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An insight on herbal drugs for managing diabetes and its complications

Akhilendra Tiwari[1*], Naveen Chaudhary[2]
[1, 2] Mandsaur University, SH-31, Mhow Neemuch Bye-Pass Road, Mandsaur, India

Abstract
The incidences of lifestyle diseases are very common and large proportion of population is getting affected. The cases of diabetes, obesity and cardiovascular diseases had shown enormous progression in the last decade and evolved as the most focused area of drug discovery and formulating research. Herbal medicines are also contributing as an alternative therapy, due to their vast efficiency in disease management and also these medicines have less or none side effects. Indian herbs are getting popularity with the scientific exploration of its rich flora and fauna for anti-diabetic potential. Many Indian medicinal plants are worldwide used in herbal preparations and people are striving them for the achievement of good health in case of chronic cases of diabetes also. Plants like Eugenia jambolana, Allium cepa, Pterocarpus marsupium, Syzigium cumini, Trigonella foenum graecum, Gymnema sylvestre etc are few extensively explored plants. The search of new molecule and phytopharmaceutical from many such Indian herbs for the effective treatment and management of diabetes is the thrust area of research. Many anti diabetic polyherbal formulations prepared from Indian medicinal plants are also available in the market and becoming the preferred choice in the long term treatment and management of diabetes. The global acceptance had laid to the development and growth of many new herbal preparation industries and now they are also contributing a major share in the health care product market both globally as well as in the domestic market.

Keywords: Indian medicinal plants, alternate therapy, diabetes, herbal preparation industries

1. Introduction
Diabetes mellitus is a common metabolic disorder and becoming very common in many developed country and slowly it is escalating in developed country as well. Recently around 20 million cases of diabetes are diagnosed in African region. The scientists are working on development of new synthetic molecule and have become one of the trust areas of research. The contribution of herbal medicines in the effective management and cure of diabetes is remarkable and many new plants are now explored to find out the natural anti-diabetic agents. The usage of synthetic drug is associated with long term complications and have many major side effects along with they are restricted to be use during many conditions like pregnancy. Indian medicinally plants research on diabetes is phenomenal and tremendous successful research had laid to the development of newer and better herbal preparations that are effective and no side effects have been observed. So the aim of the present review is to gather the available data related to medicinal plants having anti-diabetic potential reported in pharmaceutical journals.

2. Important medicinal Plants with Anti-diabetic potential
2.1 Acorus *calamus*
The anti-diabetic study on Acorus *calamus* using Streptozotocin induced diabetes model showed reduced blood glucose level. The oral administration of the extract (methanolic) was also having beneficial effect on the reduction of lipid profiles including LDL, HDL, total cholesterol and other enzymes like glucose 6-phosphatase, aspartate aminotransferase, hepatic markers enzymes etc [1].

2.2 *Catharanthus roseus*
A very common Indian medicinal plant Catharanthus roseus revelled reduction in blood glucose level and it also proved to enhance the plasma insulin level. A 15 days study on streptozotocin model have also been explored for the management of lipid profile like total cholesterol, LDL, VLDL etc. And showed significant reduction [2].

2.3 Coccinia indica
The plant is widely distributed in India. The Coccinia indica is used for the cure and management of diabetes, skin disorders etc. in ancient ayurvedic and unani system of medicine [3]. The alcoholic extract consisting of soluble alkaloids of Coccinia indica leaves have been found to possess hypoglycemic activity. The active phytochemical responsible for the activity was beta sitosterol [4]. In the similar study the isolated pectin from the Coccinia indica fruit also demonstrated the hypoglycaemic activity. The probable mechanism of action was the stimulation of enzyme glycogen synthetase and also the decrease in phosphorylase activity [5].

2.4 Costus speciosus
Costus specious rhizome extract consist of one of the active phytochemical as Eremanthin. The study on hypoglycemic and hypolipidemic potential of the compound showed reduction in various lipid parameters like total cholesterol, LDL and also found to posses enhancement of plasma insulin level [6].

2.5 Emblica officinalis
The plant is found to grow in all parts of the country. It is also widely distributed in Sri lanka, Pakistan, china and

South east Asia. The plant is small to medium size and grow at an height of 8-18 meters. The pharmacognostic features of plant include bark with light grey colour, leaves are light green and pinnate in arrangement, fruits pale yellow in colour and possess six obscure vertical furrows and flowers have greenish yellow appearance. The amla fruits are very rich in Vitamin C. Overall the plant contains many active phytochemicals like tannins, phenols, alkaloids etc. It is been used in many ayurvedic formulations from ages. The recent scientic study on ethanolic extract of seed powder have shown to possess blood glucose reduction potential and also affect serum cholesterol. The study was performed in alloxan induced anti-diabetic model [7].

2.6 Senna auriculata

Recent pharmacological study on anti-diabetic and hypolipidemic possibilities of leaf extract of *Senna auriculata* using alloxan induced diabetic model showed that the extract at an dose of 150 mg/kg body weight of rat have significant potential in lowering the lipid profile including total cholesterol, triglycerides, LDL along with reduction in SGOT, SGPT levels. The extract was also proved to reduce the blood glucose level to normal [8]. The herb found to contain many medicinally important active constituents including flavonoids, saponins, terpenoids, phenols etc. and the ethnopharmacological evidences of the plant as an anti-diabetic herb is now been scientifically proven.

