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Ethnomedicine for diabetes by the tribes of Srikakulam district, Andhra Pradesh, India

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Abstract

The paper deals with 19 species of plants covering 19 genera and 16 families used for the treatment of diabetes by the tribes of Srikakulam district, Andhra Pradesh. Rutaceae, Cucurbitaceae and Apocynaceae are the dominant families with 2 species each followed by others. Climbers are dominant with 6 species followed by shrubs and trees (5 species each) and others. Leaf is used in a maximum of 8 practices followed by others. 8 practices were found to be new and be subjected to phytochemical analysis.

Keywords: Ethnic communities, Ethnomedicinal data, Medicinal plants, *Vaidya*

1. Introduction

Diabetes is regarded as a group of disorders associated with high bloodsugar levels which lead to several complications as increase in blood pressure, complications in eyes, heart, kidney, etc. There are three main types of diabetes mellitus (DM) *viz.*, Type 1 DM, Type 2 DM and gestational diabetes. The present study is a thorough survey on diabetes for information on the treatment prevailing among the tribes to enrich the traditional systems and to document the new plants/practices which are not listed so far in Srikakulam district of Andhra Pradesh, India.

Srikakulam district is the northern most part of Andhra Pradesh State, located within 18°5' - 19°12'N and 83°32' - 84°47'E and bounded by Orissa state on the north and Bay of Bengal in the east and south-east and the Vizianagaram district in the west and south-west. It is inhabited by 133,239 tribal people comprising of 5.74 % of the population (Census, 2001) and include *Savara, Jatapu, Konda dora, Gadaba, Kuttiya* and *Yerukula*. Though there are publications on different diseases by the tribes of Srikakulam district (Raju and Rao, 1989; Rana *et al.,* 1999; Bondya and Sharma, 2004; Jayakumar *et al*., 2010; Kachare and Suryawanshi, 2010; Mitra and Mukherjee, 2011; Maruthupandian *et al*., 2011; Singh *et al.,* 2015; Dalmari *et al*., 2019) exclusive studies on diabetes were not reported necessitating the present study.

2. Materials and methods

The ethnomedicinal data presented here is the outcome of a series of intensive field studies conducted over a period of five years (1997-2001) in 74 interior tribal pockets. The field trips were planned in such a manner to cover the selected tribal pockets in different seasons of a year. Each field trip was of 5-7 days duration covering 3-5 pockets in a day. The collected plants were identified using the Flora of the Presidency of Madras (Gamble and Fischer, 1915-1935). In addition to the randomly selected informants in the field, tribal villages and shandies, 41 *vaidyas*/medicine men have contributed their ethnomedicinal knowledge to the present study. Each medicinal practice was cross checked with at least 4-5 informants. Voucher specimens were collected, herbarium specimens were prepared and deposited in the Herbarium of the Department of Botany, Andhra University, Visakhapatnam (AUV).

3. Results and discussion

3.1. Enumeration

The plants are enumerated alphabetically with valid botanical name followed by family, vernacular name (VN), locality, name of the collector, voucher specimen number, informing tribe and part(s) used. Each ethnomedicinal practice is provided with the method of preparation of the drug, mode of administration, dosage and duration.

Aegle marmelos (L.) Correa. Rutaceae VN: *Maredu, Kadangadi*, BVAR, 1174, *Jatapu,* Leaf. 10 ml of leaf juice is given with 5 black pepper seeds twice a day before food for about 2 months.

Azadirachta indica A. Juss. (Plate 1a) Meliaceae VN: *Yapachettu, Antikonda*, BVAR, 1837, *Savara,* Seed. 1 g of seed powder with water is administered twice a day after food for one month.

Bougainvillea spectabilis Willd. Nyctaginaceae VN: *Kagitam puvvulu, Burnakonda*, BVAR, 1746, *Gadaba,* Leaf. Paste is made into pills of bengal gram seed size and 2 pills each are administered orally twice a day in the morning and evening before food for 20 days.

Catharanthus roseus (L.) G. Don (Plate 1b) Apocynaceae VN: *Billaganneru, Darapadu*, BVAR, 1670**,** *Jatapu,* Leaf. Decoction in doses of 5 spoonful is administered on empty stomach once a day in the morning for 45 days.

