

SEARCH FOR THE NOVEL AND ETHNIC POLYHERBAL FORMULATIONS FOR THE TREATMENT OF PSORIASIS IN CHHATTISGARH, INDIA

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ABSTRACT

Psoriasis is an autoimmune disorder that leads to scaling and inflammation of skin accompanying with pain, swelling, redness and heat. The percent prevalence of psoriasis in India is 0.44 – 2.2%. The present study enumerated the medicinal traditional knowledge currently in use by the indigenous people for curing Psoriasis. Methods of Martin (1995) were followed for ethnobotanical data collection and voucher specimen during field study. The role of traditional healers locally known as *Baiga*, as per the literature survey was included. The local names of the medicinal plants were recorded carefully along with plant parts used and polyherbal formulations.

The analysis of data revealed that 43 polyherbal formulations were used for the curing Psoriasis that included 39 plant species belonging to 30 families. The present research work is promising and might help in the discovery of potential therapeutic molecule(s) for the control and cure of Psoriasis.

KEYWORDS: Psoriasis, Polyherbal formulations, Traditional knowledge, Chhattisgarh, India

INTRODUCTION

Psoriasis is an autoimmune disorder that leads to scaling and inflammation of skin accompanying with pain, swelling, redness and heat. The process of skin turnover can happen in just few days resulting in to piling up on the skin surface. Anyone can suffer from this disease, but it is more prevalent in adults. It is twice more common in males compared to females [1]. The prevalence in Western populations was estimated to be around 2-3% [1].

Prevalence studies from India were mostly hospital-based representing the comparative data from various epidemiological studies on Psoriasis. A study from North India reported the prevalence of Psoriasis to be 0.8% among the skin patients. The male to female prevalence ratio was 2.5:1 [2]

A study conducted by Okhandiar *et al.* [3] from various medical colleges reported that the incidence of Psoriasis among total skin patients ranged between 0.44 and 2.2%. The higher percent prevalence of Psoriasis might be related to the different environmental conditions (extremes of temperature), dietary habits, and genetic differences.

Another study included larger number of subjects, percentage prevalence of Psoriasis among dermatology outpatients was found to be 2.8. The male to female sex ratio continued to be the same as mentioned above [4].

Excluding these studies, there is complete paucity of information on prevalence of Psoriasis in India with special reference to Chhattisgarh State.

Management of Psoriasis largely depends on the severity of the disease and location of lesions. At present, systemic therapy, phototherapy and agents applied topically are the therapeutic choice in the management of psoriasis [5]. The approved USFDA biologics for systemic therapy of Psoriasis included retinoids, cyclosporine, methotrexate [6]. The studies have revealed that systemic therapy and phototherapy are less preferred as compared to topical preparations by patients.[7, 8]. Some studies have shown that patients diagnosed with severe psoriasis receive systemic therapy [8].

Ethnomedicine is the study of traditional medicinal practices concerned to the health involving the cultural values, interpreting health, diseases and illness. In recent times it has been an important aspect of human health care system, which is based on belief and experiences of the ethnic people being part of their tradition and culture [9]. Since past few decades there has been an increase in utility of herbal drug in international trade because of the reason that they are cheaper, more effective and easy availability. Moreover, they have no side effects.

The knowledge of medicinal plants is mostly inherited by traditional learning. Thus, in the present research work is an attempt has been made for the apposite and methodical documentation of traditional knowledge (TK) currently in use by the indigenous people for curing Psoriasis.

Therefore, the present work is promising and might help in the discovery of potential therapeutic molecule(s) for the control and cure of Psoriasis.

MATERIALS AND METHODS

The Chhattisgarh is situated in central India with Raipur as its capital. It gained statehood after being carved out from Madhya Pradesh having a geographical area of 135,195 sq km. About 44% of the State's area is under forest cover [10]. The herbal State of Chhattisgarh has the densest forest cover in India as well rich flora with tremendous potential for value addition. This rich and diverse flora of Chhattisgarh remained unexplored since long. An approach has therefore been made for the exploration of traditional medicinal use of flora for treatment of Psoriasis.

The literature survey included the traditional healers locally known as *Baiga* for the documentation of their traditional medical knowledge for curing Psoriasis.

Methods of Martin (1995) were followed for ethnobotanical data collection and voucher specimen during field study [11]. The knowledge of traditional healers and knowledgeable elderly persons was inclusive factor during the study. Detailed in-depth literature survey helped in recording of traditional healers for documentation of traditional medical knowledge and polyherbal formulations used for curing Psoriasis. Literature survey also revealed about some focused group like knowledgeable elderly people of households, people of forest department, traditional *Dai* etc which were familiar about the usage of medicinal plants.

