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Characterization Simplisia and Ethanolic Extract of Pirdot (*Saurauia Vulcani*, Korth) Leaves and Study of Antidiabetic Effect in Alloxan Induced Diabetic Mice

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Abstract: Pirdot (*Saurauia vulcani,* Korth) is a species of Actinidiaceae, has been used to treat diabetes mellitus traditionally and empirically gives satisfactory results. The purpose of this study are to study antidiabetic effect of ethanolic extract of *Saurauia vulcani* Korth leaves.

Saurauia vulcani Korth leaves. This Research also testing antidiabetic activity of *Saurauia vulcani* Korth leaves ethanolic extract, performed antidiabetic effect on white male mice with alloxan induction method

The results simplisia characterization and ethanol extracts obtained water content of 6.65% and 7.25% respectively; water soluble extract was 23.55% and 64.25% respectively. Levels of ethanol soluble extract was 20.32% and 66.45% respectively. Total ash content was 4.01% and 0.60% respectively. Acid insoluble ash content was 0.88% and 0.48% respectively. Phytochemical screening of simplisia and ethanol extract are the same, both showed the presence of flavonoid, glycosides, saponins, tannins and steroids / triterpenoids,. Ethanolic extract of *Saurauia vulcani* Korth leaves shows good results as antidiabetic effect, indicated by significant depletion of blood glucose level in alloxan induced diabetic mice for ten days. Blood glucose level reduce 55.11%, with ethanolic extract of *Saurauia vulcani* Korth leaves 200 mg / kg body weight, compare with metformin 50 mg / kg body weight only show blood glucose level reduce 47.76%.

Based on the analysis it can be concluded that the ethanolic extract of *Saurauia vulcani* Korth leaves have an antidiabetic effect.

Keywords: *Saurauia vulcani* Korth alloxan, antidiabetic.

Introduction

Diabetes mellitus (DM) is a heterogeneous syndrome which symptoms are characterized by elevated blood glucose levels caused by a relative or absolute insulin deficiency. Diabetes mellitus is one of the degenerative diseases that are harmful, even including disease classified as high risk because it can cause death so it is also called the silent killer [3; 4]. According to the survey of the WHO in 2008 in the world an estimated 180 million people with diabetes and in 2030 an estimated 360 million people suffer from diabetes. [21]. Indonesia is the fourth order of the world where the prevalence of diabetic patients with diabetes every year 8.6% of the total population, so in 2025, people with diabetes is expected to increase by 12.4 million people. Indonesia is a mega-biodiversity flashlight world and occupied the country second only to Brazil. In Indonesia, which lived about 40,000 species of plants Spermatophyta, which of all the plant species, estimated at least 9600 kinds of medicinal plants and approximately 300 species that have been used as traditional medicine [2; 10]. In today's modern age of plant remains one of the sources of drugs, both used in the form of herbs, extracts and

isolation results in the form of pure compounds. There is an assumption drugs derived from herbs are not air-threatening risk patients, whereas modern medicines sometimes dangerous to health because of the side effects are not expected, let alone used in a long time as the disease-chronic degenerative diseases. World Health Organization (WHO), informs that the plant was the best source of drugs and based survey ever conducted about 80% of world population uses traditional medicines derived from plants. The use of traditional herbal preparations for the treatment of degenerative diseases is growing rapidly and getting closer to the community [2; 10; 14]. One of the degenerative disease is diabetes whose treatment requires a long time, even during life. The study of natural ingredients that have the potential to be developed as an antidiabetic from upstream to downstream to the treatment of diabetes is to completion. The use of herbs as medicine in Indonesia has been done for generations and are impiris showed satisfactory results, so it is relatively safe to use. One of antidiabetic plants that have been used traditionally by community namely pirdot (*Saurauia vulcani*, Korth). The plants is traditionally used widely by people around the Lake Toba for the treatment of diabetes as an alternative medicine and empirically give satisfactory results, due to the above research conducted the test potential, antidiabetic efficacy of plant pirdot (*Saurauia vulcani*, Korth) pharmacologically. This study includes the preparation of simplicia extraction of smplicia using ethanol andantidiabetic testing was to test the effect of a decrease in blood glucose levels (BGL) on white male mice Swiss-Webster strain induced by alloxan. [12; 13; 16].