Centratherum anthelminticum (L.) Kuntze Asteraceae VN: *Kampurodda, Samarilli*, BVAR, 1770, *Savara,* Leaf. Leaves are crushed into paste and made into pills of bengal gram seed size. 3 pills each are administered in the morning and evening before food for 40 days.

Clitoria ternatea L. (Plate 1c) Fabaceae VN: *Senkupuvvu, Donubai*, BVAR, 2151, *Gadaba,* Flower. Juice of the flower is given in 1 spoon dose in the morning before food for about 30 days.

Coccinia grandis (L.) Voigt (Plate 1d) Cucurbitaceae VN: *Adavi donda, Donubai*, BVAR, 2175, *Jatapu,* Root, Leaf, Fruit. Extract of roots, leaves and young fruits is given in 2 spoonful dose once a day in the morning before food for 30 days.

Curcuma pseudomontana Graham Zingiberaceae VN: *Adavi pasupu, Burna*, BVAR, 1393, *Konda dora,* Tuber. The Tuber extract with fruit juice of *Phyllanthus emblica* is administered in 2 spoonful dose twice a day in the morning and evening before food for 7 days.

Ficus racemosa L. Moraceae VN: *Medi, Chinnagora*, BVAR, 1220, *Savara,* Root. Latex of the root mixed with *ragi* (*Eleusine coracana*) powder is made into pills of bengal gram seed size and 2 pills are given once a day in the morning before food for 15 days.

Glycosmis pentaphylla (Retz.) DC. Rutaceae VN: *Gulimi, Korada*, BVAR, 1900, *Konda dora,* Leaf. Leaf paste in doses of 3 spoonful is given twice a day in the morning and evening before food for 1 month.

Gymnema sylvestre (Retz.) R. Br. ex Sm. Asclepiadaceae VN: *Puttabadra, Garlapadu*, BVAR, 1646, *Gadaba,* Leaf. 10 g each of the leaves with those of *Syzygium cumini* are boiled in ½ liter of water till it reduces to about 60 ml. The filtered extract mixed with 1 teaspoonful of honey is given twice a day in the morning and evening before food for 2 months.

Helicteres isora L. (Plate 1e) Sterculiaceae VN: *Chamalanara, Kotturu*, BVAR, 1954, *Konda dora,* Root bark. 2 spoonful of root bark decoction mixed with fruit powder of *Foeniculm vulgare* is administered after food for 1 month.

Ichnocarpus frutescens (L.) W. T. Aiton Apocynaceae VN: *Nallatheega, Battili*, BVAR, 1414, *Jatapu,* Leaf. 2 spoonful of leaf powder is administered twice a day in the morning and evening after food for 20 days.

Momordica charantia L. Cucurbitaceae VN: *Kakara, Polavaram*, BVAR, 2136, *Kuttiya,* Fruit. 5 spoonful of fruit juice is given once a day in the early morning for 30-45 days.

Phyllanthus amarus Schumach. & Thonn. Euphorbiaceae VN: *Nelausiri, Baleru*, BVAR, 1761, *Gadaba,* Whole plant. The whole plant is shade dried and powdered. One spoonful of powder is given once in a week after food for 5 weeks.

Senna auriculata (L.) Roxb. Caesalpiniaceae VN: *Thangedu, Althi*, BVAR, 1283, *Jatapu,* Whole plant and Flower. Decoction of whole plant along with dried flower buds are pound into

powder and 2 spoonful of it along with honey is administered once a day before food for 1 month.

Syzygium cumini (L.) Skeels (Plate 1f) Myrtaceae VN: *Jinna, Nutilova*, BVAR, 1994, *Kuttiya,* Seed. 1 teaspoonful of seed powder is administered once a day before food for 2 months.

Terminalia chebula Retz. Combretaceae VN: *Karakkayi, Antharaba*, BVAR, 2381, *Savara,* Fruit. 2 spoonful of dried fruit powder with water is administered once a day in the morning before food for 20 days.

Tinospora sinensis (Lour.) Merr. Menispermaceae VN: *Minapatheega, Bejji*, BVAR, 2330, *Gadaba,* Stem. 2 spoonful of stem decoction with honey is taken on empty stomach for 1 month.

