

Antidiabetic potential of medicinal plants

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(Accepted : May, 2006)

SUMMARY

Since ancient times plants have been exemplary sources of medicine. Ayurveda and other Indian literature mention the use of plants in the treatment of various human ailments. India has about 45000 plant species and among them, several thousands have been claimed to possess medicinal properties. Researches conducted in last few decades on plants mentioned in ancient literature or used traditionally for diabetes have shown antidiabetic property. The present article reviews some such plants and their products (active, natural principles and crude extracts) that have been mentioned/used in the Indian traditional system of medicine and have shown experimental or clinical antidiabetic activity.

Key words : Indian; Ayurveda; Diabetes mellitus; Plants; Herbal medicine; Review

Diabetes mellitus (DM) is the common most endocrine disorder that effects more than 100 million people worldwide (6% of the population) and in the next 10 years it may affect about 5 times more people than it does now (ADA.,1997). In India, the prevalence rate of diabetes is essential to be 1-5% (Patel *et al.*,1986;Verma *et al.*,1986;Rao *et al.*,1989).

Historical accounts reveal that as early as 700-200 BC, DM was a well recognized disease in india and was even distinguished as two types; a genetically based disorder and other one resulting from dietary indiscretion. In india indigenous remedies have been used in the treatment of DM since the time of Charaka and Shushruta (6th century BC) (Grover and Vats., 2001).

Plants have always been an exemplary source of drugs and many of the currently available drugs have been derived directly from them. The ethno botanical information reports about 800 plants that may possess anti-diabetic potential. Several such herbs have shown antidiabetic activity when assessed using presently available experimental technique (Saifi *et al.*,1971;Mukherjee *et al.*,1972).

Wide array of plant derived active principles representing numerous chemical compounds have demonstrated activity consistent with their possible use in the treatment of NIDDM (Bailey and Day., 1989; Marles and Farns worth, 1995).among these are alkaloids ,glycosides ,galactomannan gun ,polysaccharides ,peptidoglycans , hypoglycans ,guanidine , steroids ,carbohydrates , glycopeptides ,terpenoids ,amino acids and inorganic ions. Even the discovery of widely used hypoglycemic drug, metformin came from the traditional approach of using *Galega officinalis*.

Thus plants are a potential source of antidiabetic drugs (and other too) but this fact has not gained enough momentum in the scientific community.

Diabetes mellitus:

In diabetes mellitus major contribution were in the

field of hypoglycemic action of various plant products and drug interaction of hypoglycemic agents. Alloxan or Streptozotocin (STZ) induced diabetic animal models were used in most of the studies.

Herbal drugs:

The herbal formulation D-400, which is the combination of *Eugenia jambulana* ,*Petrocarpus marsupium* ,*Ficus glomerulata* and *Ocimum sanctum* with other herbs ,showed a favorable response to alloxan induced hyperglycemia and renal damage in rabbits (Dubey *et al.*,1994). The increased glucose level, suppressed glycogen level and in-vitro decreased glucose uptake by liver slices in diabetic rats were brought to within normal levels by D-400 (Dhawan *et al.*,1996). The glucose tolerance of D-400 was also studied in STZ induced diabetic rats (Mitra *et al.*,1995).

Significant antidiabetic and antihyperlipaemic effect was reported with neem seed (*Azardirachta indica*) kernal powder in alloxan diabetic rats. (Bopanna *et al.*,1997) possible mechanism of antihyperglycemic effect of neem leaf extract was studied in normal and STZ induced diabetic rabbits. The reduction in peripheral utilization of glucose and glycogenolytic effect due to epinephrine action was blocked by the extract almost completely in diabetic rabbits and to certain extent in normal ones (Chttopadhyay, 1996).A significantly high level of metabolic enzyme , malate dehydrogenase was observed in STZ induced diabetic rats compared to control. Insulin as well as the leaf extract of *Aegle marmelose* treatment brought about a reversal of the Km values of these enzyme to near normal. More ever, *Aegle marmelose* was found to be effective as insulin in restoration of blood glucose and body weight to normal levels (Seema *et al.*,1996). Chronic administration of crude aqueous extracts of *Momordica charantia* Linn. and *Swertia chirayita* Buch. showed hypoglycemic effect in STZ treated rats and mice. *Swertia chirayita* was found to be more effective on chronic treatment.

Aqueous and ethanol extracts of caesalpinia bonducella seeds produced hypoglycemic effect in normal