2.7 Hibiscus rosa sinensis

It is commonly known as Chinese hibiscus and China rose also have proven potential as an antihyperglycaemics. The study on aqueous extract of aerial part of the plant reported to have blood glucose level, urea, uric acid and creatinine reduction property and also increases insulin activity at an dose of 500 mg/kg. The activity was conducted using streptozotacin-induced diabetic rat's model. It also showed to improve damages caused due to streptozotacin in liver and kidney [9].

2.8 *Syzygium cumini. Linn. Gymnema sylvestre. (Retz.) Schult*

Both the drugs were studied for its effect on blood glucose level. The aqueous extracts were showed to reduce blood glucose in significant manner at 2 to 4 hours of drug administration. The study uses the fasting normal and streptozotocin (STZ)-induced model and the response of drug extract on oral glucose tolerance was also studied in normal fasting rat. In both the cases the blood glucose level reduces at an marked level and thus both the plants can be explored in the preparation of herbal anti-diabetic formulation [10].

2.9 Cinnamomum zeylanicum

The herb is found in the geographical locations of East Asia and Europe. The usage of the plant in traditional medicine for the cure and management of diabetes is evidenced in ancient literatures. Majority of the drug component is volatile oil as cinnamaldehyde. It is reported to increase the level of insulin along with hepatic glycogen and HDL [11].

2.10 Argemone Mexicana L

The plant Argemone Mexicana L. Belongs to the family Papaveraceae. The common name of the plant is prickly poppy, Kateli. It is distributed in many parts of India specially Rajasthan. The plant is reported to possess anti-diabetic activity of aqueous and ethanolic extract of the entire plant, when explored using alloxan induced anti-diabetes model. The photochemical investigation revelled the presence of many phytopharmaceuticals [12]. The major bioactive constituents of Argemone Mexicana L. includes alkaloids like berberine, optisine, chelerythrine etc. which may be responsible for the activity.

2.11 Trigonella foenumgraecum

It is commonly identified as fenugreek seeds. The major chemical constituent responsible for the anti-diabetic activity of the seeds is galactomannan that causes the increase in the production and release of insulin. It have shown to reduce both fasting as well as postprandial level of blood glucose. The continuous use of seed also slow down the absorption of glucose and reduces elevation of blood glucose post meal as well. In type I diabetes it stabilizes glucose homeostasis both in the liver as well as kidney [13]. The other phytochemicals of the seeds includes proteins, steroids, saponins, flavonoids, coumarin, volatile oil etc [14].

2.12 Picrorrhiza kurroa (Scrophulariaceae)

Picrorrhiza kurroa is a small herb distributed from the regions of Himalaya and Sikkim. The anti-oxidant potential of the rhizomes of herb is recently been explored and shown to have free radical scavenging activity and also inhibit lipid peroxidation in rat liver homogenate [15]. The plant reported to possess anti-diabetic activity in alloxan induced diabetes. The possible mechanism is its free radical scavenging activity that prevent pancreatic damage due to oxygen free radical since alloxan causes tissue damage mainly through free radicals [16].

2.13 Cinnamomum tamala

Recently ethanolic extract of leaves of Cinnamomum tamala showed to have hypoglycaemic activity and the comparision was done with the standard drug glibenclamide in alloxan induced diabetes model. The results suggested that the herb have potent activity and is comparable with the standard drug. This shows that the medicinal plants can be used as an alternative to synthetic drugs and further study on molecular mechanism behind the activity should be studied [17].

3. Conclusion

The medicinal plants are explored widely in search of identifying remedy for many life threatening diseases and also the diseases that continuous throughout the life. The ayurvedic system of medicine is one of the ancient system of our country and the climatic conditions favours the presence and growth of many rare medicinal plants with potent activities. Though the scientific developments are taking place much in the area of synthetic drug development, but still much development on herbal research in the last decade had drag the attention since these remedies are blessed with no side effect terminology. The bioactive compounds isolated from these herbs plays an important role in the maintenance and feeling of well-being in many life aspects. These plants are widely tested for their anti-diabetes potential and are playing an equivalent role in the treatment and management of worldwide issue of metabolic disorder as diabetes as that of synthetic drugs. In some cases they have gained the popularity as an alternative

therapy whereas some are using it as the only remedy for curing the disease. The data on anti-diabetes research is available at a very high rate, but the need of an hour is to use the information to develop novel and synergistic formulations to eradicate the disease in all aspects. The demand of herbal drugs is also increasing day by day, so the scientific community must focus on minimizing the time required to screen the plant and isolate the active phytopharmaceuticals for natural drug development. If we keep the correct direction than definitely these natural cure resources will surely help us in finding the safest solution to the toughest disorder. The present review will thus help in identifying few of the Indian medicinal plants that have been explored scientifically and can be used to generate newer and better anti-diabetic formulation.

4. References

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