SCIENTIFIC EVALUATION OF TRADITIONAL PLANTS HAVING ANTIDIABETIC POTENTIAL - A REVIEW

*Dr. Abhishek Gupta and Prof. Vk Joshi

Sri Sai Ayurvedic Medical College, Aligarh U.P.

ABSTRACT

Diabetes mellitus is a universal problem affecting human societies at all stages of development. It is a condition where sufficient amount of insulin is either not produced or the body is unable to use the insulin that is produced, leading to excess glucose in the blood. Insulin is the hormone that enables glucose uptake and utilization by the body cells for energy supply. Now a days, it is the most complicated syndrome and everyone wants something different, effective without hazards for this problems. From the beginning plants were the only source for curing any disease. India has a rich tradition of plant-based knowledge on healthcare. A large number of plants/plant extracts/decoctions or pastes are equally used by tribals and folklore traditions in India for treatment of diabetes. The present review thus attempts to analyze the ethnobotanical knowledge base for treatment of diabetes which includes a usage of plants, methods employed by tribals and folklore practices prevailing in India. A large number of plants used in tribal and folklore with enormous potential have not been validated for their antidiabetic potential. This review therefore attempts to bridge the lacunae in the existing literature and offers immense scope for researchers engaged in validation of the traditional claims and development of safe and effective and globally accepted herbal drugs for diabetes.

KEYWORDS: Diabetes, Ayurveda, Herbal drugs, Prameha.

1. INTRODUCTION

Diabetes is the single most important metabolic disease that affects nearly every organ/system in the body. Today diabetes affects more than 135 million people worldwide and that number is expected to increase to 300 million by 2025. To tackle diabetes effectively, a comprehensive treatment is required. Now, attention is diverted to herbal formulations due to
their versatile role in diabetes without side effects, especially in treating type 2 diabetes or NIDDM[1]. Since ages, plants have remained important sources of medicines in our country which is evidenced through their uses in traditional system of medicine i.e. Ayurveda. At present Over 80,000 species of plants are in use throughout the world. Realizing the importance of medicinal plants as a natural source of newer medicines, now the world is moving towards the plant based medicine or phytomedicines that repair and strengthening bodily systems (especially the immune system, which can then properly fight foreign invaders) and help to destroy offending pathogens without toxic side effects. Owing to various side effects of allopathic/synthetic medicine, plant based medicines are gaining popularity in world market as a whole. In the last few decades there has been a global upsurge in the use of traditional medicine and complementary and alternative medicines in both developing and developed countries.

Medicinal plants are being used since time immemorial, for treatment of various diseases. Diabetes as a medical problem was first discussed by Maharishi Agnivesh in Agnivsha Samhita (later known as Charaka Samhita) as Prameha[2]. Besides the classical systems of Indian Medicine, the folk and the tribal medicine also employ a number of plants and animal products for treatment of diabetes and many other diseases. Some of these plants have been screened scientifically for the evaluation of their antidiabetic activity in different pharmacological models and human subjects, but the potential of most of the plants remain unexplored. Ethno-botanical information on plants used in India for treatment of diabetes is widely scattered and only few papers have reported ethno-medicinal uses of plants for diabetes. The present paper will present a review of plants used in tribal and folklore people for their Antidiabetic potential.

2. OBSERVATION
Here we discuss about most of the plants used in Diabetes, about there habit, part used, phytochemical constituents and type of study whether it is experimental or clinical trial and the presence of antioxidant activity. These are mentioned in Table 1 and 2.

3. DISCUSSION
DM is a very common health problem; almost 3% of the world population or 100 million people suffer from it. [77]. In this review we discuss about those plants which having highest antidiabetic potential. Antidiabetic potential of these plants due to their phenolic, flavnoid and glycosids contents. Theses contents have potential to increase the insulin secretion. Some
of plants those are discuss here having potential to increase the insulin secretion from pancreas due to their phenolic and flavanoid contents are Acacia Arabica[78], Aegle marmelos[79], Aloe vera[80], Eugenia jambolana[25], Ficus bengalensis, Gymnema sylvestere[81], Pterocarpus marsupium[82], Tinospora cordofilia[25]. Some plants having beta cell rejuvenating, regenerating and beta cell stimulating property like Aegle marmelos, Vinca rosea, Pterocarpus marsupium, Gymnema sylvestere[83]. Some plants having high fiber contents that inhibit carbohydrate digestive enzymes and stimulate the insulin secretion like Trigonella foenum graecum seeds[84]. In pathogenesis of diabetes free radicles are the major cause for diabetes and its complication as many studies says [85,86]. Reactive oxygen species are reported to be formed in different tissues in diabetes that will cause oxidative damage to DNA of different cells[87]. All the plants having antioxidant activity which decrease reactive oxygen species in tissues and also support for the regeneration of beta cells of pancreas that leads to increase insulin secretion. Now a days there are so many modern medicine are under use for the management of diabetes like sulfonyle urease derivatives, biguanides, thiazolidinediones, alpha-glucosidase inhibitors etc. but all have some its side effects, so now a days people are attracting towards herbal plants for its management. In this article we explore those life saving plants with scientific parameters.

