Ethnomedicinal plants for skin and hair treatments under Meitei Traditional Medicine of Manipur, Northeast India

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Abstract: The Meitei community in Manipur, Northeast India, has a rich tradition of using ethnomedicinal plants for skin and hair care. As traditional ecological knowledge is declining among the community, there is a need for documentation and preservation of such knowledge. The aim of the present study is to document the plant species used by the Meitei community in Manipur for hair and skin care, as well as for treating dermatological diseases, including the preparation methods, routes of administration of herbal recipes, and the associated traditional knowledge. An ethnobotanical field study was conducted in the valley districts of Manipur, Northeast India. Plant specimens were collected, identified, and voucher specimens were collected. Ethnobotanical indices such as Use Value (UV), Informant Consensus Factor (FIC), and Fidelity Level (FL) were calculated. A total of 43 medicinal plants from 28 families were documented. Most of the recipes are prepared from leaves, fruits, and latex, while other parts are used less frequently. Routes of administration are primarily topical application. Hair care formulations are generally applied through a traditional lotion called *chinghi*, prepared from rice wash water. The use of traditional herbal products is closely related to the cultural traditions of the people. There is need for conservation of declining traditional ecological knowledge of the community.

Keywords: Ethnobotany, Phytomedicine, Skin care, Hair care, Herbal cosmetics, Field Survey, *Chinghi*

1. Introduction

The traditional ecological knowledge (TEK) plays significant role in the sustainable management of local plant resources in a community. This knowledge system includes use of various medicinal plants for various therapeutic purposes. According to an estimate of WHO, about 80% of the world's communities are still depending on traditional medicine for primary treatment, with each community having its own unique set of practices (Akerele, 1993). In various cultures, medicinal and aromatic plants have been used to prepare herbal recipes for improving skin and hair as well as for treating various skin diseases. Plant-based

skin and hair care are deeply rooted to ancient practices in different cultures all over the world (Alan et al., 2021; Bawale & Bala, 2022; Sultan et al., 2024). In recent years, synthetic cosmetic products have faced criticism due to their potential negative health effects leading to increased interest in traditional cosmetics, which are considered less toxic, effective, and believed to contain antioxidants (Hamilton, 2004; Sultan et al., 2024).

In any culture, the knowledge and practices of traditional medicine vary according to ethnicity, religion, educational background, social status, age and gender (Elansary et al., 2015; Pfeiffer & Butz, 2005). In Southeast Asia and northeastern India, indigenous people are using various medicinal plants to treat a range of ailments. Manipur is one of the states in northeastern region of India with a rich biodiversity due to its varied topography and climate. The state is ethnically and culturally diverse with different communities like the Meitei, Pangal, Naga, Kuki, and others with Meitei as the dominant community. Womenfolk of the Meitei community uses various plants for skin care, hair care and treating various skin-based ailments. The use of plants as traditional cosmetics has been poorly studied in various regions (Bawale & Bala, 2022), as most of the emphasis has been placed on other diseases (Sultan et al., 2024). Diversity of medicinal and aromatic plants are declining due to various anthropogenic factors leading to loss of traditional knowledge. Considering these aspects, an ethnobotanical field study was conducted to document the traditional knowledge of the Meitei community in Manipur with respect to cosmetics and the treatment of skin diseases. Preparation methods and routes of administration of herbal recipes are also documented, along with the associated traditional knowledge.

2. Materials and Methods

2.1. Study Site

Ethnobotanical field study was conducted in the state of Manipur, India located between latitudes 23°83'N and 25°68'N and longitudes 93°03'E and 94°78'E. The state is characterized by a central valley surrounded by mountain ranges on all sides. The study was carried out in the Imphal East District, Imphal West District, Bishnupur District, Thoubal District, and Kakching District, all situated in the central valley region (Fig. 1) where majority of the Meitei community resides. During the survey, traditional knowledge holders in the villages of these districts were consulted.

