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INFORMANT CONSENSUS FACTOR (ICF) AND FIDELITY LEVEL ANALYSIS OF TRADITIONALLY USED ANTI-DIABETIC PLANTS AMONG TRADITIONAL HEALERS (VAIDYAS) OF AMARKANTAK, MADHYA PRADESH, INDIA

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ABSTRACT
The Amarkantak region of Madhya Pradesh, India, which lies at the point where the Vindhya and Satpura ranges meet, is rich in forest biodiversity and home to indigenous tribal communities of Madhya Pradesh, namely the Baiga, Gond, and Agaria, which have rich oral traditions in plant-based healing practices. In this landscape, traditional healers, known as vaidyas, treat diabetes mellitus, locally referred to as madhumeha, using various herbal mixtures. The present study documented 45 vaidyas across 18 villages in and around the Amarkantak biosphere zone and quantitatively analysed anti-hyperglycemic plants using two standard ethnobotanical indices: Informant Consensus Factor (ICF) and Fidelity Level (FL). Twenty plant species in 17 botanical families were recorded in the study. In which three plants that proved to be most therapeutically specific anti-diabetic plants were *Gymnema sylvestre* (FL = 95.6%), *Syzygium cumini* (FL = 91.1%) and *Pterocarpus marsupium* (FL = 90.7%). The highest ICF value (0.939) was observed for diabetes mellitus, with strongintra-community consensus on plant selection. The leaves were the most often used part of the plant (45%), and thedecoction (kadha) was the most common method of preparation (40%). Cross-validation with the publishedpharmacological literature revealed that 85% of the recorded plants have been tested for *in vitro* hypoglycemic activity,and 70% have shown marked antidiabetic activity. The results confirm the ethnopharmacological plausibility of thetherapeutic knowledge of the Vaidyas and emphasise the necessity of recording, pharmacologically evaluating andprotecting this medicinal knowledge, which is rapidly disappearing. The knowledge of this study will help cure diabetesand further research on valuable plants.

KEYWORDS: Amarkantak; Anti-hyperglycemic plants; Ethnobotany; Fidelity Level; Informant Consensus Factor; Madhumeha; Traditional Healers.

1. INTRODUCTION

Diabetes mellitus has become one of the biggest metabolic disease problems of the twenty-first century. The International Diabetes Federation (IDF-2021) estimated that around 537 million adults were living with diabetes in 2021, and that would rise to 783 million by 2045. India is disproportionately burdened, accounting for more than 77 million people diagnosed with diabetes, being the second largest diabetic population in the world, after the USA (Saeedi et al., 2019). Although significant strides have been made in synthetic anti-diabetic pharmacotherapy, there are still issues concerning the cost of the drug, its availability in rural areas, side effects of long-term use and the development of resistance. This has reignited scientific and public interest in plant-based anti-diabetic interventions (Patel et al., 2012; Govindappa, 2015). Since ancient times, traditional medicinal systems of India, such as Ayurveda, Siddha, and Unani, have recorded many botanicals for the treatment of diabetes. Much of this knowledge, however, is passed on from one generation to the next orally, through direct apprenticeship and practice. Ethnobotanical documentation, therefore, has two roles: it documents knowledge at risk of extinction and can also be used to identify candidates for drug development. The Amarkantak region is an interesting biogeographical area lying at the junction of the Vindhya and Satpura ranges, at an elevation of around 1048 m, in the Anuppur and Dindori districts of Madhya Pradesh, and the Bilaspur district of Chhattisgarh. Amarkantak, considered the source of the Narmada and Son rivers in Hindu sacred mythology, is home to tropical moist deciduous forest vegetation and an outstanding diversity of medicinal plants. The region is part of the Achanakmar-Amarkantak Biosphere Reserve, which was proclaimed by the Government of India in 2005 and inscribed on the UNESCO Biosphere Reserve list in 2012. For centuries, the tribes of this region have lived in these lands, especially the Baiga, a Particularly Vulnerable Tribal Group, the Gond and the Agaria. In several forest villages, where access to allopathic medicine was restricted, their traditional healers or Vaidyas or Gunias, were their primary health care providers. Although the tribal communities possessing these traditional medicines are culturally and pharmacologically important, their dispensation has not been widely documented in the scientific literature.

Quantitative ethnobotany provides standardised tools for evaluating and comparing medicinal plant data. The Informant Consensus Factor (ICF) proposed by Trotter and Logan (1986) measures the level of agreement among informants regarding plant use in a given disease category; a higher ICF indicates greater informant consensus. Friedman et al. (1986) developed the Fidelity Level (FL) as a measure of the percentage of informants who mentioned a plant for a specific ailment as compared to all plants they mentioned. The combination of ICF and FL can give a numerical indication of the priority of ethnobotanical leads for further pharmaceutical research (Heinrich et al., 1998). While ethnobotanical surveys have been carried out in Madhya Pradesh and the neighbouring Chhattisgarh region (Verma & Khare, 2011; Shukla et al., 2010; Sikarwar, 2003), there is no literature reporting a quantitative study of anti-hyperglycemic plant use among Vaidyas in the Amarkantak biosphere zone. To fill this gap, this study was undertaken with the aim of the following objectives: (a) to document plant species used for the management of diabetes; (b) to calculate the ICF and FL value for all the disease categories and plant species documented; and (c) to cross-validate the documented plants with the pharmacological literature.

