HYPOGLYCEMIC ACTIVITY OF ETHANOLIC EXTRACT OF SAURAUIA VULCANI KORTH. LEAVES

Panal Sitorus*, Rosidah*, Denny Satria*

*Department of Pharmaceutical Biology, Faculty of Pharmacy, Universitas Sumatera Utara, Medan, Indonesia, *Department of Pharmacology, Faculty of Pharmacy, Universitas Sumatera Utara, Medan, Indonesia. Email: sitoruspanal@gmail.com

Received: 07 March 2018, Revised and Accepted: 25 March 2018

ABSTRACT

Objective: The aim of this study was to investigate the hypoglycemic activity of ethanol extract of Saurauia vulcani Korth. leaves.

Methods: S. vulcani Korth. leaf powder was extracted by maceration method with ethanol 96%. Hypoglycemic activity was examined on rats which is induced with streptozotocin in 40 mg/Kg body weight (BW) at dose of 50; 100; and 200 mg/Kg BW.

Results: Hypoglycemic activity of the extract in diabetic rats showed a significant reduction in blood glucose levels (p<0.001) at dosage 50 mg/Kg BW.

Conclusion: The results reveal that ethanol extract of S. vulcani Korth. leaves has hypoglycemic activity. Our further study is to assess mechanism action as antidiabetic.

Keywords: Hypoglycemic, Saurauia vulcani Korth., Leaves, Extract, Ethanol.

INTRODUCTION

The use of medicinal plants in the community is increasing in several decades [1-3]. Indonesia has thousands of islands with various plants in it and the manners of the community using plants as a treatment for diseases traditionally [4,5].

Diabetes mellitus (DM) is a heterogeneous syndrome which all of the symptoms are characterized by increased of blood sugar level that caused relative or absolute insulin activity. DM is divided by the need for insulin, i.e., insulin diabetes dependent DM (IDDM) called Type 1, and non-IDDM called Type 2. DM is dangerous degenerative disease, even considered as a high-risk disease because it can cause death [6].

Saurauia vulcani Korth. is one of the plants which used as antidiabetic traditionally in Tapanuli Utara, North Sumatera, Indonesia. Ethanolic extract of S. vulcani Korth. leaves can reduce blood glucose level (BGL) in mice which induced by glucose 50% and alloxan at dose 200 mg/Kg body weight (BW) [7,8]. The purpose of this study was assessed the hypoglycemic activity of ethanol extract of S. vulcani Korth. leaves toward rats which induced by streptozotocin (STZ).

METHODS

Plant and chemicals material

The materials used in this study were S. vulcani Korth. leaves were taken from Tarutung, North Sumatera, Indonesia. The chemicals used are pro-analysis grade: STZ (Nacalai), carboxymethylcellulose (CMC) Na (Merck), and technical grade of ethanol and distilled water.

Preparation of extract

The air-dried and powdered leaves of S. vulcani Korth. (1 kg) were extracted by cold maceration with ethanol 96% (3 x 3 d, 10 L) at room temperature on a shake. The filtrate was collected and then evaporated under reduced pressure to give a viscous extract and then freeze-dried to give a dried extract [2,9].

Antidiabetic assay

Animal preparation

The animals used in this study were male rats weighing 180–200 g. Before the experiment, rats were maintained for 2 weeks in a good cage to match the environment, i.e., the reception of light, 12 h dark, and 12 h light.

Suspension of test material and STZ solution

The solution of test material was prepared with 0.5% CMC-Na with certain concentration. Solution of STZ was prepared by dissolving STZ in aqua bidest.

Preparation of STZ induced diabetic rat

The rat was induced with STZ solution 40 mg/Kg intra-peritoneal. The BGL of the rat was measured on the 3rd day. On the 3rd day, rats that has BGL higher than 200 mg/dL were separated and used as test animal. Animals with BGL lower than 200 mg/dL were induced back with STZ. If on the 3rd day, the BGL of the rat has been higher than 200 mg/dL, the animal was ready to be tested.

Preparation of extract suspension and STZ solution

Suspension of the extract was prepared using 0.5% CMC-Na with certain concentration. Solution of STZ was prepared by dissolving STZ in aqua bidest.

Preparation of STZ induced diabetic rat

The rat was induced with STZ solution 40 mg/Kg intra-peritoneal. The BGL of the rat was measured on the 3rd day. On the 3rd day, rats that has BGL higher than 200 mg/dL were separated and used as test animal. Animals with BGL lower than 200 mg/dL were induced back with STZ. If on the 3rd day, the BGL of the rat has been higher than 200 mg/dL, the animal was ready to be tested.

Study of the antidiabetic effect of ethanol extract of S. vulcani Korth. leaves was conducted using STZ-induced diabetic rats by a single dose of ethanol extract. Rats were divided into five groups and each group consisting of 5 rats, they were:

- Group I: Diabetes rats were given suspension of 0.5% CMC, dose 1% of BW
- Group II: Diabetic rats were given suspension of metformin with dose 65 mg/Kg BW
- Groups III, IV, and V: Diabetic rats were given a suspension of ethanol extract of S. vulcani Korth. leaves with dose 50, 100, and 200 mg/Kg BW.

Suspension of test material (ethanol extract) was administered every day orally, and the BGL of the rat was measured on the 1st, 3rd, 5th, 7th, 9th, 11th, 13th, and 15th days after administration of the test material [10].

Statistical analysis

All data were analyzed with ANOVA using SPSS 21.

RESULTS AND DISCUSSION

Antidiabetic effect of ethanol extract of S. vulcani Korth. leaves with dose 50, 100, and 200 mg/Kg BW is shown in Fig. 1.
STZ has been shown to cause direct irreversible damage to β-cells of the pancreatic islet of Langerhans, resulting in degranulation and loss of insulin secretion. Clarification of the regenerating potential in experimentally-induced diabetic animals would be of interest as an alternative therapy for diabetes [11].

Preliminary phytochemical analysis of the ethanol extract of *S. vulcani* Korth. leaves was shown flavonoids, steroids/triterpenoids, tannins, glycosides, and saponins. Flavonoids, glycosides, and saponins have been found to be responsible for blood glucose lowering activity through increased insulin secretion, as evidenced in our experiment by STZ-induced diabetic rats, which is capable of modulating pancreatic secretion [12,13].

**CONCLUSION**

The result of this study showed that ethanol extract of *S. vulcani* Korth. leaves possess antidiabetic activity.

**ACKNOWLEDGMENTS**

We gratefully thank to Research Center University of Sumatera Utara through Hibah Talenta “Hibah Penelitian Dasar” Research Grant 2017 “No: 5338/UN5.1.R/PPM/2017” for financial support in the study.

**REFERENCES**