

Published on: 1st Aug 2012



TRADITIONAL ETHNO-MEDICINAL PLANTS USED FOR THE TREATMENT OF DIABETES IN COIMBATORE DISTRICT, TAMILNADU, INDIA

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ABSTRACT:

An ethno-medico-botanical survey was carried out among the traditional healers in Coimbatore district of Tamil Nadu for the treatment of diabetes. We report 29 species of medicinal plants used for the treatment of Diabetes mellitus. Anti-diabetic plants are used either in single or in combination with some other plant parts. The study of ethno medicine as therapeutic agents is of importance in addressing health problems of traditional communities. Further, ethno medical approach for the treatment of diabetes is a practical, cost-effective and biologically safe. Anti-diabetic medicinal plants used in Coimbatore district have been listed along with plant parts used, active chemical constituents and its geographical location

KEY WORD: *Diabetes, Medicinal Plants, Coimbatore.*

INTRODUCTION:

Traditional medicine (also known as folk medicine) comprises systems of medicine based on the theories, beliefs and experiences indigenous to different cultures that developed over generations before the era of modern medicine. It is used to maintain health, as well as to prevent, diagnose, improve or treat physical and mental illnesses. Practices known as traditional medicines include herbal, Ayurveda, Siddha medicine, Unani etc. In some Asian and African countries, up to 80% of the population relies on traditional medicine for their primary health care needs. Herbalism is a traditional medicinal or folk medicine practice based on the use of plants and plant extracts.

Diabetics, has become a very common problem in our society. It can bring serious consequences including death. Plant based drug are considered to be less toxic and free from side effects than synthetic one. Phytomedicine for diabetes mellitus has been used since ancient time in many parts of the world where access to modern medicine is limited.

Plants have evolved secondary biochemical pathways allowing them to synthesize a raft of chemicals (phytochemicals), often in response to specific environmental stimuli, such as herbivore-induced damage, pathogen attacks, or nutrient deprivation (Hermesmeier *et al.*, 2001). Most important and widely available phytochemicals were Alkaloids, Terpenes, Phenolics and Glycosides.

Alkaloids: Alkaloids are a group of naturally occurring chemical compounds that contain mostly basic nitrogen atoms. Berberine a quaternary ammonium salt from the protoberberine group of isoquinoline alkaloids is used successfully in experimental (Wang *et al.*, 2010) and human diabetes mellitus (Gu *et al.*, 2010).

Terpenes: Terpenes and terpenoids are the primary constituents of many types of plants and flowers. Terpenes can be used for the prevention and/or treatment of diabetes type II and obesity.

Phenolics: Gallic acid is a trihydroxybenzoic acid, a type of phenolic acid, found in gallnuts, tea leaves, oak bark, and other plants (Reynolds and Wilson, 1991) is used to treat diabetes.

Glycosides: Glycosides consist of a glucose moiety attached to an aglycone can help prevent elevated blood sugar in type 2 diabetics.

In the recent years more than 500 herbal medicines have been reported to possess antidiabetic property (Handa *et al.*, 1989, Jia *et al.*, 2003). Isolation of the main compounds from the active extract is a crucial step in all research activities for developing a novel phytomedicine. The principal antidiabetic plants included *Vernonia amygdalina*, *Ocimum gratissimum*, *Momordica charantia*, *Azadirachta indica*, *Gymnema sylvestre*, *Holostemma ada-kodien* and *Morinda lucida*. The present study was performed with the aim of producing an inventory of the plants used by traditional healers in Tamil Nadu to treat diabetes.

STUDY AREA:

Coimbatore is one of the largest districts of the state of Tamil Nadu, (called as the Manchester of South India) with the geographical area of 7469 Sq. km. It lies in the longitudes 77° E and latitude 11° N. The South Western and Northern parts are hilly, part of the Western Ghats, and enjoys pleasant climate all throughout the year with heavy rainfall. Vellingiri hill, a part of the Western Ghats, one of the 4 holy hills surrounding the Land of Attapady plateau, located to the west of Coimbatore, the Manchester of the east. The information was gathered from the inhabitants of the Western Ghats of Coimbatore.

