Review Article

Review on Diabetes and Its Medication

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\begin{abstract}
Diabetes mellitus is one of the chronic metabolic disorders. It causes number of complications like retinopathy, neuropathy and peripheral vascular infections. In the worldwide, nearly 2.8\% of the population suffers from this disease and it may cross 5.4\% by the year of 2025. Oral hypoglycaemic agents like sulphonyl ureas and biguanides are used for the management of diabetes, but they have some side effects so interest is growing on usage of herbal medicines. In Indian systems of medicine, nearly 100 medicinal plants are used for treatment of diabetes. Phyto-constituents like Alkaloids, Flavanoids, Coumarins etc. responsible for antidiabetic activity. In this review focuses out of large no of herbal drugs stated posses to anti-diabetic activity, some of the medicinal plants like Abelmoschus esculentus, Bidens pilosa, Carica papaya, Catharanthus roseus, Ficus racemosa, Gongronema latifolium, Michella champaca, Oreocinide integrifolia, Ruellia tuberosa Tammarindus indica, with their phyto-constituents and other pharmacological effects.
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\begin{keyword}
Diabetes mellitus, Sulphonyl ureas, Hypoglyeamic, Medicinal plants.
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\section{Introduction}
Diabetes mellitus is a disorder of homeostasis characterised by the elevation of both basal and postprandial blood glucose concentration. It affects about 15 million people in United States of America. The major two forms of diabetes are type-I and type-II. Type-I Diabetes mellitus is autoimmune disease triggered by a viral infection or autoimmune factor it resulting in destruction of B cells to leads to severe insulin deficiency, ketoanemia and
ketoacidosis. It also called as Insulin-dependent diabetes mellitus (IDDM) because it requires exogenous insulin for survival. Type-II Diabetes mellitus is heterogeneous disease of insulin resistant and obesity. It is called non-insulin dependent diabetes mellitus (NIDDM). It can be treated by oral by oral anti diabetic medication. Additional forms of diabetes mellitus include Gestational diabetes which has onset its onset during pregnancy and secondary diabetes which occurs in associated with other endocrine disorders and exposure to drugs or chemical agents that are toxic to pancreas (George and Craig, 2008).

Diabetes is also frequently associated with the development of macro and micro vascular diseases which include neuropathy, nephropathy, cardiovascular and cerebrovascular diseases (Feldman, 1988). In the world wide prevalence of Diabetes for all age groups was estimated to be 2.8% in 2000 and it is increase to be 5.4% in 2025. In India, nearly 30 millions of people are suffered with diabetes (Patel and Srinivas, 1997). Currently a number of therapies are available for diabetes which includes insulin and also different oral anti-diabetic agents like sulfonylurea, biguanides, α-glucosidase inhibitors and guanides (Patel and Srinivas, 1997). By using these drugs diabetes mellitus is not completely cured, insulin therapy is beneficial only but it is has draw backs like resistance of insulin, anorexia and fatty liver on long term use (Piedrola et al., 2001).

Presently, interest is growing on herbal remedies due to the adverse effects and undesirable side effects of synthetic drugs; demand was increased for herbal drugs. Herbal drugs can effectively treat diabetes and are considered as less toxic, fewer side effects and low cost compare to synthetic drugs, so herbal drugs are prescribed (Vershophol, 2002). According to World Health Organisation (WHO), 3.5 billion people depend on medicinal plants for their primary health care (Balick and Cox, 1996).

The WHO recommended the use of herbal medicines because of their effectiveness and minimal side effects, herbal drugs are prescribed widely even their biological compounds not known (Valiathan, 1998). Pharmacological actions of plants products related to their chemical composition. Phyto-constituents like Alkaloids, Flavanoids, Triterpinoids, Phenolic compounds, Coumarins, Polysaccharides, Steroids, Lpidids which reduces blood glucose level in humans and animals (Jung et al., 2006). The Ethnobotanical information reports about 1000 plants may posses anti-diabetic activity and used as folk medicines (Marles and Farnsworth, 1995). In Indian systems of medicines more than 100 medicinal plants are mentioned for treatment of diabetes mellitus which can be used by single or in combinations (Gravel et al., 2002). In this review article it enumerates some medicinal plant species possessing hypoglycaemic properties based on experimental animal models such as Abelmoschus esculentus, Bidens pilosila, Carica papaya, Catharanthus roseus, Ficus racemosa, Gongronema latifolium, Michella champaca, Orecinide integrifolia, Ruellia tuberosa

2. Description
1. Abelmoschous esculentus:
Abelmoschous esculentus is commonly known as Ladies finger it is used as vegetable belongs to the family Malvaceae (subrymanyam et al., 2011). Traditionally Abelmoshus was used in various diseases and medicines such as antidiresspasant (Patro ganesh et al., 2009), antioxidant (Ansari et al., 2005), anti ulcer (Gurbuz et al., 2003) and also used as suspending agent in different formulation (Ravikumar et al., 2009). Aqueous and ethanolic extracts of Abelmoschus esculentus was showed hypoglycaemic activity in alloxan-induced diabetic rats (Dibayajothi Saha, Bindu jain, vibhor jhan, 2011). It contains deferent chemical constituents like carbohydrates, proteins, Flavanoids, Phenolic compounds, Tannins, Gums and Muiclages (Dibya jyothi saja, Bindu jain, Vibhor jhan, 2011).

