol extracts against white mice were statistically analyzed using the one-way ANOVA test.

Methanolic and 70% ethanolic extracts of watermelon rind (*Citrulluslanatus L.*) contain tannin compounds that have antidiarrheal activity against mice (*Musmusculus*). From the results of the one-way ANOVA test, the weight of feces, the frequency of diarrhea, and the consistency of the stools in the methanol extracts of watermelon rind at a dose of 100 mg/KgBW gave an optimal effect, because the weight of the feces obtained a value of $p = 0.633$, the frequency of diarrhea obtained a value of $p = 0.899$ and the consistency of the feces obtained a value of $p = 0.899$ p -value = 0.525 compared to the positive control (loperamide). Ethanol extracts of *Citrulluslanatus L.* had antidiarrheal effect at a dose of 100 mg/kgBW, 200 mg/kgBW, and 300 mg/kgBW. Based on the results of the One Way ANOVA statistical test, the ethanolic extracts of *Citrulluslanatus L.* had an antidiarrheal effect at a dose of 100 mg/kg BW and the best dose was a dose of 300 mg/kg BW which was significant with the positive control group loperamide P value = 0.000, meaning that the ethanolic extracts of *Citrulluslanatus L.* at a dose of 300 mg/kg BW had almost the same effect as the loperamide positive control group based on the parameters of stool weight, frequency of diarrhea, and stool consistency. From this data, 70% of Ethanolic extracts are better than methanolic extracts for antidiarrheal activity in mice.

Keywords: Antidiarrheal, watermelon rind, magnesium sulfate, diarrhea protection.

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INTRODUCTION

Indonesian people are familiar with various types of medicinal plants and their uses. One of the plants that can be used as traditional medicine is watermelon rind (*Citrulluslanatus L.*) as an herbal treatment for anti-diarrhea.

This study was to compare the antidiarrheal activity of ethanolic and methanol extracts of watermelon rind (*Citrulluslanatus L.*) in white mice

(*Musmusculus*) and to determine at what dose the ethanol and methanol extracts of watermelon rind (*Citrulluslanatus L.*) gave antidiarrheal activity in white mice (*Musmusculus*).

The tannin content in the extracts is thought to have an antidiarrheal effect, so it is necessary to carry out an antidiarrheal test to find out how much antidiarrheal activity the two extracts have.

MATERIALS AND METHODS

The Comparison of the anti-diarrheal effectiveness of ethanolic and methanolic extracts of watermelon rind was carried out using the diarrhea protection method by inducing magnesium sulfate in white mice orally using an oral probe.

After 1 hour of administration of magnesium sulfate, the negative control group was treated with CMC, the positive control was given loperamide and ethanol, and methanol extracts of watermelon rind with doses of 100 mg/kgBW, 200 and 300 mg/kgBW.

The parameters observed were the weight of the stool, the frequency of diarrhea, and the consistency of the stool.

All of these data were then compared using the one-way ANOVA statistical test.

a. Materials

- Mice
- Watermelon Peel Extracts
- Magnesium Sulphate
- Methanol
- Na-CMC 0.5%
- FeCl₃1%
- Loperamide Tablets
- Aquadest

b. Method

Making Simplicia. The watermelon is cut into pieces and separated between the flesh and the cortex, then the cortex of the fruit is washed with clean water. The cortex of the fruit is cut into small pieces, dried by aerating for 5 days, then powdered with a blender. The finished powder is used for extraction (Muthia, 2017).

Manufacture of Watermelon Peel Methanol Extracts. The manufacture of watermelon rind extracts in this study used the maceration method. Watermelon rind that has become powder is macerated using methanol as a solvent. Maceration extraction was carried out with a sample and solvent ratio of 1:10 for 3x 24 hours.

Weigh 100 g of watermelon rind powder, then soak it with 1000 ml of methanol in a maceration vessel. Simplicia was macerated for 3x 24 hours, stirring

occasionally, and protected from sunlight. The finished macerate was filtered using a funnel, then concentrated using a rotary evaporator, and then evaporated over a water bath.

Preparation of Watermelon peel methanol and ethanol extracts suspension Weigh 50, 100, and 200 mg extracts of watermelon rind, then put it in a stamper mortar and add 0.5% Na-CMC suspension little by little, grind until homogeneous. The suspension is then put in a measuring flask, making sure the volume is up to 10 ml.