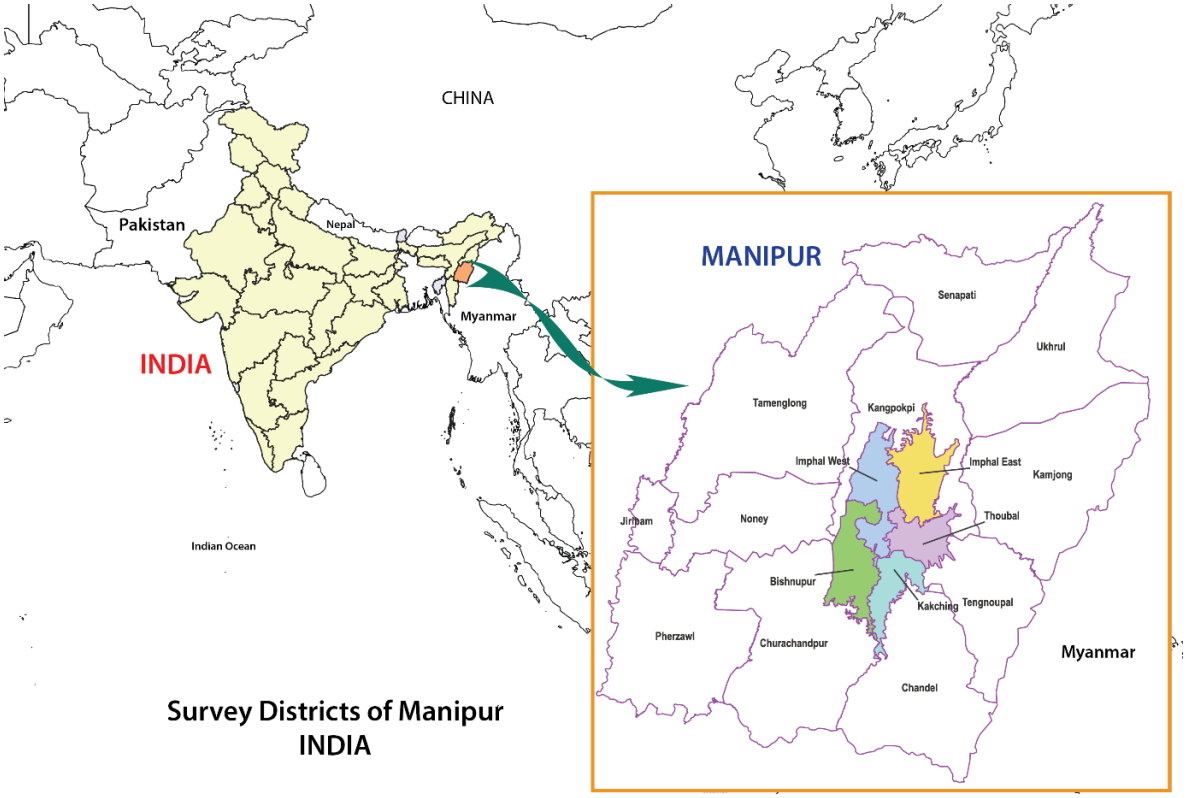

Figure 1: Map showing location of study area

2.2. Interviews

Semi-structured questionnaires were administered to collect ethnobotanical data from the informants. Information was collected from 58 informants from the study site. Emphasis was given on women while documenting the TEK, as they are the primary custodians of this knowledge (Sultan et al., 2024). Prior informed consent was obtained from the informants before the study. The informant names, detailed herbal formulations and doses of medication were kept confidential in the study.

2.3. Specimen Collection

Plant samples were collected based on information provided by the informants. Collected plants were cross checked with the informants for their vernacular names. Plants were identified in the Department of Life sciences, Manipur University. Voucher specimens are deposited at the herbarium of Department of Botany, Assam Down Town University, Guwahati, Assam, India. Scientific names were standardized according to Plants of the World Online website (https://powo.science.kew.org).

2.4. Quantitative Analysis

Ethnobotanical data of the reported uses of plants were organized in spreadsheets. Skin ailments were classified into different categories based on the characteristics of the symptoms. Ethnobotanical data were analysed as per quantitative methods described below.

2.4.1. Use Value

The use value (UV) is a quantitative measure that reflects the relative importance of a species based on the number of uses mentioned by informants (Phillips and Gentry, 1993; Rossato et al., 1999). It is calculated as:

$$UV = \frac{\sum U_i}{n}$$

Where, U_i is the number of uses mentioned by each informant for a particular species and n is the total number of informants.

2.4.2. Factor of Informant Consensus

Informant Consensus Index is determined for identifying the relative importance of medicinal plants with the ailment categories in a particular culture (Trotter and Logan, 1986). The index is calculated as per the following equation:

$$FIC = \frac{N_{ur} - N_t}{N_{ur} - 1}$$

where N_{ur} stands for the number of use reports for a particular use category and N_t stands for the number of taxa used for a particular ailment category by all informants.