2. Bidens pilosa:
Bidens pilosa Linn var radita it is weed belongs to the family Asterarces (Farah Deba et al., 2008). It is a tropical weed present in tropical and subtropical regions. It is widely distributed in pacific region and also Asia including Miyako, Island. Okinawa, Japan (Shinji Nakama et al., 2012). Aqueous extract of Bidens pilosila contain anti hypoglycaemic effect in streptozocin induced diabetic rats. It significantly decreased blood glucose level and increased serum levels it is mainly due to stimulation of pancreatic islets and increases insulin secretion (Yi-jou tesu et al., 2009). Ethanolic extract of Bidens showing anti-malarial acting against Plasmodium falciparum (Brandao et al., 1997). Other than this Bidens used as anti-inflammatory, antiseptic, liver protective (Dimo et al., 2002) and also anti-microbial and pesticide action, it is a labour facilitates in chiel birth, (Lango frida et al., 2008).

Anti-hyptensive (Theophile Dimo et al., 2002),antiviral specially acting against Herpes simplex virus (Shionji Nakama et al., 2012). Antioxidant, essential oil of this plant antibacterial and antifungal activities contain (Farah Deba et al., 2008). This plant mainly consists of phenyl propanoid glucosides, flavanoids, flavanoglycoside. Polyacetylenes and di-terpenes and 44 components are identical in essential oil mainly terpenes (Farah Deba et al., 2008).

3. Carica papaya:
Carica papaya is a perennial herbaceous plant belongs to the family Caricaceae (Ocagunju et al., 2009). It is distributed in all of world mainly cultivated in Srilanka, Tanzania, India, Hawaii, Florida, Philippines, South Africa and Austria (Park Miind and Gurditta, 2011). Aqueous seed extract of papaya having hypo-glycaemic and hypolipidemic effect it reduce significant blood glucose level (Adeneye, Olangunju et al., 2009). This plant contains chemical constituents like Enzymes, Carotenoids, Alkaloids, Flavanoids, Minerals, Vitamins, Glucosinomlates (Park Miind, Gurditta, 2011). Traditionally papaya is used in deferent diseases it contain various medicinal and
pharmacological properties like anti-fertility, antifungal, antiasthmatic, antimicrobial, anti-malarial, hepatoprotective, diuretic, immunomodulator and also used in the treatment of diarrhoea, jaundice, fever and asthma (Krishna et al., 2008).

4. Catharanthus roseus: Catharanthus roseus is shrub it is commonly called as Madagascar periwinkle or Nayanatara belongs to the family Apocynaceae (Karuna et al., 2010). It is cultivated in South Africa, India, U.S.A, Europe, Australia, and Carabean islands (Kokate, 2001). C. roseus contain nearly 130 Alkaloids mainly Vincristine, Vinblastine, Ajmalicine etc. Dichloromethane: methanol extracts of Catharanthus roseus having anti hyperglycaemic effect in alloxan-induced diabetes in rats at the dose of 500 mg/kg body weight for 20 days. Hypoglycaemic effects mainly due to by acting on hepatic enzymes like hexokinase, glucose 6-phosphate, fructose and 1-6-biphosphatase.

C. roseus significantly increased hexokinase enzyme and decreased fructose, 1-6-biphosphatase (Jayanthi et al., 2010). Other than hypoglycaemic effects this plant consists of anti-tumour, antispasmodic, antimutagenic, anti-fertility, antihypertensive, antifungal, anti-inflammatory, anti-diuretic, anti-malarial, anti bacterial, antiviral, cardiotonic, CNS depressant and cytotoxic activity (Junaid aslam et al., 2010).

5. Ficus racemosa Linn
Ficus racemosa is commonly known as Ficus glomerata Roxb belongs to the family Moraceae (Padamaa M prakash, 2008). This plant mainly distributed in Himalayan regions, Punjab, khasia mountain, Chota Nagpur, Bihar, Orissa, West Bengal and Rajasthan (Pedma M parkas, 2008). Ficus species mainly contains chemical constituent like Alkaloids, Carbohydrates, Flavanoids, Glycosides, Saponins, Steroids, Tri-terpenoides, Tannins, Phenols and Fixed oils and Fats (Poongothai et al., 2011).

Ficus racemosa contain hypoglycaemic effect ethanolic extract of F. racemosa contain anti-hyperglycaemic and hypolipemic effect in Alloxan-induced diabetic rats. Blood glucose level was decreased by inhibiting endogenous synthesis of lipids probably by penetrating the insulin secretion (Sophia and Manoharan, 2007). Other than this it acts as antioxidant, anti-diarrhoeal, anti-inflammatory, antibacterial, hepatoprotective, anti-diuretic, antitussive, analgesic, anithelmintic, anti-cholinesterase wound healing properties and also used in the treatment of bronchitis, smallpox, mumps, heamaturia (Abu Hasamat Zulfiker et al., 2011).

