

Effect of ethanolic extract from fruits of *E. involucrata* on glycemic profile and disaccharidase activities in a rat model of type 2 diabetes: a preliminary study

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Eugenia involucrata DC. is a native plant from Brazil considered an important source of bioactive compounds. Therefore, this underutilized plant species can potentially be used in dietary or pharmacological strategies for the prevention and/or treatment of several diseases. Type 2 diabetes (DM2) is a chronic metabolic disease characterized by persistent hyperglycemia secondary to impaired insulin secretion, resistance to peripheral actions of insulin, or both processes. This study evaluated the antidiabetic potential of the ethanolic extract from fruits of *E. involucrata* in adult male Wistar rats (CEUA/UFSM n. 2954100818). Animals were initially divided into two groups: control group (normal diet) and diabetic group (hypercaloric diet). On the 13th day after starting the hypercaloric diet, the animals from diabetic group received a single dose of streptozotocin (STZ) solution (40 mg kg⁻¹, 1 mL kg⁻¹ body weight, i.p.). After verifying the induction of diabetes, the animals were subdivided into four groups to evaluate the effect of the crude extract (EB) of *E. involucrata* fruits orally administered at the daily dose of 60 mg of polyphenols kg⁻¹ b.w. for 21 days: non-diabetic control (0.9% saline, n = 8), non-diabetic + extract (EB60, n = 8), diabetic (DIA, 0.9% saline, n = 4) and diabetic + extract (DIA + EB60, n = 4). After treatment, fasting blood glucose was assessed and the animals were euthanized for blood and small intestine collection. Serum fructosamine levels were higher in diabetic rats (DIA group) than other groups and serum insulin levels were not different among groups. On the other hand, treatment of diabetic rats with EB60 (DIA + EB60 group) resulted in a reduction in blood glucose levels of 54.91% compared to DIA group (159.00 ± 53.27 versus 352.7 ± 83.38 mg dL⁻¹, respectively, ANOVA/Tukey). Diabetic rats treated with EB60 (DIA + EB60 group) also have shown an improvement of both insulin resistance (HOMA-IR) and pancreas activity (HOMA-Beta) indices compared to diabetic rats that did not receive the extract (DIA group). Disaccharidase activities were evaluated to investigate a possible mechanism for the antihyperglycemic effect of EB. EB60 and DIA groups presented an increase of sucrase activity compared to control group (552.5 ± 50.9 and 538.5 ± 173.5 versus 246.07 ± 48.09 U g⁻¹ protein, ANOVA/Tukey). In turn, when the extract was administered to diabetic rats (EB60 + DIA group), sucrase activity was not different from either the control or the diabetic (DIA) group (392.7 ± 144.6 U g⁻¹ protein, p>0.05, ANOVA/Tukey). There was no difference in lactase activity between groups. Overall, our preliminary data indicate a possible beneficial effect of ethanolic extract from fruits of *E. involucrata* on blood glucose levels and on insulin resistance indices. However, our studies continue in order to clarify the involvement of disaccharidase enzymes in the antihyperglycemic effect of EB60, as well as to investigate other mechanisms involved.

Keywords: bioactive compounds for health promotion, cherry of the Rio Grande, DM2

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