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Leptadenia hastata leaf extracts reduce bodyweight gain and improve insulin sensitivity in two animal models of obesity and insulin resistance

Aim: *Leptadenia hastata* (LH), an edible vegetable and medicinal plant used traditionally in sub-Saharan African countries for various diseases. The potential anti-obesity and anti-diabetic effects of aqueous and methanol leaf extracts of LH in high fat diet-induced obese mice and leptin-deficient (*ob/ob*) mice are investigated.

Methods: C57Bl/6 female mice fed 60% High Fat Diet (HFD) and leptin-deficient (*ob/ob*) male mice (fed chow diet) were treated for six weeks with 250 $mg.kg^{-1}$ of LH aqueous or methanol extracts. The time course of changes in food intake, body weight, body fat, energy expenditure, blood glucose and plasma levels of insulin and leptin (for HFD mice) were determined. *In vitro* effects of both extracts on lipolysis and lipogenesis were also investigated.

Results: In HFD animals, both extracts resulted in a significant reduction ($p<0.05$) in body weight (16.6% and 18.7%) and food intake (10% and 11%) with a significant increase in 24 hrs. energy expenditure (53.3 and 61.4%). These effects were coupled with a significant decrease in fat mass ($p<0.05$) and in plasma leptin levels (2.8 and 3.5 fold change). Both extracts also improved ($p<0.05$)-glucose tolerance and reduced fasted blood glucose and plasma insulin levels. Consequently, HOMA-IR was reduced by 65% (compared to control group). In *ob/ob* mice, the chronic treatment with methanol extract resulted in a significant reduction in cumulative body weight gain ($p<0.001$), an improvement in both oral glucose and insulin tolerance tests ($p<0.01$ and $p<0.001$, respectively) and a decrease in fasted plasma insulin by 64%. *In vitro*, the LH extracts decreased lipogenesis in human pre-adipocytes and increased lipolysis in mouse primary adipocytes.

Conclusion: LH would be beneficial as a dietary supplement in the treatment of obesity and insulin resistance related to high fat diet consumption, acting via a reduction of food intake and fat mass and an elevation of energy expenditure and improvement of insulin sensitivity.

Biography

Mohamed S Zaibi has pursued his BSc in Biochemistry and MSc in Nutrition and Human Physiology from the School of Sciences and his PhD from Medical School (Dijon, France), where he worked on the effect of oral anti diabetic drugs on hepatic protein metabolism regulation. He is the Associate Director at the School of Postgraduate Medicine & Allied Health and is the Head of BITM.

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