

A Preliminary Study on the Hypoglycaemic Effect of *Averrhoa carambola* (Star Fruit) in Rats

L.C.A. Gunasekara, P.H.P. Fernando and R. Sivakanesan

Department of Biochemistry, Faculty of Medicine, University of Peradeniya

Diabetes mellitus (DM) is one of the five leading causes of death in the world. As estimated in 2008, around 24% of the Sri Lankan population suffer from this deadly disease. Maintenance of normoglycaemia is the key issue in managing these patients, and this is achieved by administering exogenous insulin or other hypoglycaemic agents. *Averrhoa carambola* (star fruit) leaves have been a part of traditional medicine used in Ayurvedic preparations to treat DM in Sri Lanka. Researchers have investigated the hypoglycaemic effects of several insoluble fiber-rich fractions (FRFs) including insoluble dietary fiber, alcohol-insoluble solid and water insoluble solid from the pomace of *A. carambola*. The objective of the study was to investigate the effect of *A. carambola* fruit pulp on blood glucose level of healthy rats.

Thirty male Sprague Dawley rats weighing between 150-350 g and ten healthy female Sprague Dawley rats of the same age and weight were used in the study. The animals were caged individually at the Animal House, Faculty of Medicine and were provided with 25 g of broiler starter feed per day with *ad libitum* water. They were allowed to get accustomed to the experimental set up for a period of two weeks and were divided equally into the test groups (male and female), and control groups (male and female). *A. carambola* fruit pulp was prepared by homogenising ripe fruit with a little added water in a warring blender and the resultant pulp was stored at -20°C. The animals in the test groups were then fed with the *A. carambola* fruit pulp at a rate of 1600 mg/kg body weight for 63 days and the fasting blood glucose levels were measured each week, using an enzymatic assay method using glucose oxidase enzyme. Results were compared between *A. carambola* fruit pulp treated group (1600 mg/kg BW) and control group which received only the basal diet using analyses of variance and Dunnet's t-test.

Treatment with *A. carambola* fruit pulp significantly ($p = 0.033$) decreased blood glucose levels (mean 131.0 ± 10.2 mg/dl) after a treatment period of 8 weeks and elevated body weight in healthy male Sprague Dawley rats compared to that of normal rats (blood glucose levels mean 153.4 ± 11.2 mg/dl). However, although there was a decrease in blood glucose level of the test group after three weeks of treatment the difference was not statistically significant up to 7 weeks. Treatment with *A. carambola* fruit pulp non-significantly decreased the blood glucose levels in healthy female rats after treating for 8 weeks, compared to that of control rats which could be due to hormonal changes in the female animals. This study demonstrates that the *A. carambola* fruit pulp has a hypoglycaemic effect on mammalian systems, which need to be investigated further.