3.2. Discussion

The paper deals with 19 species of plants covering 19 genera and 16 families used by the tribes of Srikakulam district for curing diabetes. Rutaceae, Cucurbitaceae and Apocynaceae are the dominant families with 2 species each (10.52%) followed by others with one species each (5.26%). In terms of habit, there are 6 species of climbers (31.57%), 5 species each of shrubs and trees (26.31%) and 3 species of herbs (15.78%). Morphological analysis showed the maximum utilization of leaf in 8 practices followed by fruit, seed, whole plant, tuber (2 each), root, root bark, latex, stem and flower (1 each). They are administered either in the form of powder, paste, decoction, juice, extract or pill along with either water, honey, *soamp*, pepper or *amla*. A total of 8 practices were found to be new or less known (Jain, 1991). Plants used for similar purpose by various tribes in different parts of India are *Azadirachta indica, Bougainvillea spectabilis, Centratherum anthelminticum, Coccinia grandis, Gymnema sylvestre, Ichnocarpus frutescens, Momordica charantia, Phyllanthus amarus, Senna auriculata, Terminalia chebula* (Raju and Rao, 1989) and *Aegle marmelos, Tinospora sinensis* (Raju and Rao, 1990) by the *Yanadi, Irula, Yerukala, Sugali, Koya, Reddi dhora, Konda kapu, Kattunayaka, Manne dora, Gadaba* and *Chenchu* tribes of Rayalaseema region of Andhra Pradesh; *Bougainvillea spectabilis, Ficus racemosa, Gymnema sylvestre, Helicteres isora, Momordica charantia, Tinospora sinensis* by the *Yanadi, Nakkala, Irula, Yerukala, Sugali/ Lambadi* and *Chenchu* tribes of Chittoor district, Andhra Pradesh (Vedavathy *et al*., 1997); *Aegle marmelos, Azadirachta indica, Catharanthus roseus, Clitoria ternatea, Coccinia grandis, Ficus racemosa, Glycosmis pentaphylla, Gymnema sylvestre, Momordica charantia, Syzygium cumini, Terminalia chebula* by the tribal and rural populations of Uttar Pradesh, Madhya Pradesh and parts of north-east India (Rana *et al.,* 1999); *Aegle marmelos, Gymnema sylvestre, Syzygium cumini* by the *Koraga, Malekudiya, Halakki vokkaliga, Siddi* and *Gowli* tribes of Dakshina and Uttara Kannada districts of Karnataka (Bhandary and Chandrashekar, 2002); *Catharanthus roseus, Gymnema sylvestre, Helicteres isora, Momordica charantia* by the people of Baharagora Block of Jharkhand (Bondya and Sharma, 2004); *Gymnema sylvestre, Momordica charantia* by the folklore of Pondicherry (Nadanakunjidam and Abirami, 2005); *Gymnema sylvestre, Momordica charantia* by the *Didayi* primitive tribal community of Malkangiri district, Orissa (Pattanaik *et al*., 2008); *Azadirachta indica, Momordica charantia, Syzygium cumini* by the *H'mar, Jaintia, Riang, Chorai, Hrangkhol, Mizo, Vaiphei Paite, Karbi, Naga* and *Kuki* tribes of Cachar district, Assam (Das *et al*., 2008); *Catharanthus roseus* by the tribal people of Lakshadweep Islands (Ansarali and Sivadasan, 2009); *Ficus racemosa, Senna auriculata, Syzygium cumini* by the local people of 11 districts of Karnataka (Shiddamallayya *et al*., 2010); *Aegle marmelos, Azadirachta indica, Catharanthus roseus, Gymnema sylvestre, Helicteres isora, Momordica charantia*, *Tinospora sinensis* by the people of Thiruvananthapuram and Kollam districts of Kerala (Jayakumar *et al*., 2010); *Azadirachta indica*, *Catharanthus roseus, Momordica charantia, Syzygium cumini* by the folklore in Marathwada region of Maharashtra (Kachare and Suryawanshi, 2010); *Aegle marmelos, Syzygium cumini* by the *Pawara, Bhil* and *Pardhi* tribes of Dhule and Jalgaon districts of Maharashtra (Jain *et al*., 2010); *Coccinia grandis, Ficus racemosa* by the *Gond, Kol, Baiga, Panica, Khairwar, Manjhi, Mawasi* and *Agaria* tribes of Rewa district, Madhya Pradesh (Shukla *et al*., 2010); *Tinospora sinensis* by the *Tangkhul-Naga* tribe in Ukhrul district, Manipur (Salam *et al*., 2011); *Azadirachta indica, Catharanthus roseus, Coccinia grandis, Gymnema sylvestre,*