Quantitative Ethnomedicinal data analysis

Microsoft excel software (2010) was used to identify proportions like plant families, habit, parts, frequency of citations and popularly used plants etc. The different standard quantitative tools like Consensus value for Plant Part (CPP) [12, 13], Informant Consensus Factor (Fic), Fidelity Level (FL%), Importance value [IVs] [13], Use Values (UVs) [14], Informant Agreement Remedies (IAR) [15], Cultural Significance Index (CSI) [15], Rank Order Priority (ROP) [15], Percentage of respondents who have knowledge regarding the use of species (PRK) [16] and Simple Preference Ranking [16] were employed to analyze the collected data.

RESULTS

Inheritance of the traditional knowledge of medicinal plants (83.78%) was the major source of knowledge acquisition. About 10.81% of traditional healers acquired medical knowledge through different sources (training, from maternal uncle, Guru etc) and 5% obtained knowledge through supernatural powers. Only 27.03% were pure traditional medicinal practitioners by occupation whereas 72.97% traditional healers were mainly farmers by occupation along with their subsidiary occupation of traditional healer

It was revealed that a large number of medicinal plants comprising of 39 plant species belonging to 30 families (Table 1) were used by traditional healers for curing Psoriasis in the form of 43 polyherbal formulations.

Table 1: Medicinal plants used for treatment of Psoriasis in the form of polyherbal formulations in surveyed districts

S. No.	Local name	Botanical name	Family	Habit	Part used
1	Gunja	<i>Abrus precatorius</i> L.	Fabaceae	Climber	Root, Stem, Seed
2	Arakasiya	<i>Acacia auriculiformis</i> A.Cunn. ex Benth.	Fabaceae	Tree	Leaf
3	Latakna	<i>Achyranthes aspera</i> Linn.	Amaranthaceae	Herb	Leaf
4	Morbha	<i>Agave americana</i> L.	Asparagaceae	Herb	Leaf
5	Bhuineem	<i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees	Acanthaceae	Herb	Whole plant, Root, Leaf
6	Kathal	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	Tree	Fruit
7	Neem	<i>Azadirachta indica</i> A.Juss.	Meliaceae	Tree	Bark, Leaf
8	Akwan	<i>Calotropis gigantea</i> (L.) W.T.Aiton	Apocynaceae	Shrub	Root, Leaf, Seed
9	Nimbu	<i>Citrus limon</i> (L.) Burm. F	Rutaceae	Tree	Fruit
10	Dhaniya	<i>Coriandrum sativum</i> L.	Apiaceae	Herb	Leaf
11	Haldi	<i>Curcuma longa</i> L.	Zingiberaceae	Herb	Rhizome
12	Motha	<i>Cyperus rotundus</i> Linn.	Cyperaceae	Herb	Root
13	Amla	<i>Emblia officinalis</i> Gaertn.	Phyllanthaceae	Tree	Fruit
14	Kharhar	<i>Gardenia turgida</i> Roxb.	Rubiaceae	Tree	Root
15	Anantmool	<i>Hemidesmus indicus</i> (L.) R. Br.	Apocynaceae	Climber	Root
16	Dasmat	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	Shrub	Leaf, Root
17	Koriya	<i>Holarrhena antidysenterica</i> (Linn.) Wall.	Apocynaceae	Tree	Bark
18	Nagar Jadi	<i>Ipomoea carnea</i> Jace.	Convolvulaceae	Shrub	Bark, Leaf
19	Mahajal	<i>Lygodium flexuosum</i> (L.) Sw.	Schizaeaceae	Climber	Root
20	Sunsuniya bhaji	<i>Marsilea minuta</i> Linn.	Marsileaceae	Herb	Leaf