Materials and Methods

The materials used in this study were *Saurauia vulcani*, Korth leaves. The chemicals used unless otherwise stated is a pro analysis quality, namely: α-naphthol, alloxan, ammonium hydroxide, acetic acid anhydride, concentrated acetic acid, concentrated hydrochloric acid, nitric acid, sulfuric acid, benzene, iron (III) chloride, bismuth (III) nitrate, sodium CMC, chloroform, ethanol, ether, iodine, isopropanol, potassium iodide, chloroform, methanol, sodium hydroxide, sodium sulfate anhydrous, petroleum ether, mercury (II) chloride, magnesium powder, zink powder, lead (II) acetate, toluene and distilled water [7]

The method used is the determination of blood glucose levels white male mice Swiss-Webster strain by induction of alloxan method[8; 9; 11; 18].

Sampling

Collection of plant samples was done purposively without comparing with the same plants from other regions. The samples used were Pirdot (*Saurauia vulcani*, Korth). leaves taken from the village of Parapat, Simalungun, North Sumatra Province [1; 10; 20]

Identification of Samples

Plant identification pirdot (*Saurauia vulcani*, Korth). was done in Bogoriense Herbarium, LIPI, Jakarta Indonesia.

Determination of Chemical Compounds

Determination of chemical compounds leaves extract pirdot includes examining group alkaloids, flavonoids, glycosides, anthraquinone glycosides, saponins, tannins, cyanogenic glycosides and triterpenoid / steroid [7; 15].

Extraction

Extraction was conducted with ethanolby maceration method. Macerate obtained was evaporated by using rotary evaporator at a temperature 40°C, then the extract was dried by freeze dryer [10; 17; 20].

Animals Preparation

The animals used in this study are white male mice Swiss-Webster strain, weighing 25-35 grams. Before the experiment, mice were maintained during the first 2 weeks in a cage that is good for adjusting environment, 12 hour light and 12 hour dark [9; 11; 16; 18; 21].

Preparation of Extract suspension and Alloxan Solution

Suspension of extract ethanol was prepared by using1.0% CMC-Na in certain concentration. Alloksan solution was prepared by dissolving alloxan in cold 0.9% NaCl solution.

Preparation of Alloxan Induced Diabetic Mice

The mice were induced with alloxan solution 200mg/kg bw intraperitonial (ip). Blood glucose level of the mice was measured on the third and the seventh day. On the seventh day, mice that have blood glucose level higher than 200 mg / dl were separated and used as animals test. The animals which blood glucose level lower than 200 mg / dl were induced again with alloxan. Mice were expressed hyperglycemia if their blood glucose levels on the thirth day greater than or equal to 200 mg / dl. The amimal (mice) is ready to be tested [5; 6; 8; 12].

Study of Antidiabetic Effect

Study of antidiabetic effect of ethanolic extract of pirdot (*Saurauia vulcani*, Korth) leaves was conducted by using alloxan induced diabetic mice by administration of a single dose of extract. Animal testing (white male mice) were randomly divided into 3 groups, each group consisting of 6 mice namely:

Group I: Diabetic mice were given suspension of 1% Sodium CMC dose 0.5% bw
Group II: Diabetic mice were given suspension of metformin dose of 50 mg/ kg bw
Group III: Diabetic mice were given a suspension of pirdot (*Saurauia vulcani*, Korth) leaves ethanol extract dose 200 mg kg/bw

Suspension of was administered for 5 consecutive days orally and blood glucose levels of mice was measured on the thirh, fifth, seventh and tenth days after administration of the test substance [5; 6; 8; 11; 18.].

Data Analysis

All of the data were analyzed with statistical methods of analysis of variance (ANOVA) method, using SPSS (Statistical Product and Service Solutions) 17.0 software.

Results and Discussion

Identification of Simplisia and Extract

Plant identification results conducted by LIPI, Bogor - Biology Research Center is kind *Saurauia vulcani*, Korth., Actinidiaceae.

Table.1 Simplisia characterization results, ethanol extract of pirdot (*Saurauia vulcani*, Korth) leaves

No	Test Group	Simplisia (%)	Ethanol extract (%)
01	Water content	6,65	7,25
02	Conten of water soluble extract	23,55	64,25
03	Conten of ethanol soluble ash	20,32	66,45
04	Total ash conten	4,01	1,51
05	Conten of acid insoluble ash	0,88	0,48

Table.2 Result of phytochemical screening of simplisia and ethanolic extract of pirdot (*Saurauia vulcani*, Korth) leaves

No	Scrining	Simplisia	Ethanol extract
01	Alkaloid	-	-
02	Flavonoid	+	+
03	Glycosida	+	+
04	Saponin	+	+
05	Antraquinonglycosida	-	-
06	Tanin	+	+
07	Triterpenoid/Steroid	+	+

Description: (+) = contains a class of compound, (-) = Not contain a class of compound

Antiabetic Test

Antidiabetic effect of ethanolic extract of *Saurauia vulcani*, Korth is determined with depletion of blood glucose level in the alloxan induce diabetic mice. The result of the mice blood glucose level depletion for ten days was 55,11% with *Saurauia vulcani*, Korth leaves ethanolic extract 200 mg / kg body weight. Fasting blood glucose level of the mice before and after induced by alloxan was shown in Table 3. Blood glucose level of the mice after treatment was shown in Table 4. Measurement blood glucose level decrese was shown in Table 5. The effect of treatment to blood glucose level of alloxan induced diabetic mice was shown in Figure 1.