6. Gongronema latifolium:
Gongronema latifolium Locally known as uttazi belongs to the family Asclepiadaceae (P.A Akah et al., 2019). It is a climber distributed in south Eastern and Asokeke in the South-Western parts of Nigeria (Nwanco et al., 2006). It contain Alkaloids, Flavonoids, Saponins & Tannins (Akuodor et al., 2010). Methanol extract of G. latifolium contain significant anti-diabetic activity in alloxan-induced diabetes in rats at the dose 200-800 mg/kg/day in dose dependent manner (Akah et al., 2011). This effect may be regeneration of islet beta cell following destruction by alloxan (Akah et al., 2011). Ethanol extract of G. latifolium leaf having in-vivo schizonticidal activity in blood brain chloroquine sensitive plasmodium berghei in mice (Akdoor et al., 2010).

7. Michelia champaca:
Michelia champaca is commonly known as swarn champaca belongs to the family Magnoliaceae. This plant is widely used in Ayurveda and homeopathic medicine such as emenagogue, purgative, inflammation, constipation, astringent, fever, cough, wound healing activity (Dwajani, Tara shanbhag, 2009). Flowers of Michelia showed anti-diabetic activity in alloxan induced rats it is significantly reducing blood glucose level (Edwin jarlad, Joshi and Jain, 2002). Whole plant of Michelia exhibited broad spectrum antibacterial activity (Khan, Khara, Omolosa, 2002).

8. Oreocinode interifolia:
Oreocinode interifolia is commonly known as tree belongs to the family Urticaceae. It is widely distributed in India, China, Bhutan, Indonesia, Loas maynmar, Skkim and Thailand (Chen et al., 2003).

9. Ruellia tuberosa:
Ruellia tuberosa is commonly known as Mimmer root is tropical pernial with hairy stem belongs to the family Acanthaceae. It is a tropical plant and widely distributed in Southeast Asia (Chawan-fwu Lin et al., 2006). Methanolic and n-hexane extract of R. tuberosa has hypoglycaemic activity in alloxan-induced diabetic rabbits. These extracts reduced blood glucose level at the dose of 100mg/kg and 150mg/kg (shawara et al., 2011). Other than this it is used as diuretic, antipyretic, analgesic, anti hypersensitive, thirst quenching and antidotal, it is also acts against different bacterial and fungal organisms (Arirudan et al., 2011).

Leaves of Ruellia tubersa contain different chemical compounds like Apigenin and Luteoelin and seed oil yields Myristic acid, Capril acid and Lauric acid, Flavanoids, Glycosides, Phenols, Saponins and essential minerals with good nutritive value and secondary metabolites (Chawan-fwu Lin et al., 2006).

10. Tammarindus indica:
Tammarindus indica Linn commonly known Tammarind belongs to the family Fabaceae, it is widely distributed Africa and South Asia (Doughari, 2006). Aqueous extract of seeds of tamarind having anti-diabetic activity, it reduces blood glucose level in streptozotocin-induced diabetic male rat at the dose of 100mg/kg. The anti-diabetic activity of Tamarindus by significantly decreases activities of glucose-6-phosphate, liver and kidney glutamate transminase (GPT) (Maiti et al., 2004). Ammarindus contain chemical constituents like alkaloids, glycosides, cardiglycosides, flavanoids, saponins (Naznin and Monirul Islam, 2009). Traditionally tamarind used in food preparation it is used to make curries, salds, soups, leaves and fruits are used as vegetables (Emmy De clave, Katerina Halmova, patrievan Damme, 2010). Other than nutritional values, it also contain anti neutrinal factors like it acts as antifungal, anti-inflammatory, antiviral, antinumatodal, molluscidal, cytotoxic activity (Emmy De clave, katerina Halmova, Patrievan Damme, 2010). It is also used in eye

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surgery for conjunctival cell adhesion and corneal wound healing (Burgalassi et al., 2010), used in fever, dysentery, jaundice, gastrointestinal disorders (Ferraria, 2005).

3. Conclusion
Diabetes mellitus is a most common endocrine disorder affecting more than 300 million people worldwide. For this, allopathic medicines are developed but which often-limited in efficacy and risk of side effects and cost. In this review, a list of anti-diabetic plants used for management of diabetes mellitus. Treating of diabetes with plant derived compounds has a significant or negligibly side effect, available at low costs. Health professionals, scientists, therapists, and scholars working in pharmacology and therapeutics to develop evidence-based alternative medicine to cure different kinds of diabetes in man and animals. More investigations in the fields of isolation and identification of active constituents, preparation of standardised dose and dosage regimen and evaluate mechanism of action of herbal drugs can play a significant role in developing of herbal remedies for anti-diabetic activity.

4. References

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[34] Padma M Prakash, Focus recemosa Linn. An overview of natural product radiance, 8(1), 2009, 84-90.


