Herbal remedies for diabetes from the Kolli hills, Eastern Ghats, India

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Received 30 June 2010; Accepted 6 July 2011

An ethnobotanical survey was carried out among the Malayali tribes in the Kolli hills of the Eastern Ghats, Tamil Nadu for the exploration of antidiabetic herbal remedies. A total of 16 species belonging to 16 genera and 13 families were identified which are being used for the treatment of diabetes. The discovered medicinal recipes have great potential for the discovery of new antidiabetic drugs.

**Keywords:** Herbal medicine, Diabetes, Malayali tribes, Kolli hills, Tamil Nadu.

**IPC code; Int. cl. (2011.01)—**A61K 36/00, A61P 3/10.

**Introduction**

Diabetes mellitus is one of the most common metabolic diseases in the world. It is a group of disorders that are associated with high blood sugar levels which often lead to complications such as blindness, kidney failure, coronary heart disease, circulatory problem that may result in amputation, nerve problem and premature death. Medicinal plants used to treat diabetic conditions are of considerable interest and a number of plants have shown varying degrees of hypoglycemic and antihyperglycemic activity.

Natural compounds derived from plants with antidiabetic activity in descending frequency of occurrence, include complex carbohydrate, alkaloids, glycopeptides, terpenoids, peptides and amines, steroids, flavonoids, lipids, coumarines and sulfur compounds. Plant derivatives with hypoglycemic properties have been used in folk medicine and traditional healing systems throughout the world. More than 100 medicinal plants are mentioned in the Indian system of medicine, including folk medicines for the management of diabetes, which are effective either separately or in combinations.

Modern therapies are far too costly and also they are beyond the reach of tribal people to be practiced for the majority of diabetes refers; so the ethnopharmacological use of herbal remedies for the treatment of diabetes is an area of study, which ripe with potential as a starting point in the development of alternative, in-expensive therapies. Medicinal plants used to treat hypoglycaemic and hyperglycaemic conditions are of considerable interest to ethnobotanical community as they are recognized to contain valuable medicinal properties in different parts of the plant. In the recent years, some researchers have reported various herbal remedies used in the treatment of diabetes from the world.

Traditional phytotherapeutic treatments may provide the valuable clues for the development of new oral hypoglycemic agents and simple dietary adjuncts. The present study was carried out with the aim of ascertaining preferences in the Eastern Ghats of Tamil Nadu, Malayalis, the indigenous community on traditional phytomedicines to treat diabetes.

**Biogeography of the Kolli hills and ethnic people**

The Kolli hills form a major range in the Eastern Ghats that is rich in biodiversity and tribal populations. It is located in the Namakkal district of the South eastern Tamil Nadu (11° 10'-11°30'N latitude; 78° 20'-78° 30'E longitude). It extends to an area of about 418.5 km² and elevation of the hills ranges between 1000 and 1500 m above MSL. The average rainfall is about 1200 mm and the temperature varies between 10° and 30°C. Vegetation is predominantly dry deciduous forest types but varies from deciduous types to Shola. The southern tropical riparian forest occurs along the rivers and streams. The ethnobotanical information

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was gathered from indigenous people inhabiting the Eastern Ghats of Tamil Nadu known as Malayali. They are believed to be descendants of proto Australoid group who lived here before Harappan civilization and possess wealth of knowledge on local utilization of medicinal plants. As tribal population is gradually adopting modern ways of life, their heritage of traditional knowledge on plants will soon be lost for ever.

**Methodology**

Frequent field surveys were conducted throughout the Eastern Ghats of Tamil Nadu during February 2002 to March 2005. The data were collected from traditional healers following the methodology of Schultes and Jain & Rao. Data was collected through questionnaires, bilateral discussion and open ended interviews on plants used by Malayali. Information about the plant, plant parts used, time of collection, plant crude drug preparation, mode of application, dosage and food restriction if any were documented. The voucher specimens were deposited in the Herbarium at Department of Environmental and Herbal Science of the Tamil University, Tanjore (India).

**Enumeration**

**Abrus precatorius** Linn.; Local name- Kundumani; Family- Fabaceae

The plant is a climber, commonly known as Indian or Wild Liquorices. It is found throughout the plains of India. Leaf juice (2 teaspoon) given orally twice a day till cure.

**Alstonia scholaris** (Linn.) R. Br.; Local name- Mukampalai, palai; Family- Apocynaceae

The plant is a large evergreen tree found both in evergreen and deciduous forests. It is commonly known as Devil’s tree. Stem bark decoction (one teaspoon) is taken orally twice a day till cure.

**Annona squamosa** Linn.; Local name- Sita; Family- Annonaceae

The plant is a small tree and also cultivated for its fruits, commonly known as Custard apple. Powdered leaves (25 g) are taken with milk orally daily in the morning.