21	Chuimui	<i>Mimosa pudica</i> L.	Fabaceae	Herb	Whole part
22	Tambaku	<i>Nicotiana tabacum</i> L.	Solanaceae	Herb	Leaf
23	Bhuikosam	<i>Ochna obtusata</i> DC.	Ochnaceae	Tree	Root, Fruit
24	Kutki	<i>Picorhiza kurroa</i> Royle ex Benth	Plantaginaceae	Herb	Leaf, Root
25	Paan patta	<i>Piper betle</i> Linn.	Piperaceae	Climber	Leaf
26	Chitawar	<i>Plumbago zeylanica</i> L.	Plumbaginaceae	Shrub	Root
27	Karanj	<i>Pongamiapinnata</i> Linn.	Fabaceae	Tree	Seed
28	Sarpgandha	<i>Rauwolfia serpentina</i> Benth. Ex. Kurz.	Apocynaceae	Shrub	Root
29	Til	<i>Sesamum indicum</i> L.	Pedaliaceae	Herb	Seed
30	Hanuman Phal	<i>Selaginella bryopteris</i> (L.) Bak.	Selaginellaceae	Herb	Fruit, Bark
31	Bhelva	<i>Semecarpus anacardium</i> Linn.	Anacardiaceae	Tree	Root, Fruit
32	Tamatar	<i>Solanum lycopersicum</i> L.	Solanaceae	Herb	Fruit, Leaf
33	Bhaskatiya	<i>Solanum xanthocarpum</i> Schrad & Wendl	Solanaceae	Shrub	Leaf
34	Kochla	<i>Strychnos nux-vomica</i> L.	Loganiaceae	Tree	Root, Leaf, Bark
35	Arjun	<i>Terminalia arjuna</i> (DC.) Wight & Arn.	Combretaceae	Tree	Bark
36	Bahera	<i>Terminalia bellirica</i> Gaertn. Roxb.	Combretaceae	Tree	Fruit
37	Harra	<i>Terminalia chebula</i> Retz.	Combretaceae	Tree	Root, Fruit, Bark
38	Ajwain	<i>Trachyspermum ammi</i>	Apiaceae	Herb	Fruit
39	Bisallakruni	<i>Tridax procumbens</i> Linn.	Asteraceae	Herb	Whole plant

Analysis revealed that family Apocynaceae and Fabaceae, represented the highest number of plant species which was followed by Combretaceae, Solanaceae and Apiaceae (Table 2 and Figure 2). The habit of majority of medicinal plants which were used for curing Psoriasis was herb (38.46%), followed by tree (35.90%), shrub (15.38%) and climber (10.26%).

S. No.	Family	Frequency
1	Apocynaceae	4
2	Fabaceae	4
3	Combretaceae	3
4	Solanaceae	3
5	Apiaceae	2

Table 2: Families of Medicinal plants reported for curing Psoriasis

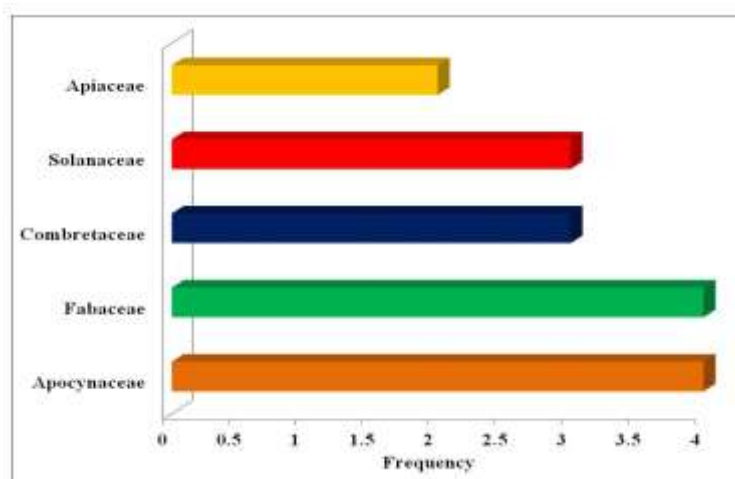


Figure 1: Families of Medicinal plants reported for curing Psoriasis

The traditional healers collected the medicinal plant species from the surrounding as well as from distant forest areas for curing Psoriasis. For dosing of the polyherbal formulations the traditional healers also took in to consideration the parameters like age, physical status and health conditions of the patient. The leaf part of the plants was mostly used by the traditional healers in various formulations for curing Psoriasis as compared to other plant parts as revealed by Consensus value (0.29) that depicted the degree of agreement among informants concerning the plant part used. It was followed by root (0.27), fruit (0.18), bark and seed (0.09), whole plant (0.05) and rhizome (0.02) (Table 3 and Figure 3).