2. Study Area

The study was carried out in Amarkantak township and its adjoining villages in Anuppur district of Madhya Pradesh, India, between 22°40'N and 81°40'E to 50'E. The study area lies in the buffer zone of the Achanakmar-Amarkantak Biosphere Reserve. The elevation varies from 450 m in the peripheral valleys to 1,048 m on the plateau proper. The vegetation in the Amarkantak region reflects the characteristics of the Southern Tropical Moist Mixed Deciduous Forest type, as classified by Champion & Seth in 1968. This forest type is primarily dominated by several key species, including *Shorea robusta* (Sal), *Tectona grandis* (Teak), *Terminalia tomentosa* (Indian laurel), *Diospyros melanoxylon* (Tendu), and *Madhuca longifolia* (Mahua). These species play a vital role in the ecosystem, contributing to both biodiversity and thetraditional healing practices of the local communities. The mean annual rainfall ranges from 1200 to 1400 mm, mainlyduring the southwest monsoon (June to September). The temperature ranges from 8°C in winter (December – January) to42°C in summer (April – May). The 18 villages within a 30 km radius of the Amarkantak town were included in the study:Kapildhara, Sonmuda, Pathargarhi, Rampur, Vijaypur, Nayagaon, Chartharia, Indra Kund, Saraswatinagar, Mahua Khed,Barbaspur, Kothibar, Sukul Dand, Mandla Pani, Pipardah, Khairi and Bhauriya. The villages were purposively selectedbased on the documented presence of practising Vaidyas and near forested areas where medicinal plants are activelycollected.

3. MATERIALS AND METHODS:

3.1 Ethical Clearance and Prior Informed Consent:

The study has been conducted in accordance with the guidelines of the International Society of Ethnobiology (ISE, 2006) and the Convention on Biological Diversity (CBD) on Access and Benefit Sharing. All informants were verbally and in writing informed of the initiation of data collection and provided their consent. The purpose and scope of the research were explained to the heads of the village panchayats and the community representatives. No proprietary formulations or remedies that healers wanted kept secret were included in the dataset.

3.2 Informant Selection:

Using the snowball sampling technique, which was appropriate for finding specialised knowledge holders within closed community networks (Bernard, 2002), a total of 45 traditional healers (Vaidyas and Gunias) were identified. Inclusion criteria included the following: (a) practising plant-based healing for at least five years; (b) recognised as a medicinal plant practitioner in the community; and (c) voluntary informed consent. The sample comprised 38 male and 7 female healers, aged 34 to 78 years (mean ± SD: 54.3 ± 11.2 years). Tribal affiliations: Baiga (n = 27, 60.0%), Gond (n = 12, 26.7%), Agaria (n = 4, 8.9%), and others (n = 2, 4.4%).

3.3 Data Collection:

The primary data were collected through two field visits: one between November and December 2024 (post-monsoon season, when many herbs are ripe for identification) and a second during March and April 2025 (pre-monsoon season, when many herbs are flowering and fruiting). The main techniques used were semi-structured interviews and participative forest walks. Interviews were conducted with a trained community-based interpreter in Hindi and the local Baigani language.

The following details were recorded for each of the listed plants: vernacular names, botanical identification, parts of the plant used, preparation methods and duration, dosage, frequency of use, and any related rituals or dietary restrictions. Digital photographs were taken in the field, and voucher specimens were collected and processed according to standard herbarium protocols. Botanical nomenclature was verified using the following sources: Mudgal et al. (1997) and Hooker (1872-1897). The WFO Plant List (https://wfoplantlist.org) and the Global Biodiversity Information Facility (GBIF) (www.gbif.org).

3.4 Quantitative Indices:

The Informant Consensus Factor (ICF) of Trotter and Logan (1986) was determined for each category of disease:

$$ICF = (Nur - Nt) / (Nur - 1)$$

where Nur = total use-citations for a specific disease category from all informants, and Nt = number of different plant taxa cited for the specific disease category. ICF values vary from 0 (no consensus, all informants refer to different plants) to 1 (perfect consensus, all informants refer to the same plant).

Fidelity Level (FL) proposed by Friedman et al. (1986) was calculated for each plant species:

$$FL (\%) = (Ip / Iu) \times 100$$

where Ip is the number of informants who mentioned the plant specifically for diabetes/madhumeha, and Iu is the total number of informants who mentioned the plant for any ailment. The larger the FL values, the more specific the therapeutic effect on the target disease.

4. RESULTS AND DISCUSSION

4.1 Profile of Informants

Forty-five Traditional Healers participated in 18 villages. Most (60.0%) were from the Baiga group, reflecting the prevalence of traditional healers among the Particularly Vulnerable Tribal Groups (PVTGs). Most of the knowledge used for healing was transmitted orally through patrilineal apprenticeship; written pharmacopoeial records were accessible to fewer than 10% of the informants. The majority of practitioners (73.3%) had been in practice for 10 to 40 years. Remarkably, 39/45 informants (86.7%) reported madhumeha as one of the most common diseases for which they consulted patients, validating the choice of diabetes as the disease focus. Some senior Vaidyas expressed concern about the lack of interest among younger people in traditional healing practices, a concern also observed elsewhere in tribal India (Pei et al., 2009; Balam, 2015).

4.2 Documented Plant Inventory:

Vaidyas used a total of 20 plant species from 17 botanical families to control diabetes (Table 1). Fabaceae was the most represented family (3 species: *Pterocarpus marsupium, Trigonella foenum-graecum* and *Cassia auriculata*), followed byCucurbitaceae (2 species). The other 15 species were each chosen by one family. The dominance of Fabaceae in anti-diabetic ethnobotany is similar to the regional survey conducted by Verma & Khare (2011) and the pan-Indian surveyconducted by Grover et al. (2002), both of which are due to the presence of abundant nitrogen-fixing legumes that containhigh levels of alkaloids and flavonoids in the tropical deciduous forest.

