

Effectiveness Test of Akar Kucing Plant Extract (*Acalypha indica* Linn.) To Lower Total Cholesterol Levels in Rats (*Rattus novergicus*) which Were Induced with a Hypercholesterolemic Diet

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Abstract—This research aims to determine the effect of ethanol extract of *Acalypha indica* Linn on the total cholesterol levels of rats that were induced with pork oil. This was an experimental research study. The 20 rats were divided into five groups. Each group consisted of four rats. The groups were 1) positive control, 2) negative control, 3) extract dose of 200 mg/kgBW, 4) extract dose of 400 mg/kgBW and 5) extract dose of 800 mg/kgBW. Groups two to five were given pork oil as a hypercholesterolemia diet for 28 days and then given the appropriate treatment based on the group. The results showed that 1) the average total cholesterol level increased after the administration of pork oil from 160 mg/dL to 232 mg/dL, 2) dose of 200 mg/kgBW, 400 mg/kgBW and 800 mg/kgBW showed a decline in the total cholesterol level by 189 mg/dl, 128 mg/dl, and 177 mg/dl. The research concluded that *Acalypha indica* Linn. extract at a dose of 200 mg/kgBW, 400 mg/kgBW and 800 mg/kgBW has an effect in relation to lowering the cholesterol level of rats which had been induced with pork oil.

Keywords—*Acalypha indica* Linn.; total cholesterol; hypercholesterolemia

I. INTRODUCTION

Cholesterol is an important component in the animal body. Irregularities in cholesterol in animals are often found as a result of the consumption of feed sourced from MBM (Meat Bone Meal) or other feed containing high fat (Adam, 2009). If the accumulation of cholesterol in the body is quite high, it will lead to coronary heart disease. According to the WHO in 2005, coronary heart disease in Indonesia increased to 23.12% (WHO, 2002). In Indonesia, morbidity and mortality from coronary heart disease has increased with the prevalence reaching 50% (Sulastomo, 2010).

Indonesia is located in a tropical area. Indonesia has diverse natural resources that can be utilised for human needs including treatment. Much of the research on medicinal plants has been done scientifically in the modern medical world as it is today. The results of the study support that many plants have efficacious compounds or substances that are clinically proven to benefit health (Josep and Pizzaro, 2012).

Akar kucing is one of the plants that contains good nutritional compounds such as saponins and flavonoids. This plant has a good effect on blood circulation. The compounds in it have the benefit of emulsifying cholesterol which can lead to hypertension. Akar kucing is also useful in stimulating the digestion process (Jawi and Budiasa, 2011).

Previous research has shown that akar kucing reduces hypoglycaemia, and is an anti-diabetic, anti-oxidant, anti-AGE (Duke, 2010). Based on that data, the researchers are interested in conducting a study on the effect of ethanol extract of akar kucing (*Acalypha indica* Linn.) on the total cholesterol level of rats (*Rattus novergicus*) which were fed a high-fat diet.

II. OBJECTIVES

This research aims to determine the effect of ethanol extract of *Acalypha indica* Linn on the total cholesterol levels of rats that were induced with pork oil.

III. RESEACH METHODS

A. Tools and materials

The tools necessary to test the samples were a mouse cage along with the feeding and drinking tools, and a pedestal

enclosure as well as 5 cc syringes, sonde, disposable hand gloves, and a few small pots of akar kucing plant extract (*Acalypha indica Linn.*) in accordance with the dosage.

The tools required in manufacturing the extracts of akar kucing (*Acalypha indica Linn*) were weighing ohaus, a blender, sieve mesh size of 100, beaker glass, measuring cups, plastic basin, glass jar, funnel, funnel glass, stir bar, rotary evaporator, erlenmeyer flask, porcelain cup, vacuum pump, and filter Buchner.

The tools used for the blood sampling were sterile scissors. The tool used to measure the levels of total blood cholesterol were an Easy touch GCU Multi Function Monitoring System (Analyser). The sample population of this study were 20 four to five male rats (*Rattus novergicus*) with an average body weight of 200g. The samples were obtained from Pusat Veterinaria Farma, in Surabaya.

The material of the research was akar kucing plants (*Acalypha indica Linn*) which were obtained from a mosque on Asemrowo Street, Surabaya. A necessary ingredient in manufacturing the akar kucing (*Acalypha indica Linn*) extract was 96% ethanol. Additionally, sterile distilled water and CMC Na 0,5% were used to dissolve the akar kucing (*Acalypha indica Linn*) plant extract. The rats were given drinking water (ad libitum) and chicken feed pellets (Pt. Charien Pokphan Surabaya).

Other ingredients were high-fat feed, which for this study, the researchers used lard heated to form the oil obtained from the RPH Penggirikan Surabaya, and this was the main ingredient in the rat’s blood samples.

