

## ABSTRACT

*Hibiscus sabdariffa* (HS) is a plant of the Malvaceae family that has anti-obesity, antihypertensive, hypocholesterolaemic, anti-oxidant and anti-cancer properties. Dietary manipulations during the suckling period cause precocious maturation of the gastrointestinal tract (GIT). Events in early life affect the individual's metabolic health in later life. This study investigated the effects of early administration of the aqueous calyx extracts of HS on the growth performance, general health and the GIT of neonatal rats and whether it conferred protection or predisposition to the development of metabolic dysfunction in adolescence. The study was carried out in two phases. The first phase was to determine the effects of HS aqueous calyx extracts on the growth performance, metabolic substrates and the development of the neonatal rat GIT. In the second phase, the effects of the early administration of the HSE on the response of the pups to diet induced metabolic dysfunction were investigated.

In phase one, forty two 4-day old Sprague Dawley pups of both sexes were randomly assigned to three treatment groups. Each group consisted of 7 males and 7 females. The control group received distilled water at 10ml.kg<sup>-1</sup> b.w while the other two groups received either a low (50mg.kg<sup>-1</sup>) or high dose (500mg.kg<sup>-1</sup>) of the HS aqueous calyx extracts via oral gavage daily for 9 consecutive days. The rats were euthanased and their tissues harvested and analyzed. Pups that were administered with the high dose HSE had significantly heavier small intestines relative to the body mass when compared to those on the low dose HSE ( $P < 0.01$ ) and the control group ( $p < 0.001$ ). Pups in the high dose HSE group had significantly heavier caeca ( $p < 0.05$ ) than those in the low dose HSE group.

In the second phase, eighty five 4-day old Sprague Dawley rat pups were used. They were initially divided randomly into three groups and received similar treatments as in phase one up to postnatal day (PND) 14. There was no intervention from PND14 to PND 21 when the

pups were weaned. The rats in each of the treatment groups were further divided into a control group that continued on their normal rat chow diet and a test group that received high fructose (20% w/v) in their drinking water for 30 days in order to induce metabolic dysfunction. Each of the six study groups had at least 5 male and 5 female rats. The male rats in each of the treatment groups gained more body mass than their corresponding female counterparts in the control and treatment groups ( $p < 0.001$ ). Female rats that received high dose HSE in the neonatal period had significantly greater visceral fat pad ( $p \leq 0.05$ ) than the males in the groups. There were no negative effects on the rats' general health. At the end of the study, features of metabolic syndrome did not manifest in the control or any of the treatment groups. *Hibiscus sabdariffa* aqueous calyx extracts did not exhibit any long term effects and therefore may be considered safe for consumption in the neonatal age group.