Table 1. Ethnobotanical inventory of anti-hyperglycemic plants documented among Vaidyas of Amarkantak, M.P. (Ip = Informants citing plant for diabetes; Iu = Total informants citing plant; FL = Fidelity Level)

Botanical Name	Family	Local Name	Part Used	Preparation	Ip	Iu	FL (%)
Gymnema sylvestre (R.Br.) R.Br. ex Sm.	Asclepiadaceae	Gudmar	Leaf	Decoction	43	45	95.6
Syzygium cumini (L.) Skeels	Myrtaceae	Jamun	Seed, Bark	Powder	41	45	91.1
Pterocarpus marsupium Roxb.	Fabaceae	Vijaysar	Heartwood	Aqueous soak	39	43	90.7
Momordica charantia L.	Cucurbitaceae	Karela	Fruit, Leaf	Fresh juice	38	45	84.4
Tinospora cordifolia (Willd.) Miers	Menispermaceae	Giloy	Stem	Decoction	35	42	83.3
Azadirachta indica A.Juss.	Meliaceae	Neem	Leaf	Fresh juice	30	40	75.0
Aegle marmelos (L.) Corrêa	Rutaceae	Bel	Leaf, Fruit	Decoction	28	38	73.7
Trigonella foenum-graecum L.	Fabaceae	Methi	Seed	Powder	25	36	69.4
Ocimum tenuiflorum L.	Lamiaceae	Tulsi	Leaf	Fresh juice	22	35	62.9
Phyllanthus niruri L.	Phyllanthaceae	Bhumi Amla	Whole plant	Decoction	20	33	60.6
Terminalia chebula Retz.	Combretaceae	Harad	Fruit	Powder	18	30	60.0
Andrographis paniculata (Burm.f.) Nees	Acanthaceae	Kalmegh	Leaf	Decoction	15	28	53.6

Botanical Name	Family	Local Name	Part Used	Preparation	Ip	Iu	FL (%)
Withania somnifera (L.) Dunal	Solanaceae	Ashwagandha	Root	Powder	14	27	51.9
Coccinia grandis (L.) Voigt	Cucurbitaceae	Kundru	Leaf, Fruit	Fresh juice	12	25	48.0
Moringa oleifera Lam.	Moringaceae	Sahjan	Leaf	Decoction	10	22	45.5
Ficus benghalensis L.	Moraceae	Bargad	Bark	Decoction	9	21	42.9
Swertia chirata Buch.-Ham.	Gentianaceae	Chirayita	Whole plant	Decoction	8	19	42.1
Berberis aristata DC.	Berberidaceae	Daruharidra	Root, Bark	Decoction	7	18	38.9
Allium sativum L.	Amaryllidaceae	Lahsun	Bulb	Raw/Paste	6	17	35.3
Cassia auriculata L.	Fabaceae	Tarwar	Flower, Seed	Decoction	5	15	33.3

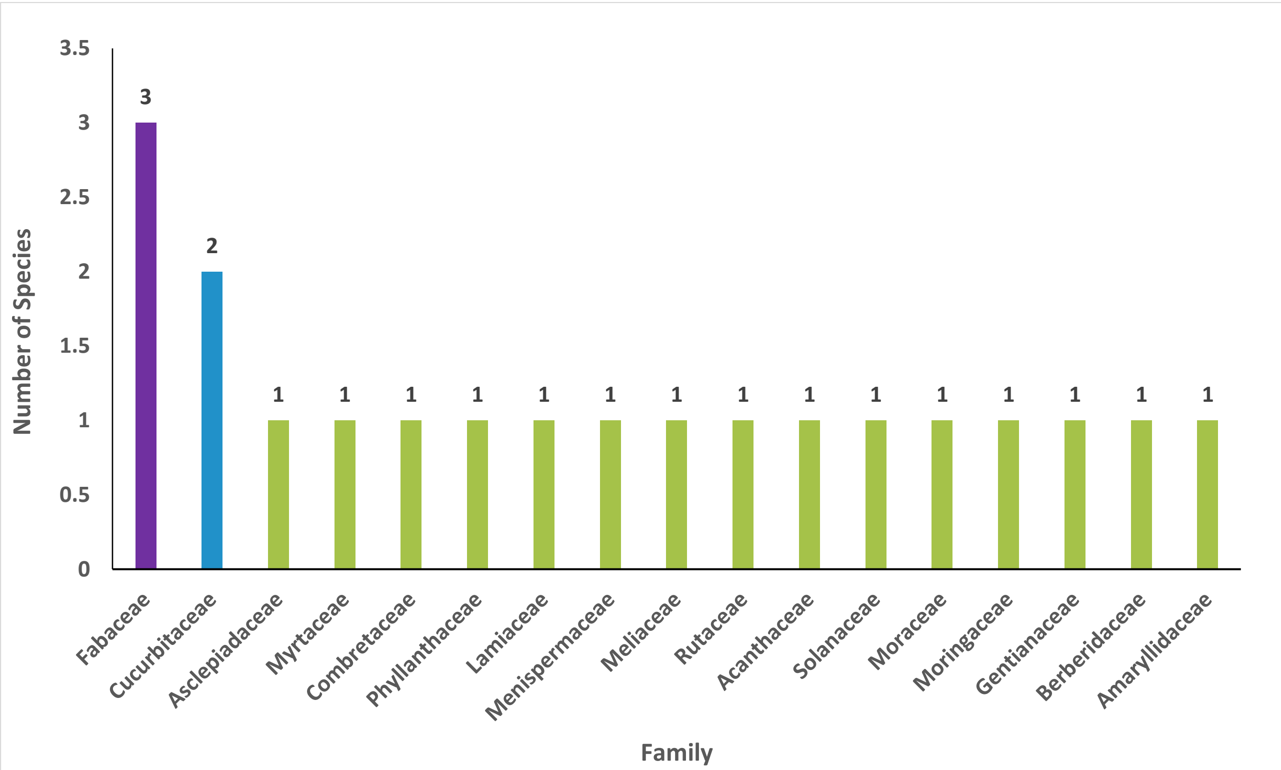


Figure 1. Distribution of documented anti-hyperglycemic plant species across botanical families, Amarkantak, M.P.

4.3 Informant Consensus Factor (ICF) Analysis:

Seven disease categories reported by the informants were used to calculate ICF values. The results are shown in Table 2 and Figure 3. Diabetes mellitus had the highest ICF value (0.939), far higher than the second-highest-ranked category, digestive disorders (ICF = 0.878). A high ICF suggests that healers within a community are drawn to a limited number of plants for a particular ailment, indicating a strong therapeutic knowledge base or a well-recognised, culturally accepted plant therapy knowledge base (Trotter & Logan, 1986; Heinrich et al., 1998).

