

# Valorization of Beetroot Pomace Flour in Obesity Prevention

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## Abstract

In vivo determination of food efficiency ratio of diet supplemented with beetroot pomace flour (BPF) was conducted. Four groups of 8 C57BL/6J mice were exposed to a standard cereal based diet without (CBD) and with the addition of 10 mg BPF per day (CBD + BPF) for 150 days, and a high-fat and sucrose diet without (CBD\*) and with the addition of 10 mg BPF per day (CBD\* + BPF). Food and water (CBD) or sucrose solution (CBD\*) intakes and BW were recorded weekly, the glycaemic status monthly and oral glucose tolerance test (OGTT) within the last week of the diet. The food efficiency ratio was calculated as BWG per food intake - food efficiency ratio 1 (FER1) and per energy unit - food efficiency ratio 2 (FER2). CBD\* group showed a statistically significant ( $p < 0.05$ ) increase in glycemia (39.3%) in comparison to CBD while BWG was not statistically different. CBD\*-BPF group showed no increase in glycemia compared to CBD. Glycaemia in CBD\*-BPF decreased by 38.7% compared to the CBD\*. In CBD\*-BPF and CBD-BPF BWG was significantly suppressed in comparison to diets without BPF (60.7% and 39.2%, respectively). BWG and FER1 significantly differ between diets with and without BPF. A statistically significant difference ( $p < 0.05$ ) was observed in daily food intake between the CBD\* and CBD groups although they were close. However, energy intake was more than 2.5 times higher in CBD\*. FER1 and FER 2 were lower in CBD\*-BPF and CBD-BPF than in CBD\* and CBD. The difference in FER1 between CBD\* and CBD as well as CBD\*-BPF and CBD-BPF was not found statistically significant. However, FER1 of CBD\*-BPF and CBD-BPF were reduced by 2.6 and 1.7 times compared to CBD\* and CBD. A similar reduction of FER 2 was noticed. Differences in BWG in the CBD\*-BPF and CBD-BPF in comparison to the CBD\* and CBD became more prominent at the end of considered period. Due to the lower food intake at the beginning of exposure, BWG increase in the CBD\* was lower but almost caught up with the CBD. At the end of the period considered, no significant difference in BWG between the CBD and CBD\* was noticeable. By far the

lowest BWG was noticed in the CBD\*-BPF during the entire period considered. Significant effects of BPF on BWG reduction were observed in the CBD-BPF, in comparison to the CBD. OGTT confirmed that BPF supplementation in the amount of 0.5% w/w led to better glucose tolerance in animals exposed to CBD\*. Obtained results demonstrated that BPF represents a valuable upcycled raw material applicable in compensation of anti-obesity factors lack in modern diet.

**Keywords:** beetroot, pomace, body weight, obesity; feed efficiency

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