

## ETHNOBOTANICAL VALUES AND CONSERVATION OF A FEW ANTI-DIABETIC PLANTS OF PONDICHERRY

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### ABSTRACT

The present work relates to the study of anti-diabetic plants of Pondicherry. This preliminary investigation is accounted to 40 species, 39 genera and 31 families of medicinal plants including herbs, shrubs and trees. The species are arranged in alphabetical order and also enumerated. A brief description, vernacular name, binomial, family and mode of administration are tabulated providing anti-diabetic plant species of Pondicherry. Land clearance due to industries, agriculture, house construction and monoculture like coconut, mango etc., would decrease the medicinal herbs particularly with anti-diabetic values. Necessary steps are to be taken to conserve vulnerable species by both *ex situ* and *in situ* methods.

### INTRODUCTION

India is well known as the emporium of medicinal plants. The use of plants to treat various diseases in India dates back to times of Rigveda. Nearly, 75 to 90% of world's rural people rely on herbal traditional medicine for their primary healthcare even today. It appears neither possible nor desirable to replace this herbal medicine with western medicine, at least in the near future. Consequently, there is growing interest in medicinal plants and traditional medicine (Kritikar & Basu 1984). Some good preliminary work on nature has been done by Arshad et al. (1997) and Satapathy et al. (2001). Diabetes mellitus (Madhumeha) is one of the common metabolic disorders in day to day clinical practice. Earliest mention of this condition and its physiotherapy was in "Charaka Samhita" during 2000 B.C. (Satapathy et al. 2001). At present treatment of this disease includes use of insulin and oral hypoglycaemic drugs or combined use of both the medicaments. In view of several adverse side effects of modern allopathic medicines discovery of a safe and efficacious anti-diabetic drug with little side effect is imperative. The prime objective of this work is to document the anti-diabetic plants of Pondicherry as the area is comprised of many medicinal plants.

### STUDY AREA

Pondicherry region lies on the Coromandel coast of eastern ghats in south India, and is bound by the Bay of Bengal on the East and by south Arcot district on other sides. The main entity of Pondicherry is almost in a semicircle between 11°46' and 12°3' north latitude and between 79°36' and 79°53' of east longitude (Fig. 1). The Pondicherry regions are embedded respectively in the south Arcot and Thanjavur districts of Tamil Nadu. The town limit of Pondicherry is located at 162 km from south of Chennai and 22 km north of Cuddalore, headquarter of south Arcot district (Fig. 2). The total area of Pondicherry and its eleven enclaves is about 290 sq. km. The mean annual rainy days for four years (1997-2000) were 52.25. Mean annual rainfall for the same period was 1678.4 mm. The annual maximum temperature was 33.38°C (January-December). The higher relative humidity was seen in the month of November (94%) (1996-1999) and the lowest relative humidity was in the month of January (69 %) (1996-1999) (Kadavul & Kamalam 2004).

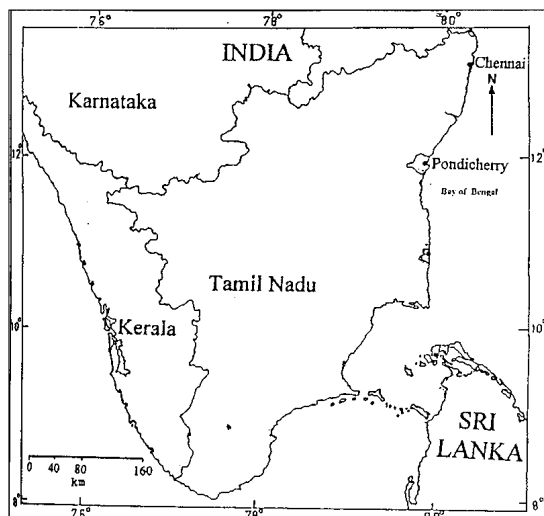


Fig 1. Map showing the Pondicherry region -South India.

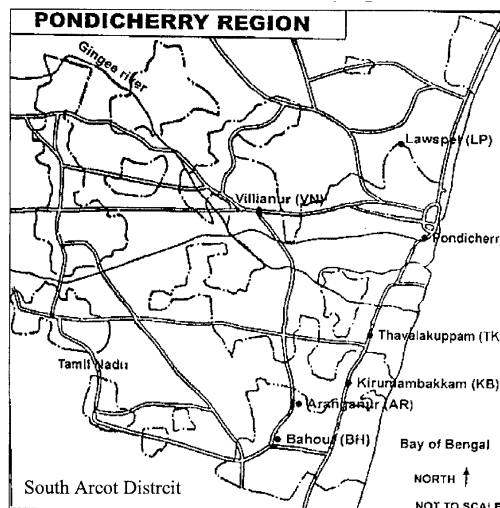


Fig 2: Map Showing the Study areas located in Pondicherry and its near by regions.

