

Hypoglycemic effect of the macaúba (*Acrocomia aculeata*) kernel oil in type 2 diabetic rats with high fat diet and low dose of streptozotocin

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Introduction: Diabetes mellitus (DM) is a metabolic disorder which arises from complex interactions between multiple genetic, environmental or lifestyle factors. DM is characterized by the presence of hyperglycemia due to defective insulin secretion, insulin action, or both.

Aim: This study aimed to evaluate the effect of macaúba kernel oil on glycemic metabolism in type 2 diabetic rats.

Methods: Male albino Wistar rats weighting 150-170 g were purchased from the Animal Facility of the São Paulo University (USP), Ribeirão Preto, SP, Brazil. A total of 40 rats were used and allocated into two dietary regimens fed with high fat diet (HFD) and a normal diet, for an initial period of 3 weeks, and received low dose of streptozotocin 35 mg/kg bw i.p dissolved in sodium citrate buffer (0.1 M, pH 4.5). Blood glucose levels were measured in fasted animals (12 hours), by the enzymatic glucose oxidase; animals with blood glucose \geq 250 mg/dL were considered diabetic. Animals were randomly divided into 5 groups of 8 animals each. I: Normal control (NC); II: Diabetic control (DBC); III: Diabetic rats + macaúba kernel oil (MKO) - low dose (DML); IV: Diabetic rats + MKO high dose (DMH); V: Non diabetic + MKO - high dose (NMH). At the end (28 days), the rats were fasted overnight and anesthetized with isoflurane for blood collection. Blood glucose was determined in the plasma using diagnostic kit (In Vitro Diagnóstica). Serum insulin levels were analyzed by ELISA kit (Crystal Chem. Inc). Homeostatic model assessment of insulin resistance (HOMA-IR) and pancreatic beta cells functional capacity (HOMA- β) were calculated. Statistical analysis was performed using one-way analysis of variance (ANOVA) followed by the Tukey test as the post-test. $P < 0.05$ was considered to be statistically significant. These experiments were approved by Catholic University Dom Bosco Committee for Ethics in Animal Experimentation under protocol N° 003/2015. **Results:** Levels of plasma glucose were increased in induced diabetes type 2 rats with HFD and STZ, after treatment in the DML and DMH groups were observed an decreasing of the fasting glucose level (49.5% and 47.1%) and an increasing of insulin levels of 86.8% and 79% respectively in comparison with DBC group. DML and DMH groups showed a decrease of 37.8% and 33.7% in HOMA-IR. HOMA- β of the DBC group was significantly lower compared to the NC group, however the DML and DMH groups demonstrated an increase of 313.5% and 183% when compared to DBC group.

Conclusion: Macaúba kernel oil exerted hypoglycemic action, improved pancreatic β cell function (HOMA- β), stimulated insulin secretion, and decreased insulin resistance.

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