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Metabolic changes in obese diabetic rats treated with *Andrographis paniculata* extract determined by ^{1}H NMR-based metabolomics

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Diabetes Mellitus (DM) is a chronic metabolic disorder characterized by high blood glucose level or hyperglycemia. It is caused either by insulin deficiency (Type 1 DM) or often combined with insulin resistance (Type 2 DM). Currently, 387 million people worldwide are suffering with diabetes and this number is expected to rise to 592 million by 2035. *Andragraphis paniculata* (*A. paniculata*) is an annual herb and widely cultivated in Southeast Asian countries for its medicinal use. In recent investigations, *A. paniculata* was found effective against Type 1 DM. In order to test the anti-diabetic activity of *A. Paniculata* aganist type 2 DM, here we used a non-genetic out-bred Sprague–Dawley rat model fed with High-Fat Diet (HFD) for obesity (model 1) and combination of HFD with a low-dose of streptozotocin induced to develop an obese-diabetic rat model (model 2). Proton Nuclear Magnetic Resonance (1H NMR) spectroscopy in combination of multivariate data analyses was used to evaluate the *A. paniculata* and metformin induced metabolic effects on obese and obese diabetic rat models. Compared to the normal rats, high levels of creatinine, pyruvate, acetoacetate and acetate were found in the urine of obese rats. Whereas, obese-diabetic rats were marked by high glucose level and low creatinine, 2-oxoglutarate, citrate, succinate, and hippurate levels, treatment with *A. paniculata* leaf water extract (at a dose of 200 mg/kg body weight) was able to partially restore the disturbed metabolism of an obese-diabetic animal model back towards normal conditions. *A. paniculata* increased the levels of creatinine, alantoin, malonate and hippurate, whereas, significantly decreased the levels of glucose and taurine in obese-diabetic rats. The use of metabolomics was found to be a practical and useful approach towards understanding the effects of *A. paniculata* water extract on the body fluids of diabetes-induced rats.

Biography

Muhammad Tayyab Akhtar has done his PhD in 2013 from Leiden University, Netherlands. During his PhD research, he used zebra-fish as a model organism to study the toxicological, behavioral and metabolic effects of cannabinoids. Currently, he is working as a Post-Doc Researcher at Institute of Bioscience of University Putra Malaysia.

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Notes:

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