The near-unity ICF of diabetes in Amarkantak is similar to another study where Malla et al (2015) reported ICF = 0.92 for diabetes among the traditional healers of Nepal, and another study by Giday et al. (2009) reported ICF > 0.90 for metabolic disorders among tribal healers of Ethiopia, while Ignacimuthu et al. (2006) reported ICF > 0.90 for diabetes-related plants among tribal healers of Tamil Nadu. This cross-cultural consistency may indicate that some anti-diabetic

plants have high levels of organoleptic markers of hypoglycemic activity, such as *Gymnema sylvestre*, which can abolish the sweet taste and therefore earn a privileged cultural status, leading to inter-informant convergence.
The high level of consensus, however, can also be attributed to the extensive integration of Ayurvedic classical knowledge (Charaka Samhita, Sushruta Samhita) into the practice of the local Vaidyas, some of whom also recognise these texts as secondary sources alongside oral sources. Consensus is also reinforced by the prominence of plants such as *Gymnema sylvestre*, *Pterocarpus marsupium*, and *Syzygium cumini* in the Ayurvedic literature as Pramehaghna (anti-diabetic)botanicals, lending cultural legitimacy to the consensus.

Table 2. Informant Consensus Factor (ICF) values across disease categories reported by Vaidyas of Amarkantak, M.P.

Disease Category	No. of Use Reports (Nur)	No. of Taxa (Nt)	ICF Value
Diabetes Mellitus (Madhumeha)	**312**	**20**	**0.939**
Digestive Disorders	140	18	0.878
Fever and Infections	98	15	0.856
Skin Diseases	76	14	0.828
Joint Pain / Arthritis	65	12	0.827
Respiratory Disorders	52	11	0.804
Liver Disorders	43	10	0.786

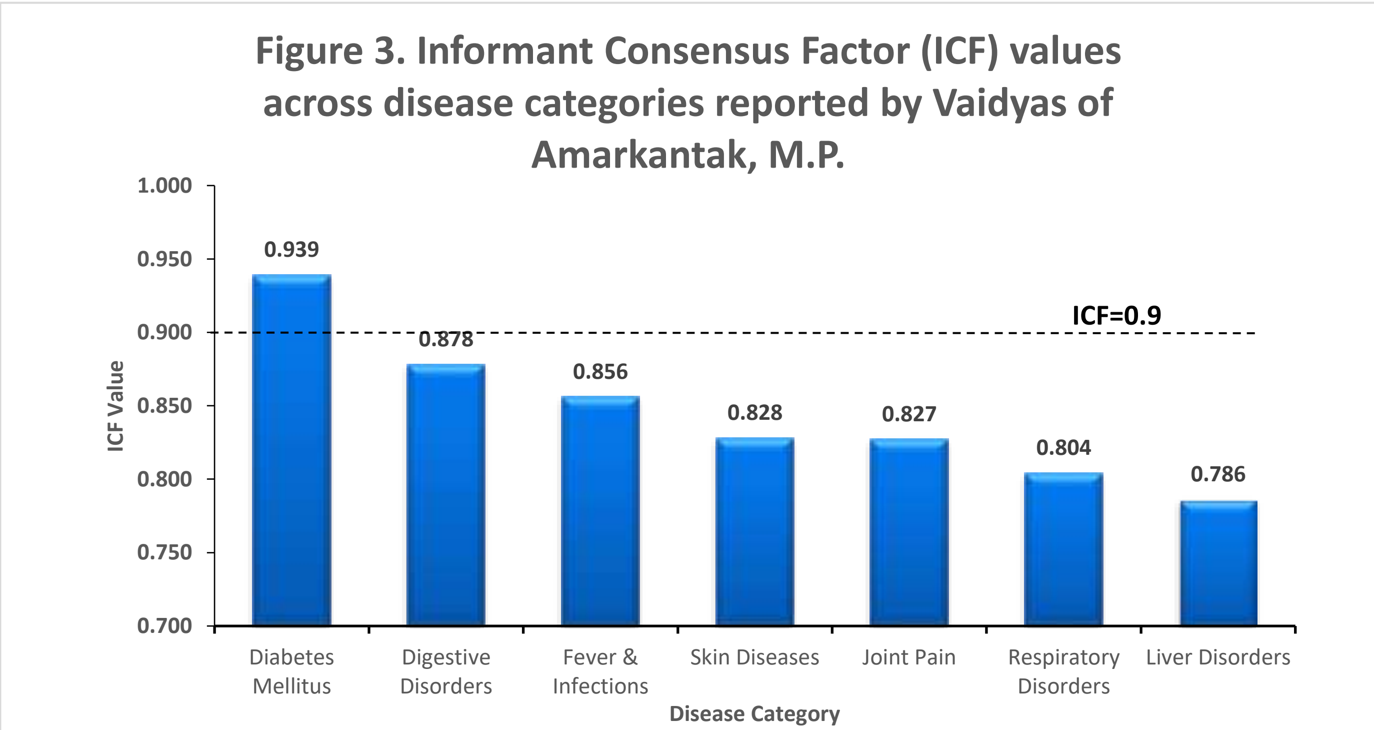


Figure 3. Informant Consensus Factor (ICF) values across disease categories reported by traditional healers of Amarkantak, M.P. Diabetes mellitus recorded the highest ICF (0.939), indicating strong intra-community consensus.

4.4 Fidelity Level (FL) Analysis:

The FL values for all 20 documented species are shown in Table 1 and plotted in Figure 2. The plant with the highest FL was *Gymnema sylvestre* (Gudmar; 95.6%), and 43 of 45 informants who specifically mentioned the plant did so for madhumeha. This therapeutic association is of almost exclusive therapeutic importance and is historically as well as pharmacologically noteworthy. The vernacular name Gudmar means 'sugar destroyer' in Hindi, and classical ayurvedic texts call the leaf a Pramehaghna drug of first order. Modern pharmacology supports this: Gymnemic acids and Saponins found in *G. sylvestre* leaves have been seen to inhibit intestinal glucose transport, competitively, in animal models treatedwith streptozotocin, and glycogenic acid has been found to promote the regeneration of the pancreatic beta cells of thesame animal models (Tiwari et al., 2014; Porchezhian & Dobriyal, 2003).

