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The effect of a stimulation drink on metabolic rate and haemodynamic parameters in comparison to a caffeinated placebo: a randomised, crossover, double blinded study

H. J. Dady and Y. Mavrommatis

Dietetics Group, Faculty of Life Sciences, London Metropolitan University, 166–220 Holloway Road, London, N7 8DB, UK

Marketing and consumption of stimulation (or energy) drinks (SDs), has increased considerably in the last two decades^(1,2). Claims made regarding such drinks include that they encourage weight loss by increasing energy expenditure (EE) and metabolic rate⁽¹⁾. Some studies have found a significant acute increase in resting EE at one, two and three hours following ingestion of an SD^(2,3), however these studies have used very high caffeine products (200–300 mg), with a low or no caffeine placebo. It is therefore unclear whether this increase is due to the high caffeine content of the SDs tested, or their specific blend of ingredients, as suggested by marketing campaigns⁽⁴⁾. In addition, studies have raised health concerns regarding the effects of SDs on haemodynamic function⁽⁴⁾.

This study aimed to explore whether an SD would increase resting EE, heart rate (HR) and blood pressure (BP), in comparison to a caffeinated placebo and baseline measurement. A sample of 11 healthy adult volunteers participated. For each, resting EE was measured using a GEM indirect calorimeter on three occasions. The first was a baseline measurement and on the other two occasions participants ingested either an SD (KX Sugar Free Stimulation Drink) or a placebo (PB: Diet Coke Citrus Zest) two hours before measurement. Both beverages were matched for caffeine content (80 mg) and volume. Blood pressure and HR were also measured on each occasion, and measurement conditions were standardised according to best practice methods to promote reliable measures⁽⁵⁾. The table shows mean EE, diastolic and systolic BP and HR under each condition.

	n	Baseline		Stimulation drink		Placebo	
		Mean	SD	Mean	SD	Mean	SD
Energy expenditure (Kcal/min)	11	1.28	0.16	1.33	0.23	1.36	0.18
Systolic BP (mm Hg)	11	120.3	8.6	120.4	11.1	119.5	10.2
Diastolic BP (mm Hg)	11	75.2	10.4	75.6	6.8	73.4	8.4
Heart rate (bpm)	11	70.2	13.3	68.6	14.1	68.1	9.3

Values are means at baseline and two hours following consumption of a stimulation drink or caffeinated placebo. For all variables, no significant differences between conditions were found (Friedman's ANOVA): $p > 0.05$.

Participants' mean EE did not significantly change between baseline and two hours following consumption of the SD or placebo drink. Similarly, no significant differences were found for HR or BP between conditions. The findings of this study indicate that SDs containing a moderate level of caffeine do not significantly increase resting EE, and therefore are unlikely to function well as a weight loss aid. In addition, the significant increase in resting EE following ingestion of an SD observed in previous studies^(2,3) is likely to be due to the very high caffeine content contained in the products tested, rather than any other ingredients. The finding that BP and HR were not significantly increased two hours following consumption of the SD is consistent with previous studies^(3,6).

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