

## The acute effects of coffee on glucose metabolism

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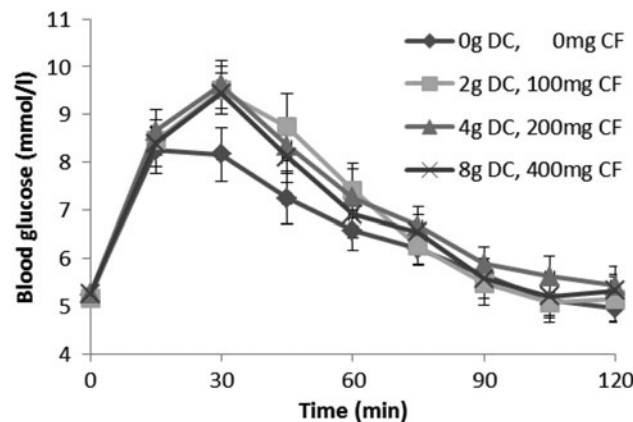
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Epidemiological studies suggest that people who drink coffee are less likely to develop Type 2 Diabetes<sup>(1)</sup>, however acute intervention studies often show that coffee has a potentially detrimental effect on glucose metabolism by increasing the postprandial glucose response<sup>(2)</sup>. Previous acute studies have used a single large dose of coffee, typically containing the caffeine equivalent of 2–4 mugs of coffee. It is unknown whether the acute effects of coffee are dose dependent or whether a “normal” dose of coffee will disrupt glucose metabolism.

This study investigated whether coffee affects glucose metabolism in a dose-dependent fashion, starting from one mug of coffee. It further looked to separate out the effects of caffeine (CF) from other coffee components by varying the doses of each independently, as it has been suggested that whilst caffeine may increase postprandial glucose, other coffee components may counteract this<sup>(3)</sup>.

Ten healthy overweight males participated in a two part randomised double blind crossover study. In the first part they ingested decaffeinated coffee (DC, 2, 4 or 8 g instant dissolved in 400 ml water) with CF added in proportion to DC (total 100, 200 or 400 mg CF) or placebo (400 ml water) along with 50 g glucose. In the second part they ingested the same amounts of DC (2, 4, 8 g) or placebo, but with a standard 100 mg CF in each. Capillary blood samples were taken every 15 min for 2 hr after each drink and glucose and insulin measured.



**Fig. 1.** Postprandial glucose response when caffeine was varied in line with coffee.

Repeated measures ANOVA on postprandial glucose found a treatment effect when CF was varied in line with DC ( $p < 0.01$ , Fig. 1). Post hoc analysis revealed both 2 g ( $p < 0.05$ ) and 4 g ( $p < 0.05$ ) DC (100 mg and 200 mg CF, respectively) increased the glycaemic response versus placebo. There was no difference in glucose between treatments when caffeine remained constant at 100 mg.

These results demonstrate that one standard mug of coffee (2 g) is sufficient to disrupt glucose metabolism. Furthermore, the amount of caffeine found in one mug (100 mg) is sufficient to mask any potential beneficial effects of other components. No dose-dependent effect was found. Postprandial insulin was not affected by any coffee/caffeine combination.

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2. Moisey LL, Kacker S, Bickerton AC *et al.* (2008) Caffeinated coffee consumption impairs blood glucose homeostasis in response to high and low glycemic index meals in healthy men. *Am J Clin Nutr*. **87**(5), 1254–61.
3. Johnston KL, Clifford MN, Morgan LM. (2003) Coffee acutely modifies gastrointestinal hormone secretion and glucose tolerance in humans: glycemic effects of chlorogenic acid and caffeine. *Am J Clin Nutr*. **78**(4), 728–33.