

Effect of defatted dabai pulp extract in urine metabolomics of hypercholesterolemic rats

ABSTRACT

A source of functional food can be utilized from a source that might otherwise be considered waste. This study investigates the hypocholesterolemic effect of defatted dabai pulp (DDP) from supercritical carbon dioxide extraction and the metabolic alterations associated with the therapeutic effects of DDP using ^1H NMR urinary metabolomic analysis. Male-specific pathogen-free Sprague–Dawley rats were fed with a high cholesterol diet for 30 days to induce hypercholesterolemia. Later, the rats were administered with a 2% DDP treatment diet for another 30 days. Supplementation with the 2% DDP treatment diet significantly reduced the level of total cholesterol (TC), triglyceride, low-density lipoprotein (LDL), and inflammatory markers (C-reactive protein (CRP), interleukin 6 (IL6) and tumour necrosis factor- α (α -TNF)) and significantly increased the level of antioxidant profile (total antioxidant status (TAS), superoxide dismutase (SOD), glutathione peroxide (GPX), and catalase (CAT)) compared with the positive control group (PG) group ($p < 0.05$). The presence of high dietary fibre (28.73 ± 1.82 g/100 g) and phenolic compounds (syringic acid, 4-hydroxybenzoic acid and gallic acid) are potential factors contributing to the beneficial effect. Assessment of ^1H NMR urinary metabolomics revealed that supplementation of 2% of DDP can partially recover the dysfunction in the metabolism induced by hypercholesterolemia via choline metabolism. ^1H -NMR-based metabolomic analysis of urine from hypercholesterolemic rats in this study uncovered the therapeutic effect of DDP to combat hypercholesterolemia.

Keyword: Antioxidant; Anti-inflammatory; Defatted dabai pulp; Hypercholesterolemia; NMR metabolomics; Supercritical fluid extraction; Total dietary fibre