

Effects of cocoa extract on glucometabolism, oxidative stress, and antioxidant enzymes in obese-diabetic (Ob-db) rats

ABSTRACT

In this present study, we investigated the effects of cocoa extract containing polyphenols and methylxanthines prepared from cocoa powder on the biochemical parameters of obese-diabetic (Obdb) rats. Obese-diabetic (Ob-db) rats were developed using a high-fat diet (49% fat, 32% carbohydrate, and 19% protein from total energy, kcal) for 3 months, followed by a low dose (35 mg/kg body weight) streptozotocin (STZ) injection. Cocoa extract (600 mg/kg body weight/day) was given to the rats for 4 weeks. The results indicated that there were no significant differences in fasting plasma glucose and insulin level after 4 weeks of cocoa extract administration. Oral glucose tolerance test revealed that cocoa supplementation in Ob-db rats significantly ($p < 0.05$) reduced plasma glucose at 60 and 90 min compared to unsupplemented Ob-db rats. Plasma free fatty acid and oxidative stress biomarker (8-isoprostane) were significantly ($p < 0.05$) reduced after cocoa supplementation. Superoxide dismutase activity was enhanced in Ob-db compared to that in nonsupplemented rats. However, no change was observed in catalase activity. The results showed that cocoa supplementation had an effect on postprandial glucose control but not for long term (4 weeks). Moreover, cocoa supplementation could reduce circulating plasma free fatty acid and 8-isoprostane and may enhance the antioxidant defense system.

Keyword: Caffeine; Catalase; Catechin; Cocoa; Epicatechin; Superoxide dismutase; Theobromine