S. No.	Part used	CPP
1	Leaf	0.29
2	Root	0.27
3	Fruit	0.18
4	Bark	0.09
5	Seed	0.09
6	Whole plant	0.05
7	Rhizome	0.02

Table 3: CPP value of the plant part used for curing Psoriasis

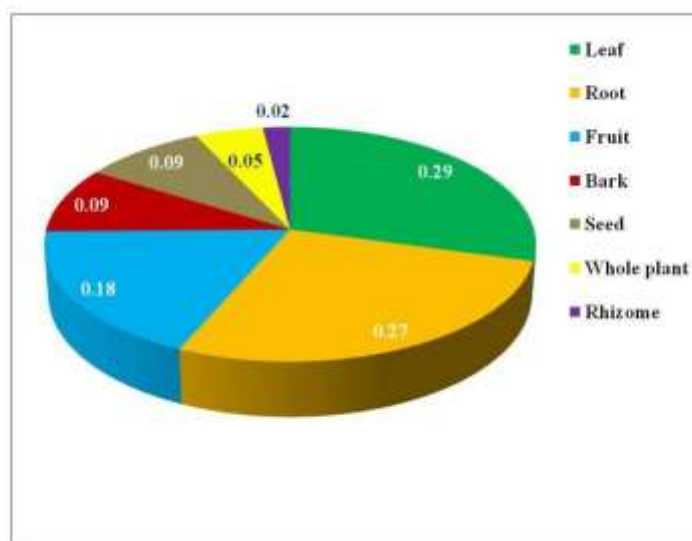


Figure 2: CPP value of the plant parts used for curing Psoriasis

Fidelity Level (FL%) value was calculated to quantify the percentage of informants claiming the use of a certain plant for the same major purpose. FL% value of the recorded 39 plant species ranges from 1.35% - 9.46% (Table 4). Highest fidelity level value has been recorded for *Pongamia pinnata* (9.46%) followed by *Ochna obtusata* (4.05%), *Azadirachta indica* (4.05%) and with 2.70% FL value for *Emblca officinalis*, *Acacia auriculiformis*, *Terminalia bellirica*, *Piper betle*, *Semecarpus anacardium*, *Abrus precatorius*, *Curcuma longa*, *Terminalia chebula* and *Cyperus rotundus*. The higher FL% value may be considered as an indicator for the high healing potential of the plants used against the Psoriasis. Thus plants with high fidelity level value could be targeted for further phytochemical investigation to identify the bioactive compounds that are responsible for their high healing potential. The matrix analysis also revealed that *Pongamia pinnata* (which is the most frequently used plant for treatment of Psoriasis in the surveyed districts) also highlights its highest efficacy potential among the plant species used by the traditional healers. Information Vales (IVs) measure the proportion of informants who regard a species as the most important. IVs of the plants used to cure Psoriasis ranges from 0.01–0.09. The highest Importance Value 0.09 recorded for the *Pongamia pinnata* followed by value of 0.04 for *Ochna obtusata* and *Azadirachta indica* (Table 4).

Since it was a gigantic task to identify the exact bioactive phytomolecules working against Psoriasis, therefore a detailed matrix of the polyherbal formulations was constructed for Simple Preference Ranking (SPR). The matrix revealed that in most of the formulations the seed of *Pongamia pinnata* was used (Table 4).

Other frequently used plants were *Ochna obtusata*, *Azadirachta indica*, *Emblca officinalis*, *Acacia auriculiformis*, *Terminalia bellirica* in the formulations prepared in diverse oil media. The sesame oil was the most preferred medium for the preparation of polyherbal formulations for Psoriasis. Paste formulations were the dominant form followed by liniments and powder for treatment of Psoriasis. However, the measurements of the dosage form by the healers were equivocal. They have their own developed dosage system which includes cups, finger, teaspoons etc. Adults and children have different dosage regimen. It also needs to be scientifically validated.

The analysis of the polyherbal formulations by traditional healers revealed that the formulations were prepared mainly from dried plant parts (64%) followed by freshly harvested plant parts (25%) and the combination of fresh and dried plant parts (11%) for curing Psoriasis. Figure 4 depicts various modes of preparations of polyherbal formulations. The most common mode is grinding (69.77%), followed by mixing (13.95%), crushing (6.98%), decoction (4.65%) boiling and heating (2.33%).

