

2021
AUGUST 20-21
Webinar

World Congress on **Diabetes and Pediatric Endocrinology**

Current and Future Scope of Terrestrial Plants and Marine Organisms Use for Anti-Diabetes Activity

Hedaeytullah Saju

Tehran University of Medical Science, Iran

Diabetes mellitus is the most common chronic and metabolic syndrome characterized by an increase in glucose levels due to absolute or relative insulin deficiency. Devasted beta-cells of the islets of Langerhans in the pancreas and consequently the development of insulin-dependent diabetes is one of the major pathological changes in the immune-regulation leading to co-morbidities. Thus, a slight inadequate regulation in the blood sugar may impose serious consequences on health. Though conventional drugs are effective but have some side effects. Medicinal plants and marine biological organisms have been shown to produce number of novel scaffolds. There has been a growing interest in looking for new metabolites from plants and organisms to treat disease. It was reported that different macro and micro plants and organisms in terrestrial and marine environment contain biologically active compounds with potential applications could be used as anti-diabetic drugs. Present study represents an in-depth review on the medicinal plants and marine biological organisms used as anti-diabetic in many countries. The antidiabetic activity of medicinal plants is attributed to the presence of polyphenols, flavonoids, terpenoids, coumarins and other constituents which showed reduction in blood glucose levels. It was also reported that some medicinal plants showed potential antidiabetic bioactivity for GDM (Gestational diabetes mellitus), severe maternal hyperglycemia on postnatal development of children and management of hormones deficiency production, uterine and placental deviations. Major plants includes *Trigonella foenum-graecum*, *Allium sativum*, *Carthamus tinctorius*, *Ferula assa-foetida*, *Bauhinia*, *Gymnema sylvestre*, *Swertia*, *Combretum*, *Sarcopoterium*, *Liriope*, *Caesalpinia bonduc*, *Coccinia grandis*, *Syzygium cumini*, *Mangifera indica*, *Momordica charantia*, *Ocimum tenuiflorum*, *Pterocarpus*, *Tinospora cordifoli*, *Salvia officinalis*, *Panax*, *Cinnamomum verum*, *Abelmoschus moschatus*, *Vachellia nilotica*, *Achyranthes*, *Fabaceae*, *Mentha*, *Asphodelaceae*, *Andrographis paniculata* L, *Artemisia herba-alba*, *Artemisia dracuncululus*, *Azadirachta indica*, *Caesalpinioideae*, *Pachira aquatic*, *Gongronema latifolium*, *Nigella Sativa*, *Tinospora cordifolia* (guduchi), *Chrysanthemum morifolium*, *Zingiber zerumbet*, *Zingiber officinale*, *Symphytum*, *Cactaceae*, *Symplocos*, *Perilla frutescens*, *Terminalia chebula*, *Kalanchoe pinnata* Lam, *Aframomum melegueta* Lin and *Aloe vera*. Seaweed is naturally grown macro plants with rich in nutrients. Several red, brown and green seaweed rich in anti-diabetes properties. Phenolic, methanolic extracts and protein hydrolysates from seaweed showed potential anti-diabetes activities. Polyphenol-rich extracts from seagrass reduced plasma glucose levels in diabetic rats. Marine plants showed to inhibit α -glucosidase, α -amylase significantly. Marine bacteria, cyanobacteria and actinomycetes found to be the inhibitors of α -glucosidase, α -amylase and β -glucosidase. The green microalgae showed stronger Anti-hyperglycemic capacities that could be used as a possible preventive agent for diabetic patients. Extraction of callispongynic acid from sponge showed inhibition activity α -glucosidase and α -galactosylceramide. Moreover, collagen, shark liver and fish oil could regulate metabolic nuclear receptors in type-2 diabetic patients and reduced glucose oxidation. In addition to these, marine bio resources such as algae, sponges have effective bioavailability in the treatment of gestational diabetes. Thus, this study can be used as a base for future research to explore the same on large scale.

Key words: Terrestrial plants, Marine organisms, Diabetes, Sugar, Hypoglycemia; Fetal Hyperinsulinemia; Glucose, Gestational diabetes.



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Biography:

Hedaeytullah Saju, PhD Research fellow of Tehran University of medical Science (TUMS), IRAN has completed his BUMS (Bachelor of Unani Medicine & Surgery) at the age of 25 years from Dhaka University, Bangladesh, and Post-graduation studies in MNSFT (Masters in Nutritional Science & Food Technology) from Islamic University, Bangladesh. He has completed "Diploma in Persian Medicine for Wellbeing" from Joint program of Tehran University of Medical Sciences (TUMS), European Medical Association (EMA) - Asian Chapter and Swiss Alternative Medicine (SAM). He peruses few special trainings like DDM (Diarrheal Disease Management) from ICDDR'B, Dhaka and Anti Diabetic Medicinal Plant with Animal Trialing system from Asian Network of Research on Anti-diabetic Plants (ANRAP). He was a R&D researcher of The IBN SINA Pharmaceutical Industry Ltd. Bangladesh. He has published many papers in reputed journals. He is the Member of Iranian Traditional Medicine Association.