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Guest editorial:

PHYTOCHEMICALS FOR TREATMENT OF DIABETES

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ABSTRACT

Diabetes Mellitus (DM) is one of the most prevalent metabolic disorders characterized by increased blood glucose levels and improper primary metabolism resulting from the defects in insulin secretion, insulin action, or both. It is one of the most common health problems worldwide, and the prevalence of this disease is rapidly increasing, leading to microvascular (retinopathy, neuropathy and nephropathy) and macrovascular (heart attack, stroke and peripheral vascular disease) complications (Umar et al., 2010). The number of individuals with diabetes is increasing due to population growth, aging, urbanization and increasing prevalence of obesity and physical inactivity. According to recent estimates, the greatest absolute increase in the number of patients with diabetes will be in India and the total number is projected to 79.4 million in 2030. It is expected that about 366 million are likely to be diabetic by the year 2030 (Rahman and Zaman, 1989). Medicinal plants are the main source of organic compounds such as polyphenols, tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids. These organic compounds represent a source for the discovery and development of new types of antidiabetic molecules. Many compounds isolated from plant sources have been reported to show antidiabetic activity. The table summarizes some recent information in the field of antidiabetic phytochemicals (Table 1).

Table 1: Recent studies investigating the phytochemicals for treatment of diabetes

Key message	Reference
Momordicine I and Momordicine II, stimulated insulin secretion significantly in MIN6 β-cells.	Kellera et al., 2011
Trans-tiliroside an a active principle of *Potentilla chinesis* decreased blood glucose level and total cholestrol, low density lipoprotein (LDL–C) and triglyceride levels in alloxan-induced diabetic mice and streptozotocin-induced diabetic rats.	Qiao et al., 2011
Eleutherinoside A from Eleutherine americana, displayed in vitro α-glucosidase inhibitory activity.	Ieyama et al., 2011
Kaempferol-3-neohesperidoside an active antidiabetic compound showed insulin mimetic action.	Trojan-Rodrigues et al., 2011
Bergenin, a major constituent isolated from *Caesalpinia digyna* Rottler (Leguminosae) displayed significant antidiabetic, hypolipidemic and antioxidant activity and regenerative effect on pancreatic β cells in Type 2 diabetic rats.	Kumar et al., 2012
Two new flavones isolated from *Callistemon lanceolatus* DC (Myrtaceae) characterized as 5,7-dihydroxy-6,8-dimethyl- 4′ -methoxy flavone and 8-(2-hydroxypropan-2-yl)-5-hydroxy-7-methoxy-6-methyl-4′-methoxy flavones exhibited blood glucose lowering effect in streptozotocin induced diabetic rats.	Syed et al., 2012

Table 1 (cont.): Recent studies investigating the phytochemicals for treatment of diabetes

Key message	Reference
Marrubiin, a constituent of *Leonotis leonurus*, increased the insulin level and glucose transporter-2 gene expressions in INS-1 cells.	Mnonopi et al., 2012
Three new germacrane sesquiterpenes obtained from *Tithonia diversifolia*, significantly increase glucose uptake without significant toxic effects in 3T3-L1 adipocytes.	Zhao et al., 2012
Alisol F and Alisol B compound of *Alismatis Rhizoma* displayed *in vitro* α-glucosidase inhibitory activity.	Li et al., 2012
Scrophuside, obtained from the roots of *Scrophularia ningpoensis* Hemsl. exhibited α-glucosidase inhibitory activity.	Hua et al., 2014
Iridoid glycosides, Ningposide I and Ningposide II obtained from the roots of *Scrophularia ningpoensis* Hemsl. showed α-glucosidase inhibitory activity.	Hua et al., 2014
Chalcomoracin, Moracin C, Moracin D and Moracin N are the compounds isolated from *Morus alba* exhibited a significant degree of α-glucosidase inhibitory activity.	Yang et al., 2012
Malonyl ginsenosides, from the roots of *Panax ginseng* showed significantly lower fasting blood glucose level, improvement of insulin sensitivity and improvement of lipid profile in diabetic rats.	Liu et al., 2013
6-O-galloyl-5'-hydroxy mangiferin, mangiferin, 5-hydroxy mangiferin, and methyl gallate are the compounds isolated from *Mangifera indica* reduced the blood glucose levels in alloxan-induced diabetic rats.	Md et al., 2013
1,2,3,4,6 Penta-O-galloyl-β-d-glucose, a bioactivity guided isolated compound from *Mangifera indica* inhibits 11-β-HSD-1 and ameliorates high fat diet-induced diabetes in C57BL/6 mice.	Mohan et al., 2013
Ginsenoside Re, exhibited antidiabetic activity by reducing insulin resistance through activation of PPAR-γ pathway by directly increasing the expressions of PPAR-γ2 and its responsive genes in 3T3-L1 adipocytes.	Gao et al., 2013
8-oxo-berberine isolated from *Berberis brevissima* inhibited Protein Tyrosine Phosphatase 1B (PTP 1B).	Ali et al., 2013
Chicoric acid isolated from *Ocimum gratissimum* L. reduced significantly the glycemic levels of diabetic mice.	Casanova et al., 2014
Asiatic acid, showed antidiabetic activity with improvement in the lipid profile in rats.	Ramachandrana et al., 2014

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