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Viable Strategies for Screening Antidiabetic Potential of Medicinal Plants/functional Foods

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Progress in understanding the metabolic staging of diabetes over the past few years has led to significant advances in regimen for treatment of this devastating disease. The most challenging goal in the management of patients of diabetes mellitus is to achieve blood glucose level as close to normal as possible. The study included 3 plant foods (psyllium, oats & barley), 3 antidiabetic medicinal formulations and 8 Indian medicinal plants (*Ficus racemosa*, *Morus indica*, *Costus igneus*, *Tinospora cardifolia*, *Eugenia jambolana*, *Aegle marmeloes*, *Gymnema sylvestrae*, *Butea monosperma*) used in the management of diabetes were explored for the possible mechanisms of action using *in vitro* and *ex vivo* model systems such as, (i) Availability and diffusion of glucose (ii) Amylolysis kinetics (iii) α -glucosidase, sucrase and α -amylase inhibitory activity (iv) Potentiation of glucose uptake by yeast cells (v) free radical scavenging (DPPH). Three medicinal plants were subjected for *in vivo* evaluation in rats. Among foods, psyllium showed excellent glucose adsorption, glucose diffusion retardation amylosis followed by oats and barley. Similarly, the Ayurvedic formulations also adsorbed glucose effectively, inhibited its diffusion and also inhibited the enzymes. Although, all the medicinal plants exhibited good glucose adsorption capacity, excellent retardation of glucose diffusion was shown by *Morus*, *Costus*, *Ficus* and *Eugenia*. Similarly, *Morus*, *Ficus* and *Eugenia* showed strongest inhibitory activity on all the enzymes compared to others. 3 plants enhanced glucose uptake in yeast cells, which was dependent on both the glucose and sample concentration. Both *Morus* and *Ficus* exhibited >70% reduction in fasting blood glucose and led to the modulation of carbohydrate metabolizing enzymes and serum insulin to near normal levels. The observations strongly support the usage of these plants/foods as an adjunct in diabetes management.