

https://dspace.org/

Effects of hydroethanolic Moringa oleifera lam: Seed extract on high-fructose diet fed growing Sprague-Dawley rats

Mapfumo, Masiline

2020

https://hdl.handle.net/10539/30444

Mapfumo, Masiline (2020) Effects of hydroethanolic Moringa Oleifera Lam, seed extract on high-fructose diet-fed Growing Sprague-Dawley rats, University of the Witwatersrand, Johannesburg, <http://hdl.handle.net/10539/30444>

Downloaded from a DSpace repository. https://dspace.org/

ABSTRACT

Fructose consumption contributes to the development of non-alcoholic fatty liver disease (NAFLD) and metabolic syndrome (MetS). The anti-obesogenic and hepatoprotective properties of crude *Moringa oleifera* seed extract make it a potential prophylactic ethnomedicine against diet-induced NAFLD and MetS. This study interrogated the potential of crude hydroethanolic *M. oleifera* seed extract to protect against high-fructose diet-induced metabolic dysfunction.

Eighty-eight 21-day old female and male Sprague-Dawley rat pups were randomly allocated to and administered one of the following five treatment regimens (8 female rats and 9-10 male rats per treatment) daily for twelve weeks: group I - plain drinking water (PW) + plain gelatine cube (PC), group II - 20% (w/v) fructose solution (FS) + PC, group III - FS + 100 mg/kg body mass fenofibrate in gelatine cube (FN), group IV - FS + low dose (50 mg/kg body mass) of *M. oleifera* in gelatine cube (LMol) and group V - FS + high dose (500 mg/kg body mass) of *M. oleifera* in gelatine cube (HMol). The rats in each treatment regimen had *ad libitum* access to a standard rat chow and were weighed twice weekly. At the end of the 12-week trial, the rats were subjected to an oral glucose tolerance test and then euthanised 48 hours later. Blood was collected via cardiac puncture and plasma was harvested. Plasma triglyceride, cholesterol and insulin concentration, HOMA-IR, and surrogate biomarkers of liver function were determined. The livers and visceral fat pads were dissected out, weighed and preserved for liver lipid content and histology analysis.

The consumption of a high-fructose diet increased ($p<0.05$) liver lipid content and caused steatosis and hypertriglyceridemia in female and male rats. Crude hydroethanolic *M. oleifera* seed extract and fenofibrate prevented the high-fructose diet-induced liver lipid accretion and steatosis in female and male rats. High-fructose diet increased ($p<0.05$) visceral fat pad mass, plasma insulin concentration and HOMA-IR in female rats only. The crude hydroethanolic *M. oleifera* seed extract prevented the high-fructose diet-induced hyperinsulinemia and insulin resistance in female rats but failed to prevent the visceral adiposity. Crude hydroethanolic *M. oleifera* seed extract did not compromise liver function.

The crude hydroethanolic *M. oleifera* seed extract can potentially be exploited as prophylaxis against diet-induced fatty liver disease and MetS without causing liver toxicity in children.