

# Effects of *Cinnamomum zeylanicum* (Ceylon cinnamon) on blood glucose and lipids in a diabetic and healthy rat model

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## ABSTRACT

**Objectives:** To evaluate short- and long-term effects of *Cinnamomum zeylanicum* on food consumption, body weight, glycemic control, and lipids in healthy and diabetes-induced rats.

**Materials and Methods:** The study was conducted in two phases (Phase I and Phase II), using Sprague-Dawley rats in four groups. Phase I evaluated acute effects on fasting blood glucose (FBG) (Groups 1 and 2) and on post-oral glucose (Groups 3 and 4) blood glucose. Groups 1 and 3 received distilled-water and Groups 2 and 4 received cinnamon-extracts. Phase II evaluated effects on food consumption, body weight, blood glucose, and lipids over 1 month. Group A ( $n = 8$ , distilled-water) and Group B ( $n = 8$ , cinnamon-extracts) were healthy rats, while Group C ( $n = 5$ , distilled-water) and Group D ( $n = 5$ , cinnamon-extracts) were diabetes-induced rats. Serum lipid profile and HbA1c were measured on D-0 and D-30. FBG, 2-h post-prandial blood glucose, body weight, and food consumption were measured on every fifth day. **Results:** Phase I: There was no significant difference in serial blood glucose values in cinnamon-treated group from time 0 ( $P > 0.05$ ). Following oral glucose, the cinnamon group demonstrated a faster decline in blood glucose compared to controls ( $P < 0.05$ ). Phase II: Between D0 and D30, the difference in food consumption was shown only in diabetes-induced rats ( $P < 0.001$ ). Similarly, the significant difference following cinnamon-extracts in FBG and 2-h post-prandial blood glucose from D0 to D30 was shown only in diabetes-induced rats. In cinnamon-extracts administered groups, total and LDL cholesterol levels were lower on D30 in both healthy and diabetes-induced animals ( $P < 0.001$ ). **Conclusions:** *C. zeylanicum* lowered blood glucose, reduced food intake, and improved lipid parameters in diabetes-induced rats.

**Key words:** Blood glucose, Ceylon cinnamon, *Cinnamomum zeylanicum*, diabetes mellitus, lipids, Sprague-Dawley rats

## INTRODUCTION

Diabetes mellitus is a leading cause of morbidity and mortality worldwide, with an estimated 80% of the world population with diabetes living in developing countries.<sup>[1]</sup> Most patients with the disease have type 2 diabetes to which the South Asians are known to have an increased predisposition.<sup>[2]</sup> The causes of type 2 diabetes are multi-factorial, and the diet plays an important role on its incidence, severity, and management.<sup>[3]</sup> Hence, studies have

frequently focused on dietary components beneficial in the prevention and treatment of diabetes. Recent studies have demonstrated that herbal products have beneficial effects in patients with diabetes by improving glucose and lipid metabolism, antioxidant status, and capillary function.<sup>[4]</sup> Cinnamon is one such a dietary component that has shown to have biologically active substances with insulin-mimetic properties. *In vitro*<sup>[5,6]</sup> and *in vivo*<sup>[7,8]</sup> studies have shown that cinnamon enhances glucose uptake by activating the insulin receptor kinase activity, auto-phosphorylation of the insulin receptor, and glycogen synthase activity.

Cinnamon, the inner bark of a tropical evergreen tree has two main types, Ceylon cinnamon (*Cinnamomum zeylanicum*

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