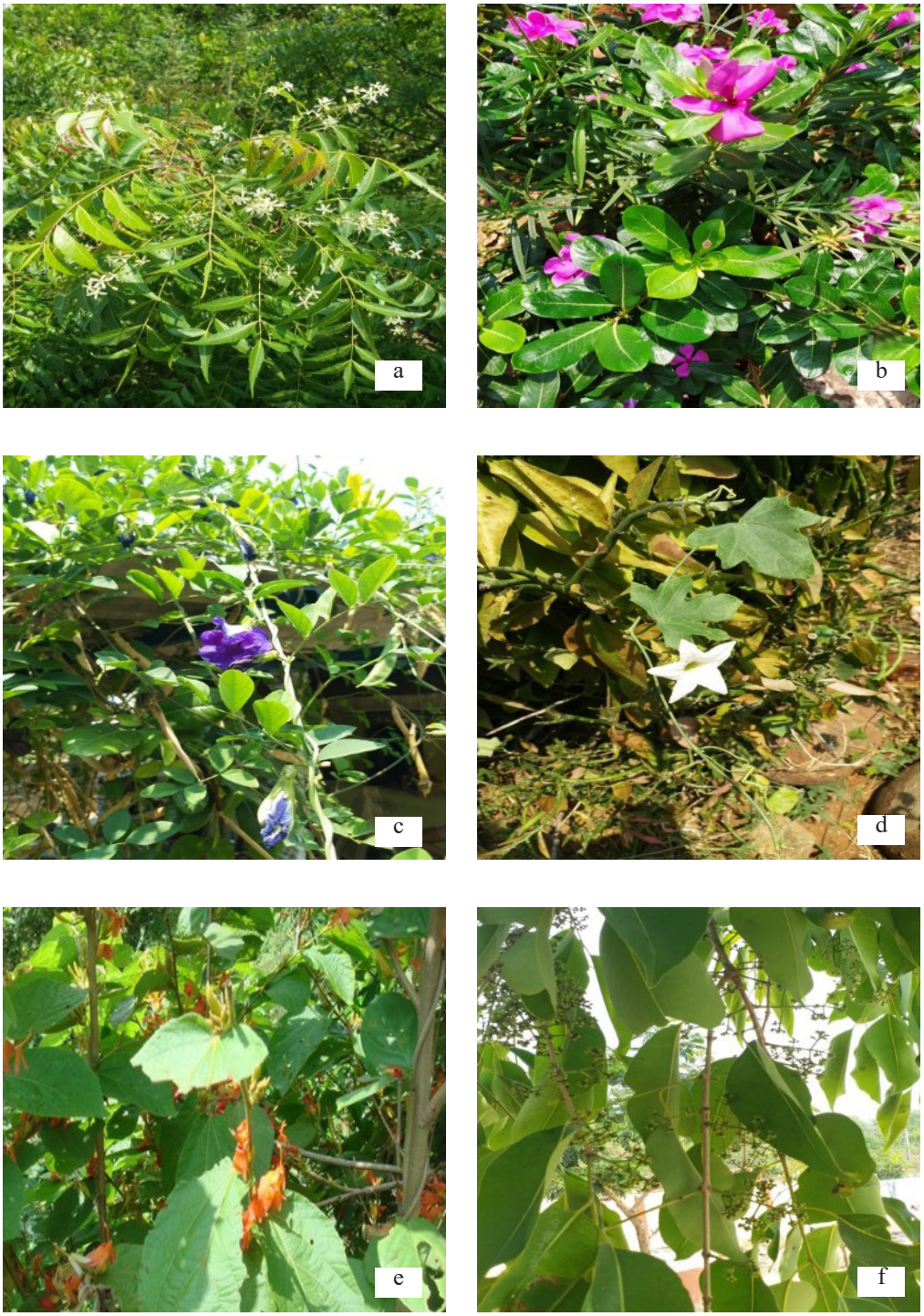

Plate 1. a. *Azadirachta indica* A. Juss.; b. *Catharanthus roseus* (L.) G. Don; c. *Clitoria ternatea* L.; d. *Coccinia grandis* (L.) Voigt; e. *Helicteres isora* L.; f. *Syzygium cumini* (L.) Skeels