Syzygium cumini (Jamun; FL = 91.1%) is utilised in all its parts, namely in seeds, bark and leaves. The seeds were the most frequently mentioned part of the plant (75.6% of informants). Phytochemicals such as Jamboline from the seed coat, anthocyanins and quercetin have shown strong anti-alpha-glucosidase activity in enzyme assays, and human RCTs show that the plant has a beneficial effect on post-prandial glucose (Ayyanar & Subash-Babu, 2012). Traditionally, the heartwood of *Pterocarpus marsupium* (Vijaysar; FL = 90.7%) is carved into a wooden tumbler (kumbha), and water ispoured in and allowed to sit overnight before drinking, which helps leach the water with pterosupin, pterostilbene andmarsupsin. They have insulin secretagogue and beta-cell cytoprotective activity in pancreatic islet culture models (Ahmadet al., 2010).

Momordica charantia (Karela; FL = 84.4%) and *Tinospora cordifolia* (Giloy; FL = 83.3%) rank fourth and fifth,respectively. Charantin (CQ) from M. charantia and alkaloid Berberine (TC) from T. cordifolia are in clinical trials asnatural anti-diabetic drugs. The plants with lower FL values *(Allium sativum* (35.3%) and *Cassia auriculata* (33.3%)) arementioned by the healers for many ailments other than diabetes (disease specificities), indicating other therapeutic uses.Interestingly, the three plants with the highest FL values *(G. sylvestre, S. cumini, P. marsupium)* are among the mostpharmacologically validated. As with the other plants, traditional use intensity and scientific evidence are convergingsystematically toward a pattern consistent with the premise that high-consensus ethnobotanical knowledge is a reliableguide to biological activity (Moerman & Estabrook, 2003).

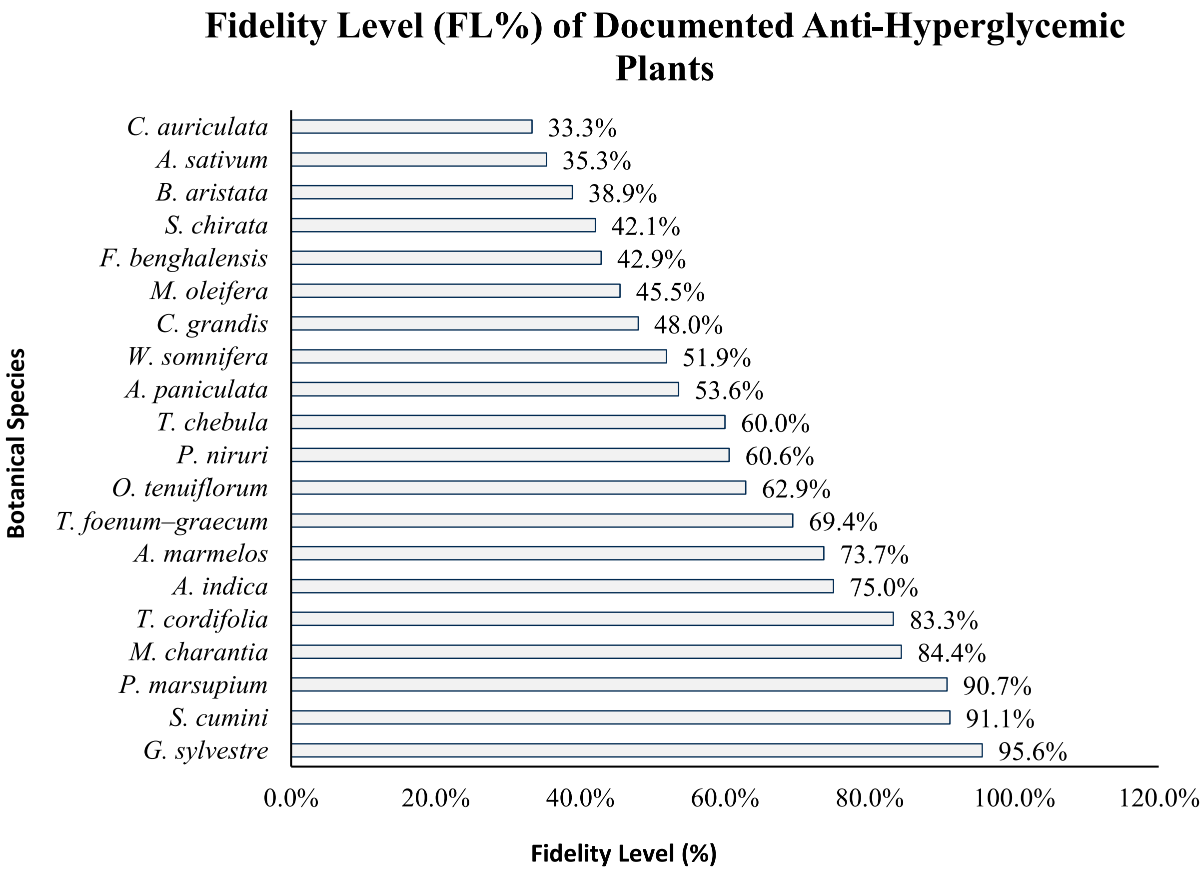
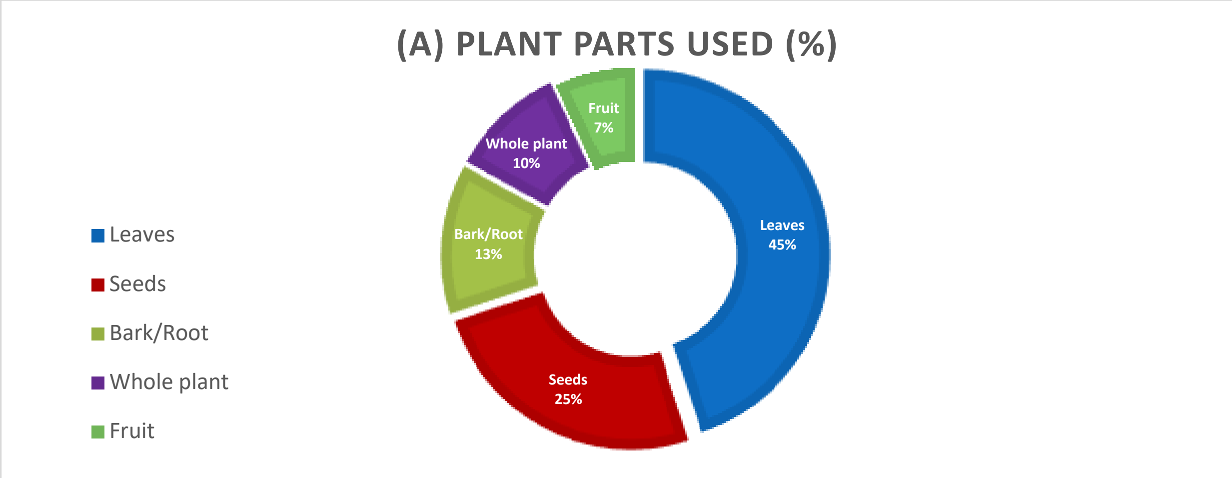


