

## Abstract

Diabetic prevalence reported in this study indicated that three districts (*Howrah, Kolkata and Burdwan*) of Bengal had high prevalence of diabetes and the prevalence was comparatively low in some other districts (*Purulia, Bankura, Dinajpur South and Dinajpur North*). Changes in diabetic prevalence at different districts of Bengal were observed due to different factors such as religion, eating patterns and physical activities and others. Of the dietary factors, a study was done to see the impact of dietary oils in diabetes and it was observed that sesame oil exhibited more beneficial effects, i.e., lowering of some of the undesired biochemical parameters (Fasting blood sugar, Low density lipoprotein cholesterol and Very low density lipoprotein cholesterol, total Cholesterol and High density lipoprotein cholesterol) in type 2 diabetic patients. A survey of commonly available plants having anti-diabetic effects at IIT Kharagpur campus was made and was duly authenticated by a herbalist. The anti-diabetic effects were reported based on IC<sub>50</sub> values of alpha amylase activities in these plants. Ten common plants in the IIT Campus (Kharagpur 1 Block) namely; *Acalypha indica, Allium cepa, Allium sativum, Azadirachta indica, Musa sapientum, Mangifera indica, Murraya koenigii, Ocimum sanctum, Phyllanthus amarus* and *Tinospora cordifolia* were thus chosen to find out the alpha amylase inhibitory activity of their extracts. Ethanol extracts of *Mangifera indica, Azadirachta indica* and petroleum ether extract of *Murraya koenigii* exhibited pronounced alpha amylase inhibitory effects in comparison to other extracts. These selected plant extracts were subjected to isolate and subsequently characterize the bio-active compounds using HPTLC, FTIR, ESI-MS and NMR. The active compounds azadirachtolide (tetranortriterpenoids), mangiferin (xanthone) and mahanimbine (carbazole alkaloid) were subjected to *in vitro* (alpha amylase and alpha glucosidase inhibitory activities) and *in vivo* anti-diabetic activities (streptozotocin induced diabetic rats). *In-vitro* and *in-vivo* results documented these compounds could be effective herbal remedies for type 2 diabetes with azadirachtolide showing the maximal response. Thus, the study may prove the utility of alternative medicines in rural Indian sectors and it needs further experimental validations.

**Keywords:** Diabetes, Edible oils, Natural products, *in vitro*, *in vivo*, Streptozotocin, Anti-diabetic, Hypolipidemic