

Antidiabetic Potentials of Various Ethno-Medicinal Plants of Rajasthan

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Abstract

Diabetes Mellitus is a syndrome of disordered metabolism, due to a combination of hereditary and environmental causes, resulting in abnormally high blood sugar levels (hyperglycemia), caused by defects in either insulin secretion or insulin action in the body. Diabetes epidemic is underway. Currently available therapeutic options for non-insulin-dependent diabetes mellitus such as dietary modification, oral hypoglycemics and insulin have a lot potentials to cure diabetes. Now-a-days natural products and herbal medicines have been recommended for the treatment of diabetes. The present paper is an attempt to list of the plants and their preparations used for cure of diabetes with Ethnomedicinal backgrounds with the list of plants experimental or clinically listed from Rajasthan (arid zone) with antidiabetic potentials. The review also include the various preparations which can safely used to cure diabetes in the form of daily diet as plant potentials for future generations. The studies are a move towards awareness towards changing our diet system with potential input of Ethnomedicinal knowledge to cure the incidence of diabetes.

Keywords: Ethnomedicinal Treasure, Diabetes, Rajasthan, Indian Medicinal Plants.

Introduction

Diabetes mellitus (DM) is the commonest endocrine disorder that affects more than 100 million people worldwide (6% of the population)(WHO/Acadia, 1992). It is caused by the deficiency or ineffective production of insulin by pancreas which results in increase or decrease in concentrations of glucose in the blood. It is found to damage many of the body systems, particularly the blood vessels and nerves (Nagappa et al., 2003). For its therapy along with the synthetic drugs, many agents of the plant origin are also in use particularly for the treatment of non insulin dependent diabetes mellitus (NIDDM).

Diabetes is epidemic underway. Due to sedentary habits, urbanization more people are suffering from diabetes. A decade later, the global burden of diabetes was estimated to be 135 million. Quantifying the prevalence of diabetes

and the number of people affected by diabetes, now and in the future, the latest WHO estimate – for the number of people with diabetes, worldwide, in 2000 among adults ≥ 20 years of age was estimated to be ~ 171 million (Wild et al., 2004). This is likely to increase to at least 366 million by 2030 where the global cost of treating diabetes and its complication could reach US \$ 1 trillion annually. Plant derivatives with antidiabetic potentials have been used in traditional healing systems around the world (Yeh et al., 2003).

Over the centuries, Indian herbal drugs have served as a major source of medicines for the prevention and treatment of diseases including diabetes mellitus. Ethnobotany studies the complex relationships between plants and cultures. It is multidisciplinary science defined as the interaction between plants and people. The relationship between plants and human cultures is not limited to the use of plants for food, clothing and shelter but also includes their use for religious ceremonies, ornamentation and health care 1. It is estimated that more than 800 species of plants exhibit hypoglycaemic properties, including many common plants, such as bitter gourd, guduchi etc (Alarcon-Aguilara et al., 1998). To date hundreds of herbs and traditional medicine formulas have been reported to have been used for the treatment of diabetes mellitus. In past decade, research has been focused on scientific evaluation and justification of traditional drugs of plant origin and screening of more effective and safe antidiabetic potentials has continued to be an important area. In developing countries 80% of population are using traditional medicine in primary medical problems (Grover and Yadav, 2004). Therefore, Government is endowed with the wealth of medicinally important plants and has focused on ancient herbal treatment methods where traditional alternative medicines are popularly practiced among the large segment of its population.

In present investigation attempts have been made to study the indigenous plants which show inhibitory effect of glucose utilization and are in use as antidiabetic agents in traditional system of medicine. Hence, the present study was performed with the aim of producing an inventory of the plants used by traditional healers in tribal pockets of Rajasthan to treat diabetes, simultaneously also included those plants which are scientifically justified as antidiabetic agents and are present in the habitat of Rajasthan. So, the above document is a complete inventory of the antidiabetic herbs of Rajasthan.

Study area and ethnic people

The Aravalli Range literally meaning line of peaks is a range of mountain in western India running approximately 800 km from northeast to southeast across states of Rajasthan, Haryana and Gujarat. The highest peak is Guru Shikhar in Mount ABU. Rising to 5653 feet (1723 meters), it lies near the southwestern extremity of the range, close to the border with Gujrat District. Mt.Abu is Rajasthan's only hill station. It is around 180 km away from Jodhpur, and 509 km away from Jaipur. It is also rich in natural science beauties. Mt. Abu is the highest point between the Nilgiris in the south and the Himalayas in the north. The location and weather has given this place a wide variety of vegetation. It stands out like an oasis in arid environs. It is an old saying that the Mt Abu used to speak that instead of my height people separate me from Himalaya, so I will provide all the treasure herbs of Himalaya. During our visit to the various places of Mt Abu, we met with a lot of tribal people, some disciples of God known as Sadhu Ji. Shambhu Maharaj Ji is one of the person we inspired a lot, he was narrating about the uses of plants and also chewing the adventitious roots of bargad. Further he was also encouraging us to use these herbs in our daily life to cure various ailments. The survey really showed that the treasure is hidden in our Rajasthan.