B. High-fat feeding

High-fat feeding was performed for 28 days after the adaptation process which was done over seven days. High-fat feed was given in a form of lard with a dose of 1ml/day orally using sonde and drinking water ad libitum (Merisa, 2011). The impact of the lard was observed after a period of adaptation from the 7th to the 28th day of treatment.

C. Giving Therapeutic of Akar Kucing Extract

The giving of akar kucing (*Acalypha indica Linn.*) extract was conducted for 14 days after and during the giving of high-fat feed after adaptation. Each dose of akar kucing extract was dissolved in CMC-na and given as much as 1ml/oral/day to the three treatment groups. The influence of akar kucing extract was observed and checked based on the total cholesterol levels at day 36.

D. Sampling and examining total blood cholesterol levels

Blood sampling was performed on the tail vein of the rats (V. Lateralais tail). The rats were handled (for ease of treatment) for blood sampling via the tail. The rat's tail was cut 0.2 cm from the base of the tail using sterile scissors. A direct blood cholesterol check strip was inserted in to the

Glucose Monitoring Analyser System (One Med). The cholesterol level then showed on the instrument.

E. Data Analysis

The data which had been obtained was analysed by ANOVA (Analysis of Variant) tests and advanced tukey tests using the software program SPSS (Statistics Product and Service Solution) version 23.

IV. RESULTS AND DISCUSSION

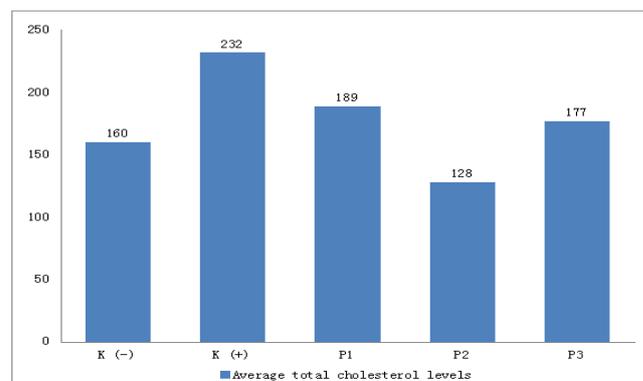
A. Total cholesterol

The comparison of the mean cholesterol levels total between those that were not fed a high-fat diet (lard/pork oil) (160.2500 ± 13.04799) and those that were fed a high-fat diet (lard) for 28 days on day 7 to day 35 ($232, 0000 \pm 41.10961$) shows the result of a significant difference with a significance level of 95% or ($p < 0.005$).

A comparison of the mean cholesterol levels in the rats which were fed a high-fat diet only with the high-fat and akar kucing extract therapy in the first treatment stage that is given a dose of 200 mg/kg bw/day extract of the akar kucing ($\pm 189.5000 17.48333$) showed in the results that there was a real difference with a significance level of 95% or ($p < 0.005$), whereas the second dose of 400 mg / kg bw / day showed the average total cholesterol level ($\pm 128.2500 25.57831$). The results also show the results with a real difference with a significance level of 95% ($p < 0.005$). The average cholesterol levels in all three treatment groups with the group fed the high-fat without the akar kucing extract ($\pm 177.7500 32.90770$) shows the result of a significant difference with a significance level of 95% or ($p < 0.005$).

TABLE I. MEAN ± STANDARD DEVIATION CHOLESTEROL LEVELS OF RAT IN ALL TREATMENT GROUP

Treatment	Mean ± standard deviation cholesterol levels
K (+)	160,2500 ± 13,04799
K (-)	232,0000 ± 41,10961
P1	189,5000 ± 17,48333
P2	128,2500 ± 25,57831
P3	177,7500 ± 32,90770



PICTURE 1 - Average total cholesterol level of rat in all treatment group

The normal cholesterol level of rats is 10-54 mg/dl (Wahyu et al, 2015), thus, giving the akar kucing extract at dose of 400 mg/kg bw/day resulted in the lowering of the cholesterol level total to normal.

The rat's blood cholesterol level ≥ 130 mg/dl is categorised as hypercholesterolemia (Herpandi et al, 2006). This means that the addition of cholesterol as much as 1ml pig oil has been able to increase the blood cholesterol levels of the rats.

Giving an akar kucing extract at a dose of 200 mg/kg bw/day, 400 mg/kg bw/day and 800mg/kg/day has the effect of lowering the rat's total cholesterol levels. The akar kucing plant extract contains active ingredients such as saponins and flavonoids that can lower the rat's total cholesterol level. Saponins work as a surface emulsifier for cholesterol while flavonoids are antioxidants, which can dispose of the materials that are not needed by the body. Previous research studies stated that the saponins and flavonoids contained in guava leaf extract can lower the total cholesterol levels in Wistar strain rats which were fed using high-fat feed (Zou et al., 2005).

V. CONCLUSION

Based on this research, it can be concluded that the extract of akar kucing (*Acalypha indica* Linn.) with a dose of 400 mg/kg bw/day has an effect in lowering the rats' total cholesterol level.

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