Preparation of 0.5% w/v. Na-CMC Suspension. Weighed 500 mg Na-CMC sprinkled in a mortar stamper containing hot aqua-dest. Let stand for 15 minutes then ground until homogeneous, diluted with distilled water, and put in a volumetric flask to make up to 100 ml.

Preparation of Loperamide Suspension. Take 2 loperamide tablets and grind them until smooth, then put them in a 100 ml Erlenmeyer, then add about 50 ml of aqua-dest, shake until homogeneous, and then make up the volume to 100 ml.

Tannin Test. Take 2 ml of ethanol extracts of watermelon rind heated for 5 minutes then add 3 drops of 1% FeCl₃ if the solution turns blackish green, the extracts are positive for tannins.

Preparation of Test Animals. The experimental animals used in this study were 25 mice weighing 20-30 g which were then divided into 5 groups. Each group consisted of 5 mice (*Musmusculus*).before the experiment the mice were adapted to the research environment for one week (Linda et al., 2013).

RESULT

Methanolic and ethanol extracts of watermelon rind (*Citruluslanatus L.*) contain tannin compounds that have antidiarrheal activity against mice (*Musmusculus*). From the results of the one-way ANOVA test, the weight of feces, the frequency of diarrhea, and the consistency of the stools in the methanol extracts of watermelon rind at a dose of 100 mg/KgBW gave an optimal

effect, because the weight of the feces obtained a value of $p = 0.633$, the frequency of diarrhea obtained a value of $p = 0.899$ and the consistency of the feces obtained a value of $p = 0.899$ p -value = 0.525 compared to the positive control (loperamide). Ethanol extracts of *Citrulluslanatus* L. had antidiarrheal effect at a dose of 100 mg/kgBW, 200 mg/kgBW, and 300 mg/kgBW.

Table 1.1 Fees WeightExctrat Watermelon Cortex with Ethanol

Group	n	Mean±SD
Negative	5	0.2092±0.02932
Positive	5	0.1006±0.00856
EEKBS 100mg/kgBW	5	0.1798±0.2125
EEKBS 200mg/kgBW	5	0.1586±0.01831
EEKBS 300mg/kgBW	5	0.1286±0.01422

Table 1.2 DiarrheaFrequency Extracts Watermelon Cortex with Ethanol

Group	n	Mean±SD
Negative	5	120000±1.58114
Positive	5	5.0000±0.70711
EEKBS 100mg/kgBB	5	10.0000±1.00000
EEKBS 200mg/kgBB	5	8.4000±0.74833
EEKBS 300mg/kgBB	5	0.8366±0.37417

Table 1.3 Diarrhea Consistency Extracts Watermelon Cortex with Ethanol

Group	n	Mean±SD
Negative	5	3.0000±0.00000
Positive	5	1.2000±0.44721
EEKBS100mg/kgBB	5	2.4000±0.54772
EEKBS 200mg/kgBB	5	2.0000±0.00000
EEKBS 300mg/kgBB	5	1.4000±0.54772

Table 1.4 Fees Weight Exctrat Watermelon Cortex with Methanol

Group	n	Mean±SD
Negative	5	0.2054±0.06686
Positive	5	0.0934±0.01518
EMKBS50mg/kgBB	5	0.2160±0.02904
EMKBS 100mg/kgBB	5	0.1236±0.02508
EMKBS 200mg/kgBB	5	0.1110±0.00505

Table 1.5 DiarrheaFrequency Extracts Watermelon Cortex with Methanol

Group	n	Mean±SD
Negative	5	13.4000±2.70185
Positive	5	5.4000±0.54772
EEKBS 50mg/kgBB	5	10.2000±1.09545
EEKBS 100mg/kgBB	5	6.2000±1.09545
EEKBS 200mg/kgBB	5	5.8000±0.44721

Table 1.6 Diarrhea Consistency Extracts Watermelon Cortex with Methanol

Group	n	Mean±SD
Negative	5	1.2000±0.44721
Positive	5	3.0000±0.0000
EMKBS50mg/kgBB	5	2.0000±0.0000
EMKBS 100mg/kgBB	5	1.6000±0.54772
EMKBS 200mg/kgBB	5	1.4000±0.54772

Based on the results of the One Way ANOVA statistical test, the ethanolic extracts of *Citrulluslanatus* L. had an antidiarrheal effect at a dose of 100 mg/kgBW and the best dose was a dose of 300 mg/kgBW which was significant with the positive control group loperamide p -value = 0.000, meaning that the ethanolic extracts of *Citrulluslanatus* L. at a dose of 300 mg/kg BW had almost the same effect as the loperamide positive control group based on the parameters of stool weight, frequency of diarrhea, and stool consistency. From this data, 70% of Ethanolic extracts are better than methanolic extracts for antidiarrheal activity in mice.

