

PHCOG MAG.: Research Article

The effect of the aqueous stem bark extract of *Kokoona zeylanica* Thw. on the blood glucose level of mice

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ABSTRACT

This study examined the blood glucose lowering potential of the aqueous stem bark extract (ABE) of Sri Lankan endemic plant - *Kokoona zeylanica* (Family: Celestraceae). This was tested in normoglycaemic mice using three oral doses (1800, 2500 and 3000 mg/kg of body weight). The results show a moderate but dose dependant acute hypoglycaemic activity with a fairly rapid onset (4 h). However, it did not have a hypoglycaemic effect in non fasted mice or in fasted mice (treated consecutively for 30 days). ABE did not improve the glucose tolerance test indicating the lack of antihyperglycaemic activity. However, ABE improved the sucrose tolerance test indicating the α -glucosidase inhibitory activity, which appears to be the main mechanism of hypoglycaemic activity. ABE was well tolerated (in terms of overt clinical signs of toxicity, hepatotoxicity and renotoxicity), and it did not provoke a change in the lipid profile. It is concluded that the ABE of *K. zeylanica* has a safe, moderate and acute hypoglycaemic activity

KEY WORDS: *Kokoona zeylanica*, Hypoglycaemia, Diabetes, Toxicity

INTRODUCTION

Kokoona zeylanica Thw. (Family: Celestraceae) is a large tree (20 - 35 m high) branched towards the top with a rough outer bark which is corky and grey in colour and an inner bark which is bright yellow or dark orange in colour. Leaves are obovate, cuneate at base, rounded or letuse at apex with serrated margins entirely or faintly. Flowers are in axillary panicles, bisexual and dull yellowish brown in colour, (1). *Kokoona* species occur in the Annamallay hills in India and in Sri Lanka. *Kokoona zeylanica* is endemic to Sri Lanka, which is rather rare in the country and found in forests (Pelawatte, Pasdun Korale, Ratnapura, Ambagamuwa, Udugama and Hiniduma) in moist regions between 1000 - 4000 feet altitude (2, 3).

According to phytochemical studies, the water extract has revealed the presence of alkaloids, saponins, terpenes and tannins in the inner stem bark of *K. zeylanica* (4). Twelve D:A-friedo-oleanane triterpenes have been isolated from the hot benzene extract of the inner stem bark of *K. zeylanica* (5). Zylasterone, pristimerin (6), minor triterpene and celastranhydride (7) are also recorded from the outer stem bark of *K. zeylanica* from the light petroleum extract.

In the traditional medicine, the inner bark is used as a treatment for snakebites, swollen joints, eye diseases, framboesia pimples and skin diseases. The inner bark may also be used to lighten the colour of the skin and for removing marks from the face. It is often used as a

snuff for severe headaches and the oil from the seed is used as a leech repellent (2). *K. zeylanica* is also claimed to be useful as a treatment for diabetes mellitus (2, 8, 9). Several of the multiplant decoctions for diabetes mellitus also contain the inner stem bark of *K. zeylanica* as one of the components (8). However, so far its effect on blood glucose level has not been scientifically investigated. The aim of this study was to examine the hypoglycemic potential, and the toxic effects of the aqueous stem bark extract of *K. zeylanica*.

MATERIALS AND METHODS

Plant collection authentication

The stem bark of *K. zeylanica* was purchased from D. Peris & Sons Ltd. Drug Merchants, Gabo's Lane, Pettah, Colombo and was identified and authenticated by Dr. M. Chandrasena of the Institute of Indigenous Medicine, University of Colombo. A voucher specimen of the leaves and bark (WDR/kokun) was deposited at the museum of the Department of Zoology.

Preparation of the ABE of *K.zeylanica*

The outer gray bark of the *K. zeylanica* was removed and the pieces of inner bark were dried in the shade for two days and powdered using a mechanical grinder (Sumeet Master No: 864, Sumeet machines Ltd, Nasik, India). The powder (750 g) was mixed with tap water and then refluxed with 4 l of tap water for two days in a round bottom flask fitted to a Leibig's condenser.