2.4.3. Fidelity Level

The Fidelity Level (FL) is defined as the ratio between the number of informants who independently suggested the use of a species for the same major purpose and the total number of informants who mentioned the plant for any use (Friedman et al., 1986). The index is calculated according to following formula:

$$FL = \frac{Np}{N \times 100}$$

Where, Np is the number of informants that reported a use of a plant species to treat a particular disease, and N is the number of informants that used the plants as a medicine to treat any given disease.

3. Results and Discussion

3.1. Diversity of Plants

The majority of species used to treat skin and hair are herbs (55.81%) although trees (25.58%) and shrubs (18.60%) are also used. Sources and gathering places for skin and hair care are related to local availability. Herbaceous plant can be collected easily from grassland, agricultural land and home gardens as compared to other woody plants as well as they are highly abundant (Zhao et al., 2020). Plants mostly used in haircare and beautification purposes are readily available in the home garden and nearby grasslands. Though there are many various species available in the forest and fringe areas, womenfolk usually collect only the plants near the household areas. There are reports of the use of *Citrus* × *aurantiifolia* (Christm.) Swingle, *Microtoena patchoulii* (C.B.Clarke ex Hook.f.) C.Y.Wu & S.J.Hsuan, *Phyllanthus emblica* L., *Allium tuberosum* Rottler ex Spreng. and *Carica papaya* L. in other studies (Frank C. Roia, 1966; Wongrakpanich et al., 2022). Their high citation in the present study is corroborated by their abundance in home gardens, grasslands and croplands. The use of *Holmskioldia sanguinea* Retz. is recalled by many people but is not practiced nowadays because this plant has significantly decreased in the wild. This reflects the relationship with abundance of the species and ecological knowledge. Some people used to cultivate rare plants at home, but this practice is uncommon.

The three most commonly used families are Lamiaceae (11.63%), Asteraceae (9.30%) and Fabaceae (6.98%) (Fig. 2). The rest of the families are represented by either two species or one species in the survey. The family Lamiaceae is known for presence of many cosmetic and medicinal plants (Didita et al., 2010; Peter and Shylaja, 2012). Medicinal plants recorded in the present study are observed to be used in following categories – Hair care, Dermatological care, Diseases of the hair, Skin diseases and Infectious or parasitic diseases. Most of the plants recorded for hair care are used in hair lotions. The highest usage in this category is reported for *Microtoena patchoulii* (C.B.Clarke ex Hook.f.) C.Y.Wu & S.J.Hsuan and *Alocasia macrorrhizos* (L.) G.Don, with 24 and 17 use reports, respectively. Other species such as *Ageratum conyzoides* (L.) L., *Artemisia vulgaris* L., *Holmskioldia sanguinea*

Retz., *Leucocasia gigantea* (Blume) Schott, *Mussaenda glabra* Vahl, and *Oxalis debilis* Kunth are also used as ingredients in these preparations.