Methanolic and 70% ethanolic extracts of watermelon rind (*Citruluslanatus* L.) contain tannin compounds that have antidiarrheal activity against mice (*Musmusculus*). From the results of the one-way ANOVA test, the weight of feces, the frequency of diarrhea, and the consistency of the stools in the methanol extracts of watermelon rind at a dose of 100 mg/KgBW gave an optimal effect, because the weight of the feces obtained a value of $p = 0.633$, the frequency of diarrhea obtained a value of $p = 0.899$ and the consistency of the feces obtained a value of $p = 0.899$ p -value = 0.525 compared to the positive control (loperamide). Ethanol extracts of

Citrulluslanatus L. had antidiarrheal effect at a dose of 100 mg/kgBW, 200 mg/kgBW, and 300 mg/kgBW. Based on the results of the One Way Anova statistical test, the ethanolic extracts of *Citrulluslanatus L.* had an antidiarrheal effect at a dose of 100 mg/kgBW and the best dose was a dose of 300 mg/kgBW which was significant with the positive control group loperamide p -value = 0.000, meaning that the ethanolic extracts of *Citrulluslanatus L.* at a dose of 300 mg/kg BW had almost the same effect as the loperamide positive control group based on the parameters of stool weight, frequency of diarrhea, and stool consistency. From this data, 70% of Ethanolicextracts are better than methanolicextracts for antidiarrheal activity in mice.

DISCUSSION

In this protection method, magnesium sulfate is used as an inducer of diarrhea because the magnesium sulfate given can increase stool liquidity and increase intraluminal peristalsis so that it can induce defecation. Magnesium sulfate is given orally.

The effectiveness of antidiarrheal was determined by observing the weight of the stool, the frequency of diarrhea, and the consistency of the mice's feces after administration of the test compound compared to the administration without the antidiarrheal compound (negative control group).

Observation of fecal weight in mice began with the administration of magnesium sulfate by observing the consistency, and frequency of feces and weighing the weight of the feces every 30 minutes for 1 hour, after that giving the test compound for 4 hours with 30-minute intervals by weighing the weight of the feces.

From the stool weight data, it was found that there was a decrease in fecal expenditure. In mice that were given CMC as a negative control, 0.2054 grams of feces passed, positive control as a comparison was 0.0934 grams, watermelon rind methanol extract dose of 50 mg/kgBBs was 0.216

grams, watermelon peel methanol extract was 100 mg/kgBW as much as 0.118 grams, watermelon rind methanol extract dose of 200 mg/kgBW as much as 0.111 grams.

From the data on the frequency of diarrhea, there is a decrease in the frequency, this is also a sign of healing diarrhea. From the observation, it was found that the highest frequency of diarrhea was in the negative control group (CMC) as much as 67 times, this was because the negative control did not contain active substances that could reduce fecal expenditure and reduce the frequency of diarrhea. The results showed that the lowest frequency of diarrhea occurred when loperamide was given as a comparison (positive control) 27 times, followed by watermelon rind methanol extract at a dose of 50 mg/kgBW 51 times, 100 mg/kgBW 31 times, 200 mg/kgBW 27 times. time.

From the stool consistency data, it can be seen from the number that often appears in the positive control, the number that often appears is the number 1 which means solid feces, in the negative control the number that often appears is the number 3 which means the stool is soft liquid, in the methanol extract of watermelon rind the dose is 50 mg./kgBW the number that often appears is 2 solid soft, at a dose of 100mg/kgBB the number that often appears is 2 which means solid mushy stool, at a dose of 200mg/kgBB the number that often appears is 1 which means solid stool.

Based on the results of the research that has been analyzed, the research can be concluded that:

Methanol and ethanol extract of watermelon rind (*Citrulluslanatus L.*) contain tannin compounds that have antidiarrheal activity against mice (*Musmusculus*).

From the results of the one-way ANOVA test, stool weight, frequency of diarrhea, and stool consistency in methanol and ethanol extracts of watermelon rind at a dose of 100 mg/KgBW gave an optimal effect, because the weight of feces obtained a p -value of 0.633, the frequency of diarrhea obtained a p -value of 0.899 and consistency

feces obtained p-value = 0,525 compared to positive control (loperamide).

CONCLUSION

More optimal results were shown by the ethanol extracts compared to the methanol extracts.

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