Methodology

Our total survey was focused on the talks with people of tribal areas and the Sadhu's of tribal pockets of Mt. Abu totally providing the information of ethnomedicinal potentials during November 2008 to October 2009. Data were collected through general conversation with traditional healers and questionnaires were used to obtain the plants used by them. Details of medicinal plants used, mode of treatment, method of preparation, types of dosage and administration were documented. Further a documentary of their vocal talks were also be recorded to authenticate and identify the person with treasure of knowledge. Sometimes we also observed various patients coming and having relief their. We also talk to their patients and conclude regarding their ethno-medicinal use. Though they were very frightened with our questions. The information got from the tribal people were documented and the plants were identified and voucher specimens were deposited in the Ethno-medicinal Herbarium, Centre with potential for excellence in Biotechnology, MGIAS, Jaipur.

Results and Discussion

The present study was confined to Tribal people and Sadhus of Mt. Abu, who shared a lot of knowledge with us. The Shambu Nath Ji was the main person who was interviewed. He told about lots of plants with therapeutic potentials. As our present report is confined to plants with antidiabetic potentials so here we have presented ethnomedicinal information on antidiabetic plants (Table. 1). The list includes various types of preparations used to cure diabetes. Herbal medicines prescribed by tribal healers are either preparation based on single plant part or a combination of several plant parts. It was believed that compound formulations will cure more rapidly as compare to single formulations. A person named Thawara who belongs to a tribe called *Bheel* was also interviewed. He also narrated about a lots of drugs hidden in the stomach of hills. Simultaneously, all the arid zone plants scientifically authenticated with antidiabetic potentials were also listed (Table 1) Therefore, in present paper an attempt has been made to generate an overview of all the plants from ethnomedicinal and scientific background with antidiabetic potentials. This list will finally conclude that over 50 plants that are present in arid zone of Rajasthan having antidiabetic potentials.

Table 1: Medicinal plants as antidiabetic agents used by tribal people of arid zone of Rajasthan.

S. No.	Common Name	Botanical Name	Family	Part used	Ethnomedicinal uses
1.	Guggul	<i>Commiphora wightii</i> (Arn.) Bhandari	Burseraceae	Plant juice and gum oleo-resin	The juice of guggul is very important in wound healing, it has specific fragrance, it is of three types one with thorns and the other one without thorn and the third type is <i>Bhainsa</i> guggul (According to Shambhu Maharajji).

2.	Jamun	<i>Syzygium cumini</i> Linn.	Myrtaceae	Leaves, seeds, gum	The leaves and seeds are used to cure diabetes but there are two types of Jamun trees-small and big; the gum obtained from big plant used regularly to cure diabetes from its roots.
3.	Indrayan	<i>Citrullus colocynthis</i> (Linn.) Schard	Cucurbitaceae	Whole plant, fruits	Roots, fruits and seed taken raw or after making their paste, can cure diabetes.
4	Neem	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Leaves	Chewing of 4-5 leaves, daily can cure the diabetes.
5.	Methi dana	<i>Trigonella foenum graecum</i> Linn.	Fabaceae	Seeds	Chewing the seeds with closed mouth in morning can definitely cure diabetes
6.	Sadabhar	<i>Catharanthus roseus</i> Linn.	Apocynaceae	Root bark	Eating raw root bark of Sadabhar can cure diabetes.
7.	Bargad	<i>Ficus bengalensis</i> Linn.	Moraceae	Adventitious roots	Regular chewing of prop root tips can cure diabetes. The root tips also act as good brain tonic.
8.	Kathal	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	Fruits	Used as antidiabetic agent and can increase internal strength.
9.	Arkakanta	<i>Cleome viscosa</i> Linn.	Capparaceae	Whole plant	Whole plant juice is used to cure diabetes.

Conclusion

The study of ethno-medicinal system and plants as therapeutic agents is an important aspect to cure serious health problems. Conclusively, it appears that we are approaching a 'new era' in the drug development from higher plants and indeed, from natural sources in general. Now days it is an urgent need to target the drugs with anti-diabetic potentials as diet to cure the causes and restrict the diabetes at the edge of new millennium where we can move ahead with a health and healthy living. Higher plants are an untapped reservoir, only waiting to be collectively investigated. Current study is a part of a project running under 'Centre with potential for excellence' to explore the Ethno-medicinal treasure hidden in the tribal belts of Rajasthan. For many classes of drugs widely employed in humans, synthesis of novel structures have neither yielded entities with novel mechanisms of action nor with fewer side effects and/or activities improved over those of drugs currently available. In essence, it appears that the chemist has run into a dead-end street.

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