## MATERIALS AND METHODS

The survey of medicinal plants includes investigation of species treating diabetes, their genera and families possessing medicinal properties. Traditional botanical knowledge on plants and their therapeutic application to respective ailments were collected from traditional or ethnic groups of the local people. A few plants of anti-diabetic nature and their mode of use have been collected from traditional medicinal man (or) Vydias of Pondicherry and its nearby localities. Morpho-taxonomical descriptions were carried out in the field itself.

For identification of plant specimens collected from the study areas, they were compared with specimens of herbarium, French Institute, Pondicherry. Identification and nomenclature of specimens were made by referring the local floras such as "An Excursion Flora of Central Tamil Nadu" (Matthew 1992), "Illustrations on the Flora of the Tamil Nadu Carnatic" (Matthew 1982), "Further Illustrations on the Flora of the Tamil Nadu Carnatic" (Matthew 1988) and "Flora of the Presidency of Madras" (Gamble & Fischer 1915-1935 Vols. 1-3).

## RESULTS AND DISCUSSION

There are several plants which are used as folk medicines for various diseases but for treating diabetes there is a limited number of species, which have been identified and used. This documentation gives the information of 40 species, 39 genera and 31 families which are traditionally used, either directly or with the combination of other species, for the treatment of diabetes mellitus in Pondicherry and its nearby localities (Table 1). Similar investigation were also carried out in Orissa (Satapathy et al. 2001) where 300 species, and in Vatakara Taluk, Kerala where 30 species of anti-diabetics (Sujesh 2003) were reported.

The present investigation may provide helpful indication for future research in the field of pharmacology, especially in the formulation of new and potential anti-diabetic drugs.

Table 1: Name of the species, family and therapeutic uses of anti-diabetic plants of Pondicherry.

Sl. No.	Name of the Species	Family	Therapeutic Uses
1	<i>Aegle marmelos</i> (Linn.) Corr. Serr.	Rutaceae	Tender leaf juice (10mL) mixed with 2-3 drops of honey given twice daily (evening and morning) on empty stomach to reduce blood sugar within 3-4 weeks.
2	<i>Andrographis paniculata</i> (Burm.f.) Wallich ex Nees .	Acanthaceae	About 10 mL of leaf/root decoction given once a day for six months against both hyperglycaemia and gastric disorder.
3	<i>Azadirachta indica</i> ADr. Juss,	Meliaceae	Seven tender leaves of the plant are prescribed daily to the person suffering from diabetes. six seeds of the plant made into a paste with 50 mL rice wash and 5 mL of ghee should be given after meal in case of long standing diabetes
4	<i>Bacopa monnieri</i> (Linn.) Pennell.	Scrophulariaceae	Leaf juice is used to treat diabetes.
5	<i>Boerhaavia diffusa</i> Linn.	Nyctaginaceae	The raw leaf juice (10 mL) is used to reduce sugar in urine. The patient is also advised to take the leaves and tender branch tips as vegetables.
6	<i>Butea monosperma</i> ( Lam.) Taub.	Fabaceae	The leaf extract (10mL) is administered once a day for 5-10 days on empty stomach. This reduces blood sugar and is also useful in glycosuria
7	<i>Carica papaya</i> Linn.	Caricaceae	Green fruits are boiled and made into a paste and given with a pinch of common salt and jeera powder ( <i>Cuminum cyminum</i> ) for six months to cure diabetes
8	<i>Cassia auriculata</i> Linn.	Caesalpiniaceae	Leaf juice (10mL) mixed with 5g old jaggery given once daily for one month at early stage of the diabetes.
9	<i>Catharanthus roseus</i> (Linn.) G. Don. (= <i>Vinca rosea</i> Linn.)	Apocynaceae	Fresh twig with two leaf buds is given daily for 7 days on empty stomach. During this administration, eating sugar containing food stuffs is strictly prohibited.
10	<i>Cissampelos pareira</i> Linn.	Menispermaceae	About 60 g of the root is boiled in half a litre of water for 20-30 minutes in a closed vessel. About 30-60mL of this preparation is given two or three times daily to correct the kidney disorder caused by diabetes.
11	<i>Coccinia grandis</i> (Linn.) Voigt.	Cucurbitaceae	Decoction of the plant twig along with flowers and young fruits given once daily for seven days for the treatment of sugar complaints.
12	<i>Cressa cretica</i> Linn.	Convolvulaceae	The infusion of the whole plant, sweetened with jaggery is taken thrice daily after meals for impotency and loss of weight caused by diabetes.
13	<i>Cucumis sativus</i> Linn.	Cucurbitaceae	Seeds (2g) made into paste with liquorice ( <i>Glycyrrhiza glabra</i> ) is given daily for 15 days to reduce the sugar level in blood. Those who suffer from diabetes and those who want to lose weight should be advised to consume unripen fruits.
14	<i>Curcuma longa</i> Linn.	Zingiberaceae	15-20mL of fresh juice of the rhizome with equal amount of fresh juice of nelli ( <i>Phyllanthus emblica</i> ) given three times in a day for 15 days against glycosuria.
15	<i>Ficus benghalensis</i> Linn.	Moraceae	An infusion of the bark (10g) mixed 5g of old jaggery is an effective and specific medicine for diabetes. This should be given once daily for 10-15 days to reduce blood sugar. The laticiferous sap of this tree is also effective in controlling the diabetes. An increasing capacity of pancreatic cells.

