

ANTIDIABETIC EFFECT TEST OF
ETHYL ACETATE FRACTION
ETHANOL EXTRACT OF
ABELMOSCHUS MANIHOT L
MEDIK LEAVES IN
STREPTOZOTOCIN-INDUCED
RATS (*Rattusnorvegicus*)

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ANTIDIABETIC EFFECT TEST OF ETHYL ACETATE FRACTION ETHANOL EXTRACT OF ABELMOSCHUS MANIHOT L MEDIK LEAVES IN STREPTOZOTOCIN-INDUCED RATS (*Rattusnorvegicus*)

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ABSTRACT

Abelmoschus manihot (L.) Medik is one of the vegetation species commonly consumed by North Sulawesi people as vegetable and is believed useful to cure several diseases, such as cholesterol, hypertension and diabetes. One of the chemical contents of its leaves is flavonoid, widely used to treat diabetes. The aim of this research is to identify the effect of ethyl acetate fraction ethanol extract of *Abelmoschus manihot* L Medik in Streptozotocin-induced rats (*Rattusnorvegicus*).

This is an experimental research with Pretest and Posttest Control Group Design. Animals used in this research were rats, divided into 5 treatment groups, the negative control, positive control, and groups of ethyl acetate fraction of ethanol extract of *Abelmoschus manihot* leaves 1.2%, 1.8% and 2.4%. Each group consists of 5 tested rats. Before being treated, the tested rats were induced diabetes by injecting Streptozotocin intraperitoneally. Then, blood sugar levels were measured on the 7th, 14th and 21st day.

The results show that fraction of ethyl acetate ethanol extract of *Abelmoschus manihot* (L.) Medik leaves has antidiabetic effect, signified with the reduction of blood glucose levels in the tested rats.

Keywords: Antidiabetic, Ethyl Acetate Fraction, *Abelmoschus manihot* (L.) Medik

INTRODUCTION

Based on the data from World Health Organization (WHO), Indonesia ranks the 4th largest number of people with Diabetes Mellitus in the world. The latest estimation of the International Diabetes Federation (IDF), there are 382 million people living with Diabetes in the world in 2013. By 2035, this number is going to increase to 592 million people (Ministry of Health RI, 2014).

Diabetes Mellitus disease can be treated with medicinal plants that can overcome Diabetes Mellitus (Sabella, 2010). One of the plants used as a drug for Diabetes

is Red Gedi (*Abelmoschus manihot* (L.) Medical).

Red Gedi Plants (*Abelmoschus manihot* (L.) Medik) is one type of plant that has long been used by people in North Sulawesi (Sulawesi) as vegetable and is believed to have properties to cure some diseases, such as lowering plasma cholesterol levels, cure appendicitis, launching the baby's birth, hypertension and diabetes (Prawira et al, 2015; South et al., 2013).

Based on the above background, the researcher is interested to do research on antidiabetic effect test of ethyl acetate

fraction of ethanol extract of Gedi Merah leaf (*Abelmoschus manihot* L. Medik) in Streptozotocin-induced rat (*rattus norvegicus*).

RESEARCH PURPOSES

To determine the antidiabetic effect of ethyl acetate fraction of ethanol extract of Gedi Merah leaf (*Abelmoschus manihot* L. Medik) in Streptozotocin-induced rat (*rattus norvegicus*).

METHODS

Type of research used is experimental research in laboratory with Pre-test/Post-test with Control Group design.

Sample

The sample is *Abelmoschus manihot* L. Medik leaves

Sample Processing

Abelmoschus manihot L. Medik leaves taken then washed under clean running water. After that, they were air dried without direct sunlight then ground using a grinder.

Test Procedure

- a. Selection of tested animals
 1. Blood sugar level of the tested animals was measured before the treatment (t₀).
 2. Furthermore, the tested animal was induced with Streptozotocin 50 mg / kg BW intra peritoneal (i.p).
 3. After the third day (day 3), blood sugar (t₀) is again measured. (Yuda et al, 2013).
- b. Tested animal treatment
 1. Tested group I: The negative control group was given 1% Na CMC oral

treatment suspension of 2.5 mL / 200 g BB white rat.

2. Tested group II: The positive control group of white rat was given oral treatment of Glibenklamid suspension of 2.5 mL / 200 g BB.
 3. Tested group III: Given the treatment of oral suspension of the ethyl acetate fraction of ethanol extract of Gedi Merah leaf 1.2% concentration as much as 2.5 mL / 200 g BB.
 4. Tested group IV: Given the treatment of oral suspension of ethyl acetate fraction of ethanol extract of Gedi Merah leaf 1.8% concentration as much as 2.5 mL / 200 g BB.
 5. Tested group V: Given the treatment of oral suspension of the ethyl acetate fraction of ethanol extract of Gedi Merah leaf 2.4% concentration of 2.5 mL / 200 g BB.
- c. Treatment in the tested groups was performed twice daily from day 3 to the last day (21st), blood glucose levels were measured on day 7 (t₁), 14 (t₂) and 21 (t₃) and recorded blood glucose levels of the rats (Yuda et al, 2013).

