

RESEARCH ARTICLE

Hypoglycaemic effect of the methanolic extract of *Aporusa lindleyana* leaves on rats

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Abstract: *Aporusa lindleyana* is a medicinal plant, which is claimed to have a hypoglycaemic potential. This study was carried out to determine the hypoglycaemic effect, toxicity of long term usage and the phytochemistry of tender leaves of *A. lindleyana*. The hypoglycaemic effect of the methanolic leaf extract of *A. lindleyana* on the fasting and random blood glucose concentrations and the glucose tolerance were tested using three oral doses of the extract (100, 400, 800 mg/kg) in Sprague-Dawley rats. Sub-acute toxicity studies were performed after treating the rats for 28 consecutive days with the highest dose and were tested for different parameters. The results exhibit a dose dependent hypoglycaemic effect with the maximum blood glucose reduction observed at the 4th hour after the treatment. All three tested doses significantly reduced the fasting blood glucose concentration 4 hours after treatment. Only the intermediate and the highest doses showed a significant reduction in random blood glucose concentration in normoglycaemic non-fasted rats and a significant glucose tolerance, when tested on an oral glucose load. There was no significant difference in the physical and biochemical parameters in rats treated with the extract for 28 days compared to the control group. The extract contained alkaloids, saponins, flavonoids and leucoanthocyanins as revealed by phytochemical screening. It can be concluded that *A. lindleyana* leaves exhibit hypoglycaemic activity since they significantly ($p < 0.05$) reduce the blood glucose concentration in normoglycaemic rats and significantly ($p < 0.05$) enhances the glucose tolerance. The long term use of the leaf extract does not produce any toxic signs in rats.

Keywords: *Aporusa lindleyana*, blood glucose concentration, diabetes mellitus, hypoglycaemic effect, toxicity.

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder characterized by hyperglycaemia (Colledge *et al.*, 2010).

It is considered as a major public health problem and one of the leading causes of deaths in the world today. It is estimated that 370 million people will be affected by this disorder by the year 2030 (Kumar & Clark, 2009). Thus tight control of diabetes is essential.

The chemotherapy of diabetes mellitus includes oral hypoglycaemic drugs and insulin, but these agents possess many side effects (Joint Formulary Committee, 2009). Thus it is important to find a more effective hypoglycaemic agent with fewer side effects. There are herbal preparations used in Ayurvedic and other traditional systems of medicine, which are claimed to have a hypoglycaemic potential with fewer side effects (Ediriweera & Ratnasooriya, 2009). Many studies have been conducted to evaluate the hypoglycaemic effect of such medicinal plants having hypoglycaemic potential (Fernandopulle *et al.*, 1994; Ratnasooriya *et al.*, 2004; Kasiviswanath *et al.*, 2005; Sharma *et al.*, 2011).

Aporusa lindleyana (Wight) Baill, commonly known as 'Kebella' in Sinhala is an angiosperm medicinal plant belonging to the family Euphorbiaceae (Dasanayake & Clayton, 1997). The tender leaves of the plant are prescribed to diabetic patients as a food in Sri Lankan traditional medicinal system (Department of Ayurveda, 2004) and people use these leaves in the belief that the blood glucose concentrations will be reduced. The analgesic and antibacterial effects of the bark extract of the plant and the antioxidant activity of the root of the plant have also been scientifically proven (Badami *et al.*, 2005; Lingadahalli *et al.*, 2008). Only one report is available on the hypoglycaemic activity of the aqueous and alcoholic

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