METHODOLOGY:

Frequent field surveys were carried out in Coimbatore district of Tamil Nadu during October 2011 to January 2012. Details of medicinal plants used, were documented (in Table I) by interacting with them as well as through literature survey.

RESUTLS AND DISCUSSION:

This study showed the first had information on 29 interesting medicinal herbal plants used by tribal people. All systems of traditional Indian medicine have their roots in folk medicine. The people are using various treatments traditionally from generation to generation. The wealth of medicinal plant knowledge among the people of this district is based on hundreds of years of beliefs and observations. Today there is an increasing awareness to unravel the centuries old secrets of traditional medicines.

Interviews were conducted in different villages and hilly areas of the Western Ghats of Coimbatore. Herbal medicines prescribed by tribal healers are either preparation based on single plant part or a combination of several plant parts. Further they believe that combination of several plant parts cures disease in a better way. The plants which are used by the tribal people inhabiting Western Ghats of Tamil Nadu in the treatment of diabetes is provided in Table I with the details of plant parts used for the treatment and its geographical location. The survey indicated that, the traditional healers and elderly persons who are living in rural areas have extensive knowledge on phytomedicine to treat a wide spectrum of human ailments.

Documenting the traditional knowledge through ethnobotanical studies is important for the utilization of biological resources. Earlier studies also have revealed that most of the tribal people of Tamil Nadu prefer folk medicine due to low cost and sometimes it is a part of their social life (Ayyanar and Ignachimthu 2005, Ganesan *et al.*, 2004, Ignachimuthu *et al.*, 1998).

CONCLUSION:

Current study indicates that Coimbatore district is blessed with splendid diversity of antidiabetic plants. Nearly 80% of the world's people depend on traditional medicine for their primary healthcare needs. There are considerable economic benefits in the use of medicinal plants for the treatment of Diabetes. Tribal's knowledge on medicinal plants points to a great potential for research and the discovery of new drugs for Diabetes.

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Table I: List of Anti diabetic Plants

Botanical Name	Common Name	Name in Tamil / Hindi	Family	Parts Used	Active Chemical Constituents	Geographic Distribution
<i>Acacia arabica</i>	Indian Gum Arabic	Karuvel / Kala-babul-kikar	Fabaceae	Seeds, Bark	Polyphenols, tannin	Africa and India
<i>Allium cepa</i>	Onion	Vengayam / Pyaz	Alliaceae	Onion extract, Bulb	Allyl propyl disulphide, S-mehtyl cysteine sulphoxide	Japan, Korea, Thailand, Bangladesh and India
<i>Allium sativum</i>	Garlick	Vellai poundu / Lahsun	Alliaceae	Garlic extract, oil	Diallyl disulphide oxide(allicin), ajoene	North America, Britain, Bangladesh and India
<i>Aloe barbadensis</i>	Barbados Aloe	Sirukattalai / Ghikuamr,	Asphodelaceae	Leaves, gel extract, juice	Lophenol, 24-methyl-lophenol and 24-methylene-cycloartanol	North Africa, Spain and India
<i>Azadirachta indica</i>	Neem	Vaambu / Nimba	Meliaceae	Leaves, & root extract, seed	Nimbidin	Bangladesh, India, and Pakistan
<i>Beta vulgaris</i>	Beetroot	Senkizhangu / Chukunder	Chenopodiaceae	Whole plant	Sugar beet pectin and	Europe and Asia