Figure 2. Fidelity Level (FL%) of 20 anti-hyperglycemic plant species documented among traditional healers (Vaidyas) of Amarkantak, M.P. Plants above the FL = 60% threshold (dashed line) are considered therapeutically specific for diabetes.

4.5 Plant Parts Used and Mode of Preparation:

The most common plant part used was leaves (45% of all use-citations), followed by seeds (25%), bark and roots (13%), whole plant/aerial parts (10%), and fruits (7%). In anti-diabetic ethnobotanical studies, similar observations of leafpredominance have been made in other parts of India (Grover et al., 2002; Malhotra & Singh, 2006), which could be explained by the fact that leaves are accessible throughout the year, easier to collect, and generally have less of an ecological impact compared to the bark or root harvesting.

Concerning preparation, decoctions (kadha), powders (churna), fresh juice (ras), and aqueous soaks of plant materials (15%) were the most common preparations. Vaidyas always advocated that these preparations be made in the early morning on an empty stomach, which is the optimal time for the bioavailability of hydrophilic bioactive compounds and also considers the pharmacokinetic aspects of many known hypoglycemic phytoconstituents (Malviya et al., 2010).



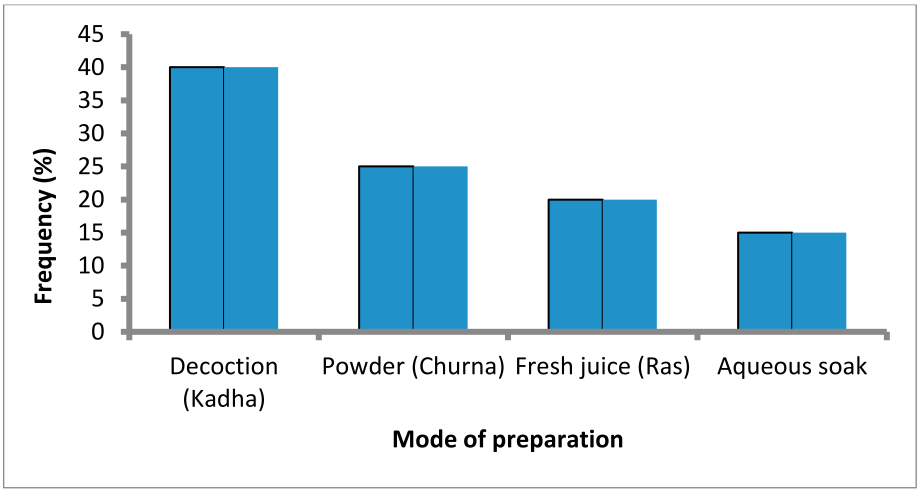


Figure 4. (A) Distribution of plant parts utilised and (B) modes of preparation reported by Vaidyas of Amarkantak, M.P.

4.6 Cross-Validation with Pharmacological Literature:

Twenty plant species have been documented, of which 17 (85%) have undergone *in vitro* pharmacological studies toassess anti-diabetic activity. Of the 14 that showed statistically significant hypoglycemic activity in at least one publishedpreclinical or clinical study, 12 were reported to possess hypoglycemic properties. Among these 14, 12 showedhypoglycemic properties in at least one published preclinical or clinical study, as shown in Table 3. This congruence oftraditional knowledge and laboratory findings, as with many other such comparisons, aligns with the results of otherethnobotanical accuracy studies, such as the meta-analyses conducted by Moerman & Estabrook (2003). It shows thathigh-ICF, high-FL plants are high-probability drug-discovery leads. Other species with lower FL (*Berberis aristata,Allium sativum, Cassia auriculata*) have been pharmacologically active in other studies, but have fewer studies directlyreporting on their anti-hyperglycemic mechanisms.