Momordica charantia, Syzygium cumini by the *Palliyar* tribe of Sirumalai Hills, Western Ghats, Tamil Nadu (Maruthupandian *et al*., 2011); *Aegle marmelos, Azadirachta indica, Catharanthus roseus, Gymnema sylvestre, Momordica charantia, Tinospora sinensis* by the *Santal, Oraon, Munda, Rabha, Kheria, Mech* and *Toto* tribes of Darjeeling, Jalpaiguri, Koch Bihar, Uttar and Dakshin Dinajpur, and Malda districts of West Bengal (Mitra and Mukherjee, 2011); *Catharanthus roseus, Syzygium cumini* by the *Kondh, Gond, Saura, Mirdha, Munda, Kharia, Kora* and *Kolha* tribes of Boudh district of Odisha (Sahu *et al*., 2013); *Syzygium cumini, Terminalia chebula* by the folklore of Mandi district, Himachal Pradesh (Sen and Samant, 2013); *Azadirachta indica, Coccinia grandis* by the *Santhal, Oraon* and *Munda* tribes of Dakshin Dinajpur district, West Bengal (Talukdar and Talukdar, 2013); *Gymnema sylvestre, Helicteres isora, Syzygium cumini* by the *Palliyar* tribe of Virudhunagar district, Tamil Nadu (Bose *et al*., 2014); *Coccinia grandis*, *Ichnocarpus frutescens, Tinospora sinensis* by the *Chenchu* and *Sugali* tribes of Nallamalais, Andhra Pradesh (Saheb 2014); *Coccinia grandis, Syzygium cumini* by the *Tharu* tribe of west-Champaran district, Bihar (Singh and Singh, 2014); *Azadirachta indica, Catharanthus roseus, Coccinia grandis, Ficus racemosa, Gymnema sylvestre, Helicteres isora, Momordica charantia, Syzygium cumini, Tinospora sinensis* by the *Santhal* and *Paharia* tribes of Santhal Paraganas, Jharkhand (Singh *et al*., 2015); *Catharanthus roseus, Syzygium cumini* by the *Gond, Madia, Pardhan* and *Kanwar* tribes of Gadchiroli district, Maharashtra (Bhogaonkar and Saudagar, 2015); *Catharanthus roseus, Coccinia grandis* by the folklore of Bhagalpur district, Bihar (Singh, 2016); *Catharanthus roseus, Gymnema sylvestre, Syzygium cumini* by the *Bhariya* and *Gond* tribes of Chhindwara district, Madhya Pradesh (Rai, 2017); *Aegle marmelos, Azadirachta indica*, *Coccinia grandis, Terminalia chebula* by the people in Shivalik Range of Panchkula, Haryana (Balakrishna *et al*. 2018) and *Aegle marmelos, Azadirachta indica*, *Catharanthus roseus, Ficus racemosa, Momordica charantia, Terminalia chebula, Tinospora sinensis* by the *Bodo* tribe of Kokrajhar district, Assam (Dalmari *et al*., 2019).

4. Conclusion

The study reveals that different ethnic communities used different species found in their localities for control of diabetes. This study recorded 8 new practices involving *Bougainvillea spectabilis, Centratherum anthelminticum, Clitoria ternatea, Curcuma pseudomontana, Glycosmis pentaphylla, Ichnocarpus frutescens, Senna auriculata* and *Tinospora sinensis*. The study further suggests phytochemical investigation to these promising plants to know their active ingredients and chemical compounds present in plant parts having anti-diabetic effects. Such diagnosis shall lead to formulation of new herbal drugs for the benefit of mankind.

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