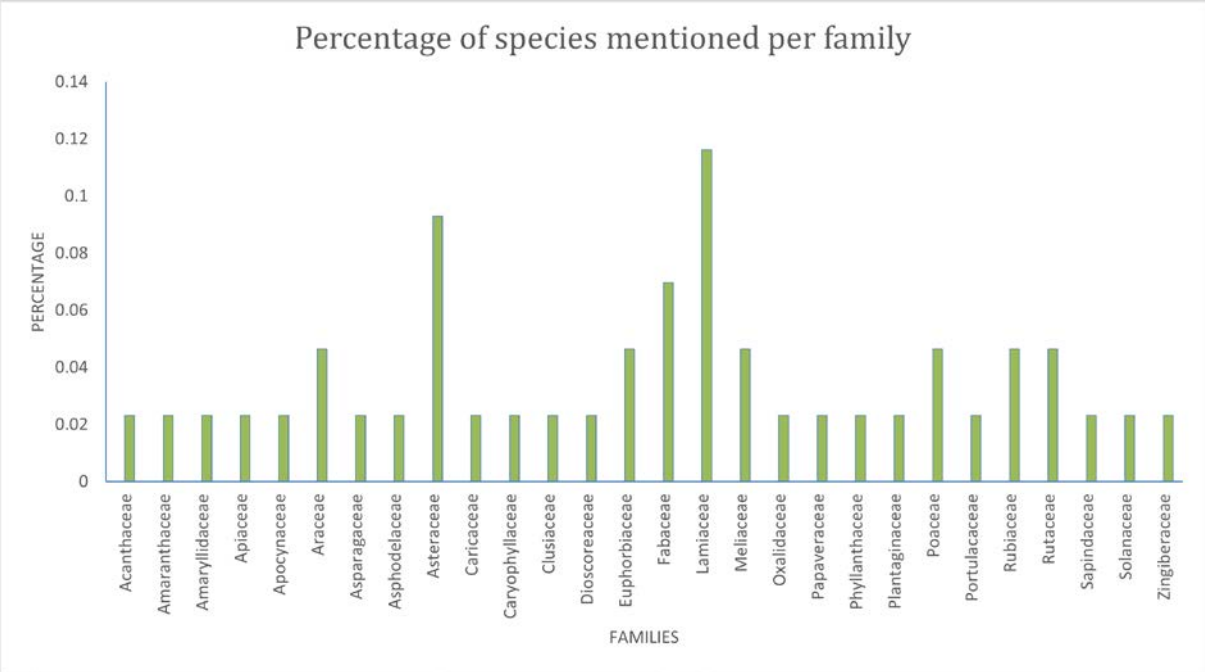

Figure 2: Number of species mentioned per family

The most commonly used parts of the plant for dermatological and trichological conditions were the leaves with 50.00% (Fig. 3) as observed in other studies in India (Mahato et al., 2019). Leaves are readily available plant parts, ensuring the community a continuous supply. Fruits represent second most commonly used plant part, making up 21.16% of the total. Selective collection of leaves, fruits, and flowers was preferred over uprooting in most plants. These approaches can be considered sustainable harvesting practices that minimize the ecological footprint and promote the regeneration of plant species.

3.2. Traditional Preparation

During the survey, various herbal preparation methods were documented. Common methods of preparation are maceration and decoction as observed in other studies (Afolayan et al., 2014; Sultan et al., 2024). Traditional preparation of these medicinal plants is closely related to their therapeutic and toxicological potential. For example, special care was taken in the preparation of *Alocasia macrorrhizos*, which contains calcium oxalate with irritant properties. Attention was given to ensure that the herbal preparations were boiled thoroughly to detoxify the irritative compounds.