Table 1: Ethno-botanical information on Indian plants used in treatment of Diabetes.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Plant name</th>
<th>Family</th>
<th>Habit</th>
<th>Plant part used</th>
<th>Phytochemical Constituents</th>
<th>Type of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Species</td>
<td>Family</td>
<td>Type</td>
<td>Part(s)</td>
<td>Description</td>
<td>References</td>
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<td>-----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>9</td>
<td><em>Embelica officinalis</em> Geart.</td>
<td>Euphorbiaceae</td>
<td>Tree</td>
<td>FR</td>
<td>Highest amount of Vitamin C (ascorbic acid), low and high molecular weight tannins 30%, phylemmin (2.4%), phyllemblic acid (6.3%), gallic acid (1.32%), ellagic acid in natural form and cytokine like substances identified as Zeatin, Z riboside, Z nucleotide. Amla fruit ash contains chromium, 2.5; zinc, 4; and copper, 3 ppm[22]</td>
<td>Experimental[23]</td>
</tr>
<tr>
<td>11</td>
<td><em>Ficus bengalensis</em> Linn.</td>
<td>Moraceae</td>
<td>Tree</td>
<td>LF, FR, BK</td>
<td>Leaves contains: quercetin-3-galactoside, rutin, and beta-sitosterol, and its bark contains leucoanthocyanin and two flavonoids[29]</td>
<td>Experimental[30, 31]</td>
</tr>
<tr>
<td>13</td>
<td><em>Murraya koengii</em> Linn.</td>
<td>Rutaceae</td>
<td>Tree</td>
<td>LF</td>
<td>Mahanimbine, Murryacine, Mahanimbicine[ 38]</td>
<td>Experimental[38]</td>
</tr>
<tr>
<td>15</td>
<td><em>Pterocarpus santalinus</em> Linn.</td>
<td>Santalaceae</td>
<td>Tree</td>
<td>HW, OIL</td>
<td>isoflavonoids, terpenoids, and related phenolic compounds, β-sitosterol, lupeol, (-) epicatechin [ 41]</td>
<td>Experimental[42]</td>
</tr>
</tbody>
</table>
BD-Bud; BK-bark; FL-flower; FR-fruit; INF-inflorescence; LA-latex; LF-leaf; PE-petiole; RH-rhizome; RT-root; SH-shoot; TU-tuber; WP-whole plant; SD-Seeds; ST-Stem; HW-Heart wood; FP-Fruit pulp; SB-Stem Bark;

Table 2: Presence of Antioxidant Activity

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Plant name</th>
<th>Presence of Antioxidant Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Acacia arabica</em> Willd.</td>
<td>+[57]</td>
</tr>
<tr>
<td>2</td>
<td><em>Aegle marmelos</em> Corr.</td>
<td>+[58]</td>
</tr>
<tr>
<td>3</td>
<td><em>Azadirachta indica</em> A.Juss.</td>
<td>+[59]</td>
</tr>
<tr>
<td>4</td>
<td><em>Aloe vera</em> Linn.</td>
<td>+[60]</td>
</tr>
<tr>
<td>5</td>
<td><em>Alstonia scholaris</em> R. BR.</td>
<td>+[61]</td>
</tr>
<tr>
<td>6</td>
<td><em>Berberis aristata</em> DC.</td>
<td>+[62]</td>
</tr>
<tr>
<td>7</td>
<td><em>Catharanthus roseus</em> Linn.</td>
<td>+[63]</td>
</tr>
<tr>
<td>8</td>
<td><em>Cassia fistula</em> Linn.</td>
<td>+[64]</td>
</tr>
<tr>
<td>9</td>
<td><em>Emblica officinalis</em> Geartn.</td>
<td>+[65]</td>
</tr>
<tr>
<td>10</td>
<td><em>Eugenia jambolana</em> Linn.</td>
<td>+[66]</td>
</tr>
<tr>
<td>11</td>
<td><em>Ficus bengalensis</em> Linn.</td>
<td>+[67]</td>
</tr>
<tr>
<td>12</td>
<td><em>Gymnema sylvestre</em> R. BR.</td>
<td>+[68]</td>
</tr>
<tr>
<td>13</td>
<td><em>Murraya koengii</em> Linn.</td>
<td>+[69]</td>
</tr>
<tr>
<td>14</td>
<td><em>Pterocarpus marsupium</em> Roxb.</td>
<td>+[70]</td>
</tr>
<tr>
<td>15</td>
<td><em>Pterocarpus santalinus</em> Linn.</td>
<td>+[71]</td>
</tr>
<tr>
<td>16</td>
<td><em>Punica granatum</em> Linn.</td>
<td>+[72]</td>
</tr>
</tbody>
</table>
4. CONCLUSION
In this review we saw that all the plants have antidiabetic potential. But it is proved only on Experimental level not on clinical level except some, So it is necessity of present era researchers to do mostly clinical trial on the basis of experimental datas.

CONFLICT OF INTEREST STATEMENT
We declare that we have no conflict of interest.

REFERENCES


[66] Balamurugan S. Fruit maturity phenolic content and antioxidant activity of *Eugenia jambolana* lam fruit *International Letters of Natural Sciences* 2014; 8(1): 41-44.