Botanical Name	Common Name	Name in Tamil / Hindi	Family	Parts Used	Active Chemical Constituents	Geographic Distribution
					polydextrose	
<i>Brassica juncea</i>	Mustard	Kadugu / Sarson	Brassicaceae	Seeds, Leaves	Isorhamnetin diglucoside	India, Nepal, Pakistan and Japan
<i>Capsicum frutescens</i>	Chilli	Mulaga / Mirch	Solanaceae	Fruit extract	Capsaicin	Africa
<i>Cinnamomum zeylanicum</i>	Cinnamon	Ilavangam / Dalchini	Lauraceae	Bark or leaves extract	Cinnamaldehyde	Sri Lanka, India and Burma
<i>Coriandrum sativum</i>	Coriander	Kothamalli / Dhania	Apiaceae.	Leaves	Alanine	Palestine, Syria, India and Greece
<i>Cuminum cyminum</i>	Cumin seeds	Cheerakam / Zeera	Apiaceae	Seed	Aldehyde	North America and Asia
<i>Curcuma longa</i>	Turmeric	Manjal / Haldi	Zingiberaceae	Root.	Curcuminoids	India, Bangladesh and Sri Lanka.
<i>Ficus bengalensis</i>	Banyan Tree	Aala maram / Baragada	Moraceae	Bark	Leucopelargonidin	India, Sri Lanka and Pakistan
<i>Glycine max</i>	Soya beans	Soya / Bhatta	Fabaceae	Seed	3-O-methyl-D-chiro-inositol (D-pinitol)	China, Japan, and Korea, Europe and United State
<i>Gymnema sylvestre</i>	Sugar destroyer	Cherukurinja / Gur-mar	Asclepiadaceae	Leaf callus, stem	Gymnemic acid and gymnema saponin	Africa and Asia
<i>Hordeum vulgare</i>	Barley	Yavai / Jau	Poaceae	Soluble fibre, malted extract	Beta-glucan	India
<i>Jatropha curcas</i>	Barbados nut	Pey-amanakku / Danti	Euphorbiaceae	Whole plant	Diterpenes	America and India
<i>Mangifera indica</i>	Mango Tree	Maangai / Aam	Anacardiaceae	Stem bark, leaves	Mangiferin	India
<i>Mentha piperitae</i>	Peppermint	Pudina / Podina	Lamiaceae	Leaves	Essential oils, terpenes, flavonoids and inorganic trace elements such as vanadium, zinc,	Europe, Asia, North America and Australia

Botanical Name	Common Name	Name in Tamil / Hindi	Family	Parts Used	Active Chemical Constituents	Geographic Distribution
					chromium etc	
<i>Momordica charantia</i>	Bitter melon	Pavakkai / Karela	Cucurbitaceae	Whole plant	Charantin	Paleotropics, United States and India
<i>Moringa oleifera</i>	Moringa	Murungai / Sehijjan	Moringaceae	Whole plant	Not known	India and Pakistan
<i>Murraya koenigii</i>	Curry leaves	Kariveppilai / Karipatta	Rutaceae	Leaves	Carbazole alkaloids	India, Sri Lanka, China and Vietnam
<i>Musa sapientum</i>	Sweet banana	Vazhai / Kele-ka-phool	Musaceae	Whole plant particularly flower extract	Flavonoids, steroid and glycoside	America and Asia
<i>Nelumbo nucifera</i>	Sacred lotus	Thamarai / Kanwal	Nymphaeaceae	Flower	Tolbutamide	Vietnam, Afghanistan, Asia and Australia.
<i>Ocimum sanctum</i>	Holy Basil	Tulasi / Tulsi	Lamiaceae	Leaf	Eugenol (1-hydroxy-2-methoxy-4-allylbenzene)	India
<i>Psidium guajava</i>	Guava	Koyyaa / Amrood	Myrtaceae	Stem bark, leaves, fruits.	Terpens and flavonoids	America and India
<i>Tamarindus indica</i>	Tamarind tree	Pulia maram / Imili	Fabaceae	Seed, Pulp of Fruit	Flavonoids	Africa and southern India
<i>Triticum vulgare</i>	Wheat	Kothumai / Gehu	Poaceae	Whole plant	Albumin protein	Argentina, Asia, United States and Canada
<i>Zingiber officinale</i>	Ginger	Inchi Chukku / Adrak	Zingiberaceae	Raw ginger.	Gingerols, ethanol, ethanoic acid	India