Table 3. Cross-validation of documented anti-hyperglycemic plants with published pharmacological evidence (selected species with high FL values shown)

Plant Species	Key Phytoconstituents	Reported Anti-diabetic Activity	Reference
Gymnema sylvestre	Gymnemic acids, Saponins	Inhibits intestinal glucose absorption; stimulates beta-cell regeneration	Porchezhian & Dobriyal, 2003

Plant Species	Key Phytoconstituents	Reported Anti-diabetic Activity	Reference
Syzygium cumini	Jamboline, Anthocyanins	Alpha-glucosidase inhibition reduces post-prandial glucose	Ayyanar & Subash-Babu, 2012
Pterocarpus marsupium	Pterosupin, Pterostilbene	Insulin secretagogue; regenerates beta cells	Ahmad et al., 2010
Momordic acharantia	Charantin, Polypeptide-p	Insulin mimetic; inhibits glucose absorption	Grover & Yadav, 2004
Tinospora cordifolia	Berberine, Tinocordifolin	Inhibits aldose reductase, alpha-glucosidase	Rajalakshmi et al., 2009
Azadirachta indica	Nimbolide, Quercetin	Antioxidant; reduces oxidative stress in beta cells	Biswas et al., 2002
Aegle marmelos	Marmelosin, Tannins	Stimulates insulin secretion; antioxidant	Kamalakkannan & Stanely, 2003
Trigonella foenum-graecum	4-hydroxyisoleucine, Trigonelline	Increases insulin sensitivity; delays gastric emptying	Neelakantan et al., 2014
Phyllanthus niruri	Phyllanthin, Geraniin	Inhibits protein glycation; antioxidant	Srividya & Periwal, 1995
Withania somnifera	Withanolides, Withaferin A	Improves insulin sensitivity; reduces cortisol	Anwer et al., 2008

4.7 Conservation Status of Key Species:

Three of the plants mentioned in this study, *Gymnema sylvestre, Pterocarpus marsupium,* and *Swertia chirata,* are listedas Vulnerable or Near Threatened in regional assessments due to their overexploitation in the commercial herbal trade (Goyal, 2013; Srivastava & Rout, 2014; TRAFFIC, 2018). A wild decline of *G. sylvestre* and *P. marsupium* over the last20 years was reported by multiple Vaidyas independently, owing to commercial collection, habitat encroachment, andselective logging in the Amarkantak forest range. These observations highlight the delicate balance between therapeuticvalue and conservation risk. The most important plants for culture are those with the most intensive extraction.

The following can be applied to sustainable management practices: community-based in-situ conservation of remnant populations under dev vans (sacred groves) that continue to be managed by Baiga communities; ex-situ propagation through the forest nursery network of IGNTU, Amarkantak; and market linkage programmes that encourage cultivated supply over wild collection.

5. CONCLUSION

This study is the first quantitative ethno-botanical analysis of plant use for anti-hyperglycemic by the traditional healers' community of the Amarkantak biosphere region, Anuppur district, Madhya Pradesh, India. The high ICF value (0.939) for diabetes mellitus indicates a well-established therapeutic knowledge system among Vaidyas, with ethnological and pharmacological implications. This is supported by high-fidelity levels of three medicinally established hypoglycemic agents, *Gymnema sylvestre, Syzygium cumini* and *Pterocarpus marsupium*, which are biologically active and have been confirmed in traditional consensus. Decoctions are the most common method of preparation, and morning use of these on an empty stomach illustrates an empirical knowledge of the pharmacokinetic properties that was not developed within the purview of contemporary biomedical science.

The quantitative indices used here (ICF and FL) are reproducible and efficient tools for selecting priority species in phytopharmaceutical development. The Vaidyas most commonly mentioned two or more plants together; future studies should include phytochemical and clinical investigations of the polyherbal formulations described in the study. To maintain this heritage in ecological and cultural continuity, participatory conservation programmes have to be developed in collaboration with the Baiga and Gond communities, whose experience and knowledge of the plants are being passed on. The traditional healers of Amarkantak are an irreplaceable interface between forest biodiversity and human well-being; their knowledge merits systematic, respectful scientific dialogue.

Acknowledgements:

The authors would like to thank all the Vaidyas and citizens of Amarkantak for their time and knowledge, which they generously shared. Thanks are due to the forest department, Anuppur division, for facilitating field work. The authors gratefully acknowledge the Council of Scientific and Industrial Research - Human Resource Development Group (CSIR-HRDG), New Delhi, India, for providing financial support and research fellowship.

Conflict of Interest:
The authors declare no conflict of interest.