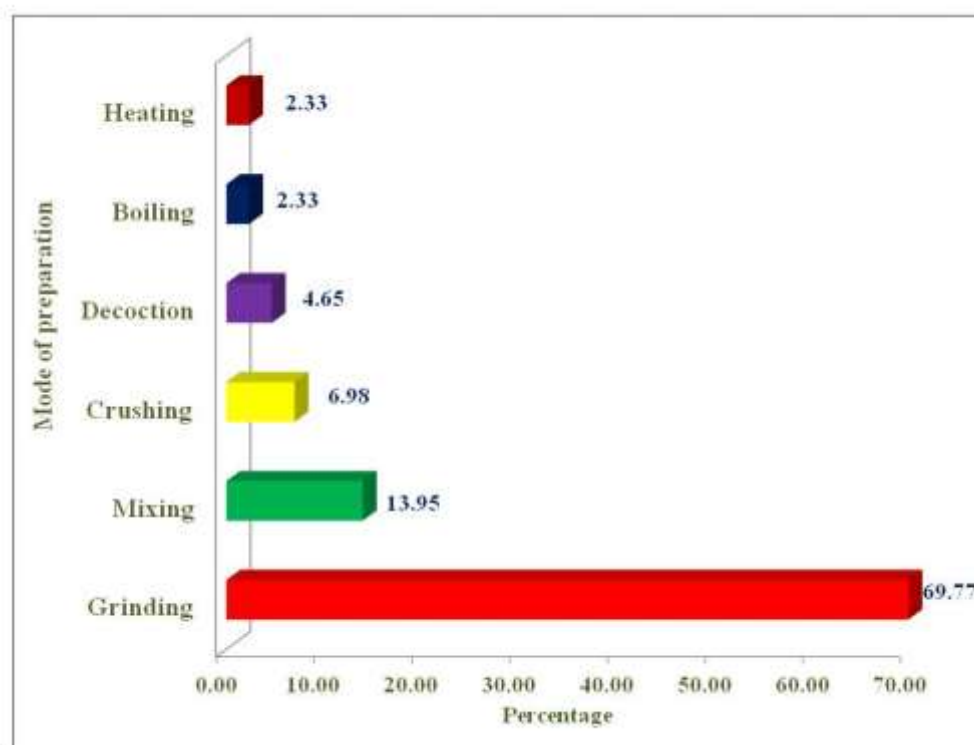


Figure 4: The various mode of preparation of polyherbal formulations for curing Psoriasis

Pongamia pinnata and *Sesamum indicum* was the most highly used species with a Use Value of 0.09, followed with same UV for *Ochna obtusata* and *Azadirachta indica* (UV=0.04). UV of *Emblia officinalis*, *Acacia auriculiformis*, *Terminalia bellirica*, *Piper betle*, *Semecarpus anacardium*, *Abrus precatorius* were 0.03 for curing Psoriasis (Table 4).

The IAR values of 39 plant species ranged from 0 to 1. *Pongamia pinnata* and *Sesamum indicum* had an IAR value of 1 with respect to curing of Psoriasis (Table 4).

According to the Cultural Significance Index (CSI), the culturally important plant species were *Pongamia pinnata* with high CSI of 14.00, followed by *Sesamum indicum* and *Ochna obtusata* with a CSI of 2.57 (Table 4). Rank Order of Priority (ROP) results showed *Pongamia pinnata* (9.46), *Sesamum indicum* and *Ochna obtusata* (1.74) and so on (Table 4).

Table 4: Quantitative analysis of Ethnomedicinal data of the Plant species used by traditional healers for curing Psoriasis

S. No.	Local name	Botanical name	FL (%)	IVs	UV	IAR	CSI	ROP	SPR	PRK
1	Karanj	<i>Pongamia pinnata</i>	9.46	0.09	0.09	1.00	14.00	9.46	7	9.46
2	Til	<i>Sesamum indicum</i>	4.05	0.04	0.09	1.00	2.57	1.74	7	9.46
3	Bhuikosam	<i>Ochna obtusata</i>	4.05	0.04	0.04	1.00	2.57	1.74	3	4.05
4	Neem	<i>Azadirachta indica</i>	2.7	0.03	0.04	1.00	1.14	0.77	3	4.05
5	Amla	<i>Emblia officinalis</i>	2.7	0.03	0.03	1.00	1.14	0.77	2	2.70
6	Arakasiya	<i>Acacia auriculiformis</i>	2.7	0.03	0.03	1.00	1.14	0.77	2	2.70
7	Bahera	<i>Terminalia bellirica</i>	2.7	0.03	0.03	1.00	1.14	0.77	2	2.70
8	Paanpatta	<i>Piper betle</i>	2.7	0.03	0.03	1.00	1.14	0.77	2	2.70
9	Bhelva	<i>Semecarpus anacardium</i>	2.7	0.03	0.03	1.00	1.14	0.77	2	2.70
10	Gunja	<i>Abrus precatorius</i>	2.7	0.03	0.03	1.00	1.14	0.77	2	2.70
11	Haldi	<i>Curcuma longa</i>	2.7	0.03	0.03	1.00	1.14	0.77	2	2.70
12	Harra	<i>Terminalia chebula</i>	2.7	0.03	0.03	1.00	1.14	0.77	2	2.70
13	Motha	<i>Cyperus rotundus</i>	1.35	0.03	0.03	1.00	1.14	0.19	2	2.70
14	Ajwain	<i>Trachyspermum ammi</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
15	Akwan	<i>Calotropis gigantea</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
16	Arjun	<i>Terminalia arjuna</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35