RESULTS

The results of antidiabetic effect of ethyl acetate fraction of ethanol extract of Gedi Merah leaf (*Abelmoschus manihot* L. Medik) concerning data of obtained blood glucose level is as follow:

Table 1. Results of Rats blood glucose level Measurement Before and After Treatment

Treatment Group	Tested Animal No.	blood glucose level (mg/dl)				
		t _a	t _i	t ₁	t ₂	t ₃
Negative Control Na CMC	1	79,00	436,00	343,00	322,00	421,00
	2	64,00	249,00	334,00	386,00	398,00
	3	67,00	308,00	417,00	405,00	128,00
	4	70,00	331,00	364,67	371,00	315,67
	5	68,00	383,00	540,00	368,00	319,00
	average	60,00	394,00	470,00	406,00	381,00
Positive Control Glibenclamid	1	58,00	406,00	568,00	383,00	332,00
	2	62,00	394,33	526,00	385,67	344,00
	3	72,00	540,00	533,00	221,00	142,00
	4	67,00	235,00	456,00	406,00	175,00
	5	80,00	362,00	463,00	417,00	241,00
	average	73,00	379,00	484,00	348,00	186,00
Leaves Infusion 10 %	1	85,00	436,00	543,00	308,00	294,00
	2	43,00	406,00	424,00	297,00	234,00
	3	36,00	60,00	339,00	299,00	175,00
	4	54,67	300,67	435,33	301,33	234,33
	5	39,00	424,00	436,00	197,00	81,00
	average	68,00	406,00	550,00	322,00	224,00
		80,00	214,00	352,00	334,00	152,00
		62,33	348,00	446,00	284,33	152,33

Information :

t_a: the initial blood glucose levels of rats
 t_i: blood glucose levels after induction with pepton 10%
 t₁: blood glucose levels after 7th day treatment

t₂: blood glucose levels after 14th day treatment
 t₃: blood glucose levels after 21st day treatment

Data of blood glucose levels is illustrated on Figure 1 below

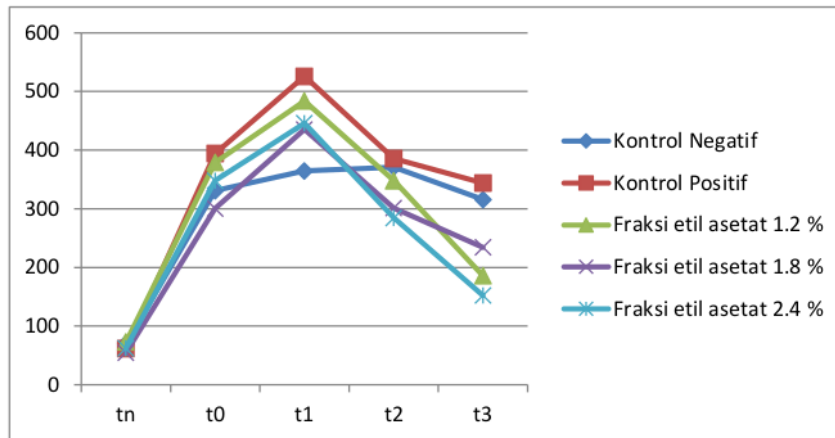


Figure 1. Graphics of the Rats' blood glucose level Measurement Before and After Treatment

All the treatment groups were induced with Streptozotocin resulting in elevated blood sugar levels. Streptozotocin is used because it forms highly reactive free radicals that can cause damage to cell membranes, proteins and deoxyribonucleic acid (DNA) resulting in impaired insulin production by Langerhans pancreatic beta cells (Wilson and Ledoux, 1989).

Based on the observations during the antidiabetic test of ethyl acetate fraction of ethanol extract of Gedi Merah leaf (*Abelmoschus manihot* L Medik) on Streptozotocin-induced rats (*Rattus norvegicus*), in Figure 1 shows that ethyl acetate fraction of ethanol extract of Gedi Merah leaves can increase blood sugar levels on day 7th (t1) and decreased on day 14th (t2) until day 21st (t3).

Decrease in blood sugar levels in tested animal due to the flavonoids in Red Gedi is widely used in the treatment of Diabetes

Mellitus. Time of observation and concentration can also affect the effects of blood sugar levels, it may take longer observation time and more precise concentration so that the effect of blood sugar level is better.

CONCLUSION

Based on the result of the research, it is concluded that ethyl acetate fraction of ethanol extract of Gedi Merah leaves (*Abelmoschus manihot* L Medik) has antidiabetic effect on decreasing blood sugar level in white rat (*Rattus norvegicus*)

SUGGESTION

The researchers suggest to conduct further research on the effect of ethyl acetate fraction of ethanol extract of Gedi Merah leaves on blood glucose level in white rats by increasing the treatment time.

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