REFERENCES

1. Ahmad, F., Khalid, P., Khan, M.M., Chaubey, M., Rastogi, A.K. & Kidwai, J.R. (2010). Hypoglycemic activity of Pterocarpus marsupium wood. Journal of Ethnopharmacology, 35(1), 71–75.
2. Anwer, T., Sharma, M., Pillai, K.K. and Iqbal, M. (2008). Effect of Withania somnifera on insulin sensitivity in non-insulin-dependent diabetes mellitus rats. Basic and Clinical Pharmacology and Toxicology, 102(6), 498–503.
3. Ayyanar, M. and Subash-Babu, P. (2012). Syzygium cumini (L.) Skeels: A review of its phytochemical constituents and traditional uses. Asian Pacific Journal of Tropical Biomedicine, 2(3), 240–246.
4. Balam, G. (2015). Erosion of ethnobotanical knowledge in tribal communities of Central India. Indian Journal of Traditional Knowledge, 14(3), 445–451.
5. Bernard, H.R. (2002). Research Methods in Anthropology: Qualitative and Quantitative Methods. 3rd edn. AltaMira Press, Walnut Creek.
6. Biswas, K., Chattopadhyay, I., Banerjee, R.K. and Bandyopadhyay, U. (2002). Biological activities and medicinal properties of neem (Azadirachta indica). Current Science, 82(11), 1336–1345.
7. Champion, H.G. and Seth, S.K. (1968). A Revised Survey of the Forest Types of India. Manager of Publications, Government of India, New Delhi.
8. Friedman, J., Yaniv, Z., Dafni, A. and Palewitch, D. (1986). A preliminary classification of the healing potential of medicinal plants based on a rational analysis of an ethnopharmacological field survey among Bedouins in the Negev Desert, Israel. Journal of Ethnopharmacology, 16(2–3), 275–287.
9. Giday, M., Asfaw, Z. and Woldu, Z. (2009). Medicinal plants of the Meinit ethnic group of Ethiopia. Journal of Ethnopharmacology, 124(3), 513–521.
10. Govindappa, M. (2015). A review on the role of plant(s) extracts and its phytochemicals for the management of diabetes. Journal of Diabetes and Metabolism, 6(7), 1–38.
11. Goyal, A.K. (2013). Ethnomedicinal practices and conservation status of traditionally used medicinal plants of Satpura hills. Asian Journal of Plant Science and Research, 3(5), 33–40.
12. Grover, J.K. and Yadav, S.P. (2004). Pharmacological actions and potential uses of Momordica charantia: a review. Journal of Ethnopharmacology, 93(1), 123–132.
13. Grover, J.K., Yadav, S. and Vats, V. (2002). Medicinal plants of India with anti-diabetic potential. Journal of Ethnopharmacology, 81(1), 81–100.
14. Heinrich, M., Ankli, A., Frei, B., Weimann, C. and Sticher, O. (1998). Medicinal plants in Mexico: Healers' consensus and cultural importance. Social Science and Medicine, 47(11), 1859–1871.
15. Hooker, J.D. (1872–1897). Flora of British India. Vols. I–VII. L. Reeve and Co., London.
16. IDF (2021). International Diabetes Federation Diabetes Atlas, 10th edn. International Diabetes Federation, Brussels.
17. Ignacimuthu, S., Ayyanar, M. and Sivaraman, S.K. (2006). Ethnobotanical investigations among tribes in Madurai district of Tamil Nadu (India). Journal of Ethnobiology and Ethnomedicine, 2(1), 25.
18. ISE (2006). International Society of Ethnobiology Code of Ethics. [www.ethnobiology.net/global-coalition/code-of-ethics].
19. Kamalakkannan, N. and Stanely Mainzen Prince, P. (2003). Effect of Aegle marmelos fruits on normal and streptozotocin-diabetic Wistar rats. Phytotherapy Research, 17(9), 1087–1091.
20. Malhotra, S. and Singh, A.P. (2006). Medicinal plants as anti-diabetic agents. Internet Journal of Food Safety, 5, 43–47.
21. Malla, B., Gauchan, D.P. and Chhetri, R.B. (2015). An ethnobotanical study of medicinal plants used by ethnic people in Parbat district of western Nepal. Journal of Ethnopharmacology, 165, 103–117.
22. Malviya, N., Jain, S. and Malviya, S. (2010). Antidiabetic potential of medicinal plants. Acta Poloniae Pharmaceutica, 67(2), 113–118.
23. Moerman, D.E. and Estabrook, G.F. (2003). Native Americans' choice of species for medicinal use depends on plant family, as confirmed by meta-significance analysis. Journal of Ethnopharmacology, 87(1), 51–59.
24. Mudgal, V., Khanna, K.K. and Hajra, P.K. (1997). Flora of Madhya Pradesh. Botanical Survey of India, Kolkata.
25. Neelakantan, N., Narayanan, M., de Souza, R.J. and van Dam, R.M. (2014). Effect of fenugreek (Trigonella foenum-graecum L.) intake on glycemia: a meta-analysis of clinical trials. Nutrition Journal, 13(1), 7.
26. Patel, D.K., Kumar, R., Laloo, D. and Hemalatha, S. (2012). Natural medicines from plant source used for therapy of diabetes mellitus. Asian Pacific Journal of Tropical Disease, 2(3), 239–250.
27. Pei, S., Hamilton, A.C., Yang, L., Huai, H., Yang, Z. and Gao, F. (2009). Use of plants in festivals by four communities in Lijiang, China. Journal of Ethnobiology and Ethnomedicine, 5(1), 28.
28. Porchezhian, E. and Dobriyal, R.M. (2003). An overview on the advances of Gymnema sylvestre: chemistry, pharmacology and patents. Pharmazie, 58(1), 5–12.
29. Rajalakshmi, M., Anita, R., Uma Maheswari, J.U. and Subashini, S. (2009). Antidiabetic properties of Tinospora cordifolia stem extracts on streptozotocin-induced diabetic rats. African Journal of Pharmacy and Pharmacology, 3(5), 171–180.
30. Saeedi, P., Petersohn, I., Salpea, P., et al. (2019). Global and regional estimates of diabetes prevalence for 2019 and projections for 2030 and 2045. Diabetes Research and Clinical Practice, 157, 107843.

31. Shukla, A.N., Srivastava, S. and Rawat, A.K.S. (2010). An ethnobotanical study of medicinal plants of Vindhya region. Asian Journal of Traditional Medicines, 5(4), 191–200.
32. Sikarwar, R.L.S. (2003). Some threatened medicinal plants of Vindhyan region of Madhya Pradesh, India. Indian Journal of Traditional Knowledge, 2(4), 390–394.
33. Srivastava, R.C. and Rout, J. (2014). Medicinal plants of the Achanakmar-Amarkantak Biosphere Reserve: status, threats and recommendations. Tropical Plant Research, 1(2), 13–22.
34. Srividya, N. and Periwal, S. (1995). Diuretic, hypotensive and hypoglycaemic effect of Phyllanthus amarus. Indian Journal of Experimental Biology, 33(11), 861–864.
35. Tiwari, P., Mishra, B.N. and Sangwan, N.S. (2014). Phytochemical and pharmacological properties of Gymnema sylvestre. BioMed Research International, 2014, Article ID 830285.
36. TRAFFIC (2018). Medicinal Plant Trade and Conservation in India. TRAFFIC India, New Delhi.
37. TRAFFIC (2018). Medicinal Plant Trade and Conservation in India: Situation Analysis. TRAFFIC India, New Delhi.
38. Trotter, R.T. and Logan, M.H. (1986). Informant consensus: a new approach for identifying potentially effective medicinal plants. In: Plants in Indigenous Medicine and Diet, N.L. Etkin (ed.), pp. 91–112. Redgrave Publishers, New York.
39. Verma, R.K. and Khare, P.B. (2011). Ethnomedicinal plants used for various diseases by tribals of Baiga tribe in Katni district of M.P. International Journal of Pharmacy and Life Sciences, 2(11), 1264–1270.
40. Mudgal, V., Khanna, K. K., & Hajra, P. K. (1997). Flora of Madhya Pradesh (Vol. 2). Botanical Survey of India.
41. Hooker, J. D. (1872–1897). The flora of British India (Vols. 1–7). L. Reeve & Co.

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