Antidiabetic activity of *Pongamia pinnata* leaf extracts in alloxan-induced diabetic rats

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**ABSTRACT**

The antidiabetic activity of *Pongamia pinnata* (Family: Leguminosae) leaf extracts was investigated in alloxan-induced diabetic albino rats. A comparison was made between the action of different extracts of *P. pinnata* and a known antidiabetic drug glibenclamide (600 µg/kg b. w.). An oral glucose tolerance test (OGTT) was also performed in experimental diabetic rats. The petroleum ether, chloroform, alcohol and aqueous extracts of *P. pinnata* were obtained by simple maceration method and were subjected to standardization using pharmacognostical and phytochemical screening methods. Dose selection was made on the basis of acute oral toxicity study (50–5000 mg/kg b. w.) as per OECD guidelines. *P. pinnata* ethanolic extract (PPEE) and aqueous extract (PPAE) showed significant (P < 0.001) antidiabetic activity. In alloxan-induced model, blood glucose levels of these extracts on 7th day of the study were 155.83 ± 11.211 mg/dl (PPEE) and 132.00 ± 4.955 mg/dl (PPAE) in comparison of diabetic control (413.50 ± 4.752 mg/dl) and chloroform extract (210.83 ± 14.912 mg/dl). In glucose loaded rats, PPEE exhibited glucose level of 164.50 ± 6.350 mg/dl after 30 min and 156.50 ± 4.089 mg/dl after 90 min, whereas the levels in PPAE treated animals were 176 ± 3.724 mg/dl after 30 min and 110.33 ± 6.687 mg/dl after 90 min. These extracts also prevented body weight loss in diabetic rats. The drug has the potential to act as an antidiabetic drug.

**Key words:** Acute toxicity, alloxan, antidiabetic activity, *Pongamia pinnata*

**INTRODUCTION**

Diabetes mellitus is a serious complex chronic condition that is a major source of ill health worldwide. This metabolic disorder is characterized by hyperglycemia and disturbances in carbohydrate, protein and fat metabolisms, secondary to an absolute or relative lack of the hormone insulin. Besides hyperglycemia, several other factors including dyslipidemia or hyperlipidemia are involved in the development of micro and macrovascular complications of diabetes, which are the major causes of morbidity and death. According to World Health Organization (WHO) projections, the prevalence of diabetes is likely to increase 35% by 2020. Currently, there are over 150 million diabetics worldwide and this is likely to increase to 300 million or more by the year 2025. Statistical projection about India suggests that the number of diabetics will rise from 15 million in 1995 to 57 million in the year 2025, the highest number of diabetics in the world. Reasons for this rise include increase in sedentary lifestyle, consumption of energy rich diet, obesity, higher life span, etc. Other regions with greatest number of diabetics are Asia and Africa, where diabetes mellitus rates could rise to 2–3 folds than the present rates. Evaluation of plant products to treat diabetes mellitus is of growing interest as they contain many bioactive substances with therapeutic potential. In recent years, several authors have reported the antidiabetic potential of traditionally used Indian medicinal plants using experimental animals. Although a large number of medicinal plants have been already tested for their antidiabetic effects, several other Indian medicinal plants remain to be investigated.

*Pongamia pinnata* (Family: Leguminosae) is a medium-sized, glabrous, semi-evergreen tree, growing up to 18 m or higher, with a short bole, spreading crown with grayish green or brown bark. Leaves are imparipinnate, alternate, and leaflets are 5–7