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16	<i>Ficus racemosa</i> Linn.	Moraceae	A paste (50g) made out of the boiled unripe fruit and equal quantity of fine rice, given with normal meal for 2-3 months to reduce the sugar level in urine.
17	<i>Gmelina arborea</i> Roxb.	Verbenaceae	Juice of the young leaves with 2-3 drops of honey given three times a day after food for 10 days to rectify eyesight during diabetes (i.e. diabetic retinopathy).
18	<i>Gymnema sylvestre</i> (Retz.) R. Br. ex Romer & Schultes.	Asclepiadaceae	Dried leaf powder (2-3g) is given with water. Seven fresh leaves are prescribed daily in the morning for 15 days.
19	<i>Helicteres isora</i> Linn.	Sterculiaceae	One teaspoonful root/bark powder given once daily for 15 days early in the morning before breakfast to relieve sugar complaints.
20	<i>Hemidesmus indicus</i> (Linn.) R. Br.	Asclepiadaceae	Powdered roots (5g) given 2-3 times a day in a cup of hot milk for one month to reduce sugar content in blood as well as urine. Young fruit (or) leaf juice given to the patient at least for six months.
21	<i>Hybanthus enneaspermus</i> (Linn.) F.V Muell (= <i>Ionidium suffruticosum</i> (L.) Ging.)	Violaceae	20g of whole plant (including roots) ground with 3 black peppers ( <i>Piper nigrum</i> ) and the paste is given in the morning on empty stomach for one month to relieve sugar complaints.
22	<i>Ichnocarpus frutescens</i> (Linn.) R. Br.	Apocynaceae	Fresh juice of leaf and fruit along with 2 black pepper ( <i>Piper nigrum</i> ) given early in the morning on empty stomach to control increased sugar level.
23	<i>Lawsonia inermis</i> Linn.	Lythraceae	Decoction of equal quantity of flowers and seeds (2-5g) given once a day for 10-15 days to reduce the sugar level in urine.
24	<i>Luffa acutangula</i> Roxb.	Cucurbitaceae	Extract of the fruit skin (pericarp) (10g) and roots (5g) administered once daily on empty stomach to reduce blood sugar.
25	<i>Madhuca indica</i> Gmel.	Sapotaceae	The dried bark made into powder and the decoction is prepared from it, can be given 15g internally for diabetes mellitus for beneficial results.
26	<i>Momordica charantia</i> Linn.	Cucurbitaceae	Decoction of the fruits is given to the patients in the morning in empty stomach at least for one month. The patient is also advised to take the fruit as vegetable in his/her daily diet. A mixture of Naval ( <i>Syzygium cumini</i> ), Sirukurinjan ( <i>Gymnema sylvestre</i> ), Vembu ( <i>Azadirachta indica</i> ) and Karavellam leaves ( <i>Acacia nilotica</i> ) in the ratio 1:1:1:2 is an effective remedy for diabetes.
27	<i>Moringa oleifera</i> Lam.	Moringaceae	Fruit juice (15-20 mL) along with little old jaggery given once daily for 15 days. Patients are advised to take fruits and leaves as vegetables in daily diet at least 15 days per year.
28	<i>Murraya koenigii</i> (Linn.) Sprengel.	Rutaceae	Eating 7 fresh fully grown curry leaves every morning for three months is said to prevent diabetes due to heredity factors. It also cures diabetes due to obesity, as the leaves have weight reducing properties as the weight drops, the diabetic patients stop passing sugar in urine.
29	<i>Paspalum scrobiculatum</i> Linn.	Poaceae	Mature grains (10g) of this plant made into paste with the latex (1mL) of Banyan prop roots ( <i>Ficus benghalensis</i> ) and administered once daily for 7 days to lessen excessive appetite during diabetes.

