A 1H-NMR-based metabolomics investigation on the effect of saffron extract and crocin on rats fed a high fat diet

ABSTRACT

Overweight and obesity are rapidly growing health problem and indeed it has become a strong risk factor in many types of chronic diseases. The aim of this study was to evaluate the anti-obesity effect of saffron extract and its pure bioactive compound, crocin on obesity in in-vivo high fat diet (HFD) induced model in comparison to orlistat as the positive control. Obese model was successfully established in male Sprague Dawley rats fed by a HFD (40%) for 12 weeks. The obese rats were administered with saffron extract (40 and 80 mg/kg), crocin (40 and 80 mg/kg) and orlistat (20mg/kg) by mixing with HFD for consecutive 8 weeks. Changes in metabolic profiles of serum were determined by using 1H-NMR based metabolomics approach combined with multivariate statistical analysis. The Orthogonal projections to latent structures discriminant analysis (OPLS-DA) on the serum 1H-NMR profiles showed a clear discrimination between obese rats from a normal control rats. This discrimination showed that obese rats serum had higher content of glucose, lactate, β-hydroxybutyrate, alanine and creatinine with lower content of taurine, betaine and trimetylamine N-oxide than those in normal control group. The metabolic profile of serum in obese rat after the administration of saffron extract (80mg/ kg) and crocin (80mg/kg) were deviated from negative control. This results indicated that administration of saffron extract (80mg/ kg) and crocin (80mg/kg) could effectively improve disturbed metabolism in obese rats induced by HFD. These study findings could demonstrated the potential anti-obesity effect of saffron extract and crocin at pre-clinical study.

Keyword: 1H-NMR; Metabolomics; Saffron extract; Crocin; Rats fed; High fat diet; Overweight; Obesity