**Andrographis paniculata** (Burm. f.) Wall. ex Nees; Local name- Periya nangai; Family- Acanthaceae

The plant is an erect herb, commonly known as Creat and found in dry forest undergrowth and also cultivated in gardens. Decoction of the leaves (50 ml) is prescribed thrice a day after food or fresh raw leaves eaten every day.

**Coccinia grandis** (Linn.) Voigt.; Local name- Kovai; Family-Cucurbitaceae

The plant is a climber with large white flowers, commonly known as Ivy-guard. It is found in the hedgerows throughout the plains in India and also cultivated for its fruits as vegetables. Leaf juice and mucilage from immature fruits (2 teaspoon) are given twice or thrice a day after food.

**Costus speciosus** (Koenig) J.E. Smith; Local name- Kostakkilangu; Family- Zingiberaceae

The plant is a gregarious succulent herb and is found in moist localities, stream banks, shoal floor and hilly areas. Rhizome juice (20-25 g) is taken orally thrice a day after food till cure.

**Derris scandens** (Roxb.) Benth.; Local name- Theykil; Family- Fabaceae

A woody climber, having imparipinnate leaves and white or pale rose flowers. It is found in scrub jungles and along river banks. Leaves and flowers juice is taken once in a day after food till cure.

**Gmelina arborea** Roxb.; Local name- Kumalamaram; Family- Verbenaceae

A large or moderate sized tree, found in deciduous forests and also often planted in avenues and gardens. The stem bark decoction (10 ml) taken orally.

**Gymnema sylvestre** (Retz) R. Br. ex Schult.; Local name- Siru Kurinjan; Family-Asclepiadaceae

The plant is a straggler to liana, commonly known as Mera-singi. It is found in scrub jungles and on the slopes and on thickets by shoal border. Leaf decoction (50 ml) is taken internally after food continuously till cure.

**Madhuca longifolia** (J. Koenig.) J.F. Macbr.; Local name- Illupai; Family- Sapotaceae

The plant is a large deciduous tree, found in plains from the coast to 800 m. Bark decoction (40 ml) regularly taken for maintaining normal blood sugar level.

**Mangifera indica** Linn.; Local name- Maa; Family- Anacardiaceae

A large, spreading, evergreen tree, often cultivated for its fruits. Decoctions of bark and young leaves are given daily after food till cure.

**Mucuna pruriens** (Linn.) DC.; Local name- Poonaikaali; Family-Fabaceae
The plant is a vine, occasionally found in plains and lower hills along river banks. It is commonly known as the Cowhage plant. The fried seeds are taken to control diabetes.

*Psidium guajava* Linn.; Local name- Koyya; Family-Myrtaceae

The plant is a small tree, often cultivated for its fruits and is almost naturalized in India. Juice of leaves (2 teaspoon) and fruits are taken orally thrice a day till cure.

*Syzygium cuminii* (Linn.) Skeels.; Local name- Naval; Family-Myrtaceae

The plant is an evergreen tree found in shoals, river banks, scrub jungles or planted as avenue trees. Decoction of stem bark (50 ml) is taken orally twice a day till cure. Mature fruits are eaten raw.

*Tinospora cordifolia* (Willd.) Hook. f. & Thoms.; Local name- Chintil kodi; Family-Menispermaceae

The plant is an extensive climber with succulent stems and yellow flowers at the nodes of the old wood. It is found commonly in scrub jungles, on thickets, fences and among bushes. The seed powder (30 g) is taken orally along with water daily till cure.

**Discussion**

The tribe Malayalis preferred to use a diversity of native plants with medicinal utility. During the study, a total of 16 species distributed among 16 genera belonging to 13 families used in the treatment of diabetes were identified and the plants have been collected in their flowering and fruiting stages as far as possible from the natural habitat. As far as plant part utility is concerned, leaves are used commonly, followed by stem bark, seeds and rhizome (Figure 1). The remedies are prepared in the form of extract/juice followed by decoction, powder form and from raw plant parts (Figure 2). The present study perceived that the local people always prepare single plant to treat diabetes or the different parts of the same plant. To make better acceptability of herbal remedies that are taken orally, additives are not taken. The prepared herbal medicines are given as an antidiabetic only after the conditions of the patients are actually observed.

**Conclusion**

The data recorded can possibly be used as the potential source for discovering modern medicine. Studies on new medicinal plants can serve as substitutes for other plants with high demand and also for threatened plants. Many plants used for the treatment of diabetes contain substances like glycosides, alkaloids, terpenoids, flavonoids. However, more investigations must be carried out to evaluate the mechanism of action with antidiabetic effects.

**References**

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