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30	<i>Phyllanthus emblica</i> Linn. (= <i>Embllica officinalis</i> Gaertn.)	Euphorbiaceae	5g paste of fresh leaves given daily for one month in empty stomach. Paste prepared from equal quantity of boiled fruits of this plant and the fruits of Thani ( <i>Terminalia bellirica</i> ) given with 50mL cow's milk twice daily one hour before food to rectify the problems of sugar related disease.
31	<i>Pistia stratiotes</i> Linn. var. <i>cuneata</i> Engl.	Araceae	The juice (10mL) of young plant mixed with equal amount of green coconut milk is given to reduce sugar content in blood. Periodic check of the patient is required.
32	<i>Plumbago indica</i> Linn.	Plumbaginaceae	Root extract (5mL) with 5g of old jaggery given two times in a day for 5 days during excessive appetite related to diabetes.
33	<i>Portulaca quadrifida</i> Linn.	Portulacaceae	A teaspoonful of seeds given every day with hot water for 2-3 months can increase the body's own insulin, which help in curing diabetes.
34	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	Heart wood soaked overnight with water and filtrate (10mL) is given daily for one month. Seeds of this plant are also used for the same but found less efficient than the wood. Both bark and heart wood is effectively used for diabetes.
35	<i>Punica granatum</i> Linn.	Punicaceae	Root bark and fruit rind ground in equal proportions and the paste (10g) given twice a day to check excessive urination i.e. polyurea due to the symptoms of diabetes.
36	<i>Sida acuta</i> Linn.	Malvaceae	Root powder (2-3g) with one glass of milk given daily is effective within a short period. A periodic check may be undertaken for the level of sugar in blood for the patient.
37	<i>Sphaeranthus indicus</i> Linn.	Asteraceae	The whole plant is made into paste. About 15 g of paste given with old jaggery twice a day for 3 days to check the excessive urination and to control the blood sugar.
38	<i>Syzygium cumini</i> (Linn.) Skeels.	Myrtaceae	About 10g of the leaves and (Sirukurinjan) <i>Gymnema sylvestre</i> in (1:1) ratio are boiled in 500mL of water till it reduces to about 50mL. The filtered extract is then given along with 5g of jaggery daily for two months. The fruit pulp (5g) or dried powder (1-2g) is given twice a day for 15 days. However, the seed powder (1-2g) given twice daily is more effective than the fruit. Periodic sugar level in blood to be checked.
39	<i>Tinospora cordifolia</i> (Willd.) Hook.f & Thomson	Menispermaceae	Delicate stem juice of 15-20mL with 2 drops of honey is given twice a day for 15 days. Stem powder (5g) of this plant and 2-3g of long pepper powder ( <i>Piper longum</i> ) are prescribed for 7 days for oral stomatitis of diabetic patients and also expected to reduce sugar level in blood.
40	<i>Tribulus terrestris</i> Linn.	Zygophyllaceae	Common on fallow lands of Lawspet near halipads and also along the coastal regions of Kalapet, Pondicherry.

The destruction of existing natural ecosystems due to urbanization is an important threat to precious medicinal plants in Pondicherry region. Necessary steps are to be taken to conserve the medicinal plants before they disappear. The conservation of medicinal species and ecosystems are part of the wider global need to preserve the biosphere as the stable habitat system.

## ACKNOWLEDGEMENT

The authors are thankful to the Dr. K. Balalalida, Director, K.M. Center for P.G Studies, Pondicherry, and to the Director, Periyar University, Salem for their consistent encouragement.

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