17	Kathal	<i>Artocapus heterophyllus</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
18	Bhuineem	<i>Andrographis paniculata</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
19	Bisallakruni	<i>Tridax procumbens</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
20	Chitawar	<i>Plumbago zeylanica</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
21	Chuimui	<i>Mimosa pudica</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
22	Anantmool	<i>Hemidesmus indicus</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
23	Hanuman Phal	<i>Selaginella bryopteris</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
24	Kharhar	<i>Gardenia turgida</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
25	Kochla	<i>Strychnos nux-vomica</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
26	Mahajal	<i>Lygodium flexuosum</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
27	Morbha	<i>Agave americana</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
28	Nimbu	<i>Citrus limon</i>	1.35	0.03	0.01	1.00	1.14	0.19	1	1.35
29	Nagar Jadi	<i>Ipomoea carnea</i>	1.35	0.01	0.01	0.00	0.29	0.19	1	1.35
30	Sunsuniyabhaji	<i>Marsilea minuta</i>	1.35	0.01	0.01	0.00	0.29	0.19	1	1.35
31	Tamatar	<i>Solanum lycopersicum</i>	1.35	0.01	0.01	0.00	0.29	0.19	1	1.35
32	Latakna	<i>Achyranthes aspera</i>	1.35	0.01	0.01	0.00	0.29	0.19	1	1.35
33	Sarpgandha	<i>Rauwolfia serpentina</i>	1.35	0.01	0.01	0.00	0.29	0.19	1	1.35
34	Tambaku	<i>Nicotiana tabacum</i>	1.35	0.01	0.01	0.00	0.29	0.19	1	1.35
35	Kutki	<i>Picorhiza kurroa</i>	1.35	0.01	0.01	0.00	0.29	0.19	1	1.35
36	Koriya	<i>Holarrhena antidysenterica</i>	1.35	0.01	0.01	0.00	0.29	0.19	1	1.35
37	Dasmat	<i>Hibiscus rosa-sinensis</i>	1.35	0.01	0.01	0.00	0.29	0.19	1	1.35
38	Bhaskatiya	<i>Solanum xanthocarpum</i>	1.35	0.01	0.01	0.00	0.29	0.19	1	1.35
39	Dhaniya	<i>Coriandrum sativum</i>	1.35	0.01	0.01	0.00	0.29	0.19	1	1.35

DISCUSSION

Large number of villagers is still dependent upon plant resources for health care. Rural people still prefer and have faith on herbal formulations for alleviating their ailments. The diagnosis and prognosis of the diseases is done by the traditional healers for the villagers and prescribes them the polyherbal formulations. It is an integral part of a community's identity as well. During the survey it was observed that traditional medicines are facing challenges owing to the disinterest of youth in learning the traditional knowledge from their ancestors. Migration towards cities also resulted in decreased transmission of knowledge to younger generation. Therefore, it is utmost important to document the traditional medical knowledge as it is confined to the few traditional healers. This will help in carrying out further research work and to future generations as well.

CONCLUSION

Ethnomedicinal knowledge used for traditional health care is gaining importance will lead to encouragement for R & D activities for evaluation and standardization of polyherbal formulations.

We have initiated this task and it is an ongoing research work to find out the exact phytochemical(s) that could be implicated for curing Psoriasis, which might help in the discovery of potential therapeutic molecule(s).

Now it is our top-priority to archive and conserve the long-established knowledge. This knowledge can be utilized in an efficacious way in the field of pharmacognosy, which will lead to the upliftment of society and preservation of utilitarian drug yielding species.

Moreover, native medicinal plants are also under threat due to global warming, anthropogenic and developmental activities. There is also a need for a suitable framework and approach for protection of Intellectual Property Right (IPR).

Conflict of Interest

There is no conflict of interest in this article.

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