

The Effect of Radish (*Raphanus Sativus* L.) Leaves Ethanol Extract on Blood Glucose Levels in Streptozotocin-Nicotinamide-Induced Type-2 Diabetic Rats

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Abstract : Background: Diabetes mellitus (DM) is a metabolic disorder syndrome characterized by chronic hyperglycemia. The number of people with diabetes rose from 108 million in 1980 to 422 million in 2014. In general, almost 90% of the prevalence of DM is type 2 DM which marked by insulin resistance and decreased receptor sensitivity. Aside from conventional antidiabetic therapy, the utilization of medicinal plants as alternative medicine has beneficial effects in diabetic patients. Flavonoid contents in radish leaves such as quercetin, pelargonidin, and kaempferol are thought to have antidiabetic activity on decreasing blood glucose levels by tricyclic nucleotide modulation of pancreatic beta cells and ameliorating insulin resistance. This study aimed to determine the effect of variant concentration of radish leaves ethanol extract on blood glucose levels in diabetic rats. Method: This study used pretest-posttest control group design by using 16 male Wistar rats which were induced type-2 diabetic by streptozotocin 60 mg/kg BW-nicotinamide 120 mg/kg BW intraperitoneally. Rats who had developed type-2 DM later divided randomly into 4 groups; negative control received placebo, positive control received glibenclamide 5 mg/kg BW/day, rats intervention I and intervention II received 100% and 50% of radish leaves ethanol extract, respectively. Treatments were administered orally for four weeks. The blood glucose levels were measured using the Enzymatic Colorimetric Test "GOD-PAP". Data were analyzed by the dependent t-test for pretest-posttest intervention difference and one-way ANOVA followed by post hoc test to determine the significant difference of each treatment to obtain the significant data. Result: The result revealed that intervention group had lower blood glucose levels mean than control group which the lowest was intervention II group (negative control: $540,9 \pm 191,7$ mg/dl, positive control: $494,97 \pm 64,91$ mg/dl, intervention I: $301,92 \pm 165,70$ mg/dl, and intervention II group: $276,1 \pm 139,02$ mg/dl. Intervention II group had the highest antidiabetic activity, followed by the intervention I group with the amount of decrease in blood glucose levels were $-151,85 \pm 77,43$ mg/dl and $-11,08 \pm 186,62$ mg/dl, however negative and positive control group didn't have antidiabetic activity. The dependent t-test result showed there is a significant difference in decreasing blood glucose levels in the intervention II pretest-posttest intervention ($p=0,03$) while the other group didn't. Data analyzed by one-way ANOVA also revealed the intervention II group significantly declined blood glucose levels compared to the negative and positive control group ($p = 0,033$ and $p=0,032$, respectively). Conclusion: There is a significant effect of radish leaves ethanol extract on blood glucose levels in streptozotocin-nicotinamide-induced diabetic rats with the optimal therapeutic effect at a concentration of 50%.

Keywords : blood glucose levels, medicinal plant, radish leaves, type-2 diabetes mellitus

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