Table 3. Fasting blood glucose level of the mice before and after alloxan induction

Test Group	Fasting BGL before alloxan induction (mg/dl)	Fasting BGL after alloxan induction (mg/dl)
Sodium CMC 1.0%	82.67 ± 1.02	413.17 ± 6.14
Metformin 50 mg / kg body weight	83.00 ± 2.54	589.17 ± 1.11
Ethanol Extract 200 mg / kg body weight	82.67 ± 1.74	483.66 ± 3.61

Table 4. Blood glucose level of the mice after treatment was shown

Test Group	Blood Glucose Level After Treatment (mg/dl)			
	Day-3	Day-5	Day-7	Day-10
Sodium CMC 1.0% (0.5 % body weight)	403.00 ± 6.68	403.17 ± 2.75	395.00 ± 3.13	394.17 ± 1.02
Metformin (50 mg / kg body weight)	544.33 ± 2.04	505.83 ± 3.28	425.33 ± 3.44	284.33 ± 2.54
Ethanol Extract (200 mg / kg body weight)	427.83 ± 6.16	397.67 ± 8.19	246.83 ± 12.86	191.82 ± 1.74

Tabel 5. Measurement blood glucose level decrese

Test Group	Decrese BGL (%)			
	Day-3	Day-5	Day-7	Day-10
Metformin (50 mg / kg body weight)	7.61	14.14	27.81	47.76
Sodium CMC 1.0% (0.5 % body weight)	2.45	2.30	4.27	2.00
Ethanol Extract (200 mg / kg body weight)	11.63	25.66	49.04	55.11

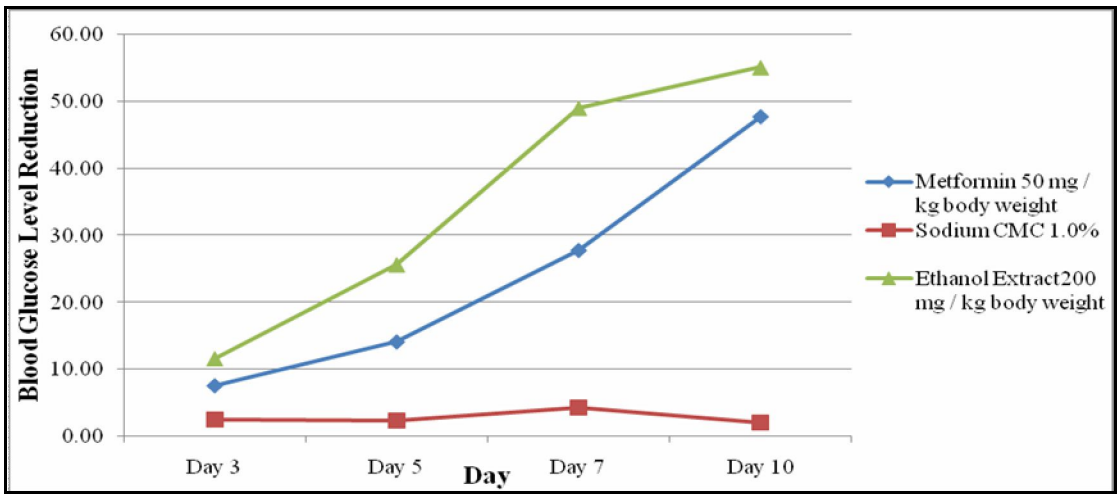

Figure 1. Effect of treatment to the blood glucose level in alloxan induced diabetic mice by *Saurauia vulcani*, Korth leaves extract

Conclusion

According to the analysis of the data above, it is concluded that the ethanolic extract of pirdot leaves (*Saurauia vulcani*, Korth) is effective as antidiabetic agent. Ethanolic extract of pirdot leaves (*Saurauia vulcani*, Korth) has the ability to reduce blood glucose level in mice (animal studies) until the tenth days shows 55.11% reduction of blood glucose level**.**

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