

The satiating effects of four isoenergetic breakfasts of different macronutrient content

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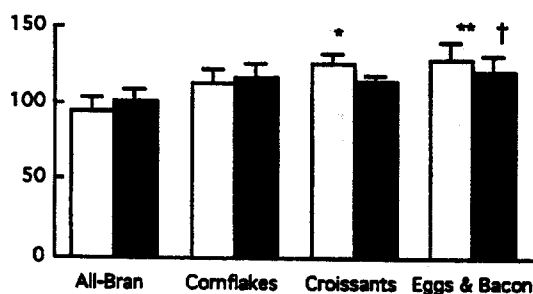
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A satiating breakfast may assuage hunger throughout the morning reducing the need for morning tea and is likely to play a key role in weight control diets. Previous studies have shown that fat-rich foods are relatively less satiating than foods rich in protein, carbohydrate and/or fibre. However, under these controlled conditions, the subjects were fed a fixed amount of the test food and were not allowed to eat during the next few hours even though they may have been hungry. Under free-living conditions, a fat-rich breakfast may result in greater food intake during the morning but the subjects have the rest of the day to compensate. This study compared the effect of four isoenergetic breakfasts varying in macronutrient content on subsequent changes in hunger and food intake under free-living conditions.

Four isoenergetic breakfasts (2035 kJ) were assembled using combinations of popular breakfast foods: (i) Cornflakes, sugar, semi-skimmed milk, slice of white toast with margarine and jam; (ii) All-Bran™, banana slices, semi-skimmed milk, slice of white toast with margarine; (iii) One fried egg, grilled tomato and bacon rashers, two slices of white toast with margarine; (iv) Warm croissants with margarine and jam. Fourteen healthy university students (7 females, 7 males, age 18-24 yr) consumed the breakfasts with a standard beverage in a random order on separate mornings after an overnight fast. After finishing breakfast, subjects left the unit and completed a weighed food diary for the rest of the day. Rating scales assessing subjective sensations of hunger, fullness and alertness were also completed periodically over the rest of the day.

The All-Bran™ meal, high in carbohydrate, protein and fibre, was the least palatable but most satiating meal and resulted in less food intake both during the morning and at lunch. The satiety-enhancing effect of the Cornflakes meal, based on quickly-digested refined carbohydrate, dissipated at a faster rate than the All-Bran meal containing slowly-digested carbohydrate. The two fat-rich meals, containing either protein (eggs and bacon) or refined carbohydrate (croissants), were more palatable and less satiating than the two carbohydrate-rich breakfast cereal meals and resulted in greater energy intakes during the morning and at lunch. By the end of the day, subjects had consumed significantly more energy after the eggs and bacon breakfast than after the All-Bran meal ($P < 0.05$). Subsequent fat intakes were also not reduced after the high-fat breakfasts resulting in significantly higher total day fat intakes than after the All-Bran meal ($P < 0.01$).



□ Fat (g)
■ Energy (MJ x 10)

Figure. Total day fat and energy intakes (mean \pm SEM)

* Croissants > All-Bran ($P < 0.01$)
** Eggs > All-Bran ($P < 0.01$)
† Eggs > All-Bran ($P < 0.05$)

The results confirm that fat-rich meals are only weakly satiating and facilitate excessive energy intakes. A breakfast rich in carbohydrate and fibre may be the optimal choice for people attempting to control their weight.