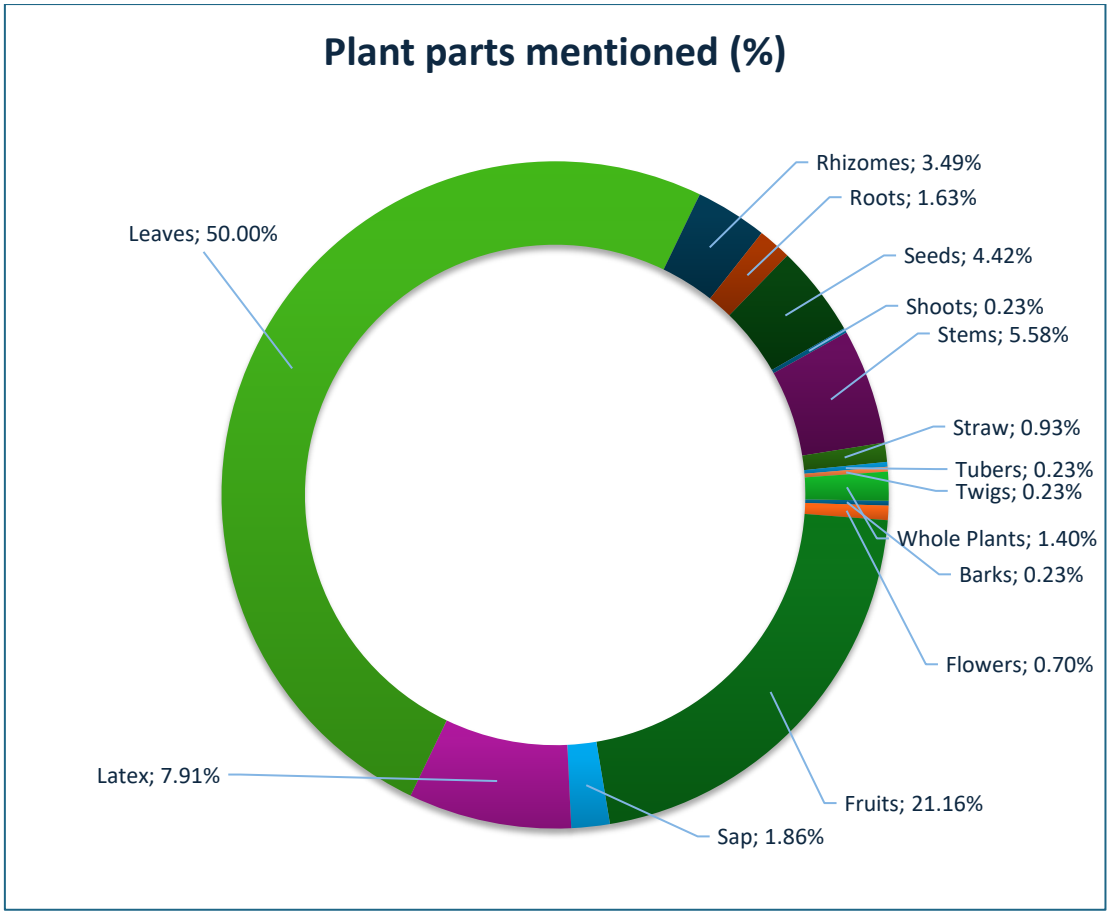

Figure 3: Plant parts mentioned by the Meitei community during the survey

Most of the hair care treatment of the Meitei community was done through "*Chinghi*" or "*Chenghi*" (literal meaning: rice water), a traditional hair lotion obtained by washing hulled young rice in water, hereinafter referred to as “rice water” in this paper. This rice water is infused with various herbal ingredients collected from the courtyard or garden. The mixture is boiled and allowed to simmer until the green parts are fully cooked. Fresh sticky rice is preferred, as the quality of the rice greatly affects the final quality of the hair lotion (Thitipramote et al., 2022). After boiling, the mixture is allowed to cool in a cool place. It can be used immediately. However, for optimal results, it is best to let it stand for one to three days to enhance its effectiveness. Despite the common medium, the role of rice water lotion differs according to the constituents used. When *Oxalis* is the major constituent, lotion is used as a cleansing agent for hair. When *Phyllanthus emblica* L. is added, it serves primarily to darken and soften the hair (Singh et al., 2014). The use of rice water is common throughout Asia due to its effects on hair, such as reducing surface friction, increasing hair elasticity, and promoting hair growth (Inamasu et al., 2010).

For making hair strengthening recipe, ashes of straw from *Oryza sativa* L. are used. At first, ashes are soaked in water for a long time. The water is then filtered through a cotton cloth and used to wash hair. For the treatment of smallpox, leaves are boiled in water, and the decoction is used to wash the diseased parts. *Piliostigma malabaricum* (Roxb.) Benth., *Andrographis paniculata* (Burm.f.) Wall. ex Nees, *Coix lacryma-job*i L., and *Vitex negundo* L. are used for the treatment of smallpox.

Allium tuberosum Rottler ex Spreng. is used for the treatment of hair loss. In this case, the plant is crushed along with the pulp of *Carica papaya* L. until juice is obtained. The head is first rubbed with *Ficus hispida* L.f. leaves, and then the mixture of fresh extracts is applied to treat hair loss. In certain conditions, only *Allium* leaves are applied, signifying their importance in treating hair loss. In a study in Korea, extracts of *Allium tuberosum* was found to promote hair growth by regulating the expression of insulin-like growth factor-1 (Park et al., 2015).

Most of the route of application in skin care, hair care and skin diseases are topical applications (Fig. 4) aligning with other studies (Sultan et al., 2024). Topical application of traditional medicines is considered to be effective that may reduce potential systemic side effects. (Alan et al., 2021; Hoffmann et al., 2020).

Among the dermatological care categories, medicinal plants are observed to be used for skin toning, as anti-wrinkle agents, and in skin crack treatments. *Curcuma longa* L. is used as a skin toner by making a paste, which is applied to the face as a protectant and for skin toning. Gel from the inner leaves of *Aloe vera* L. is also used for general skin care as well as anti-wrinkle treatments. *Meyna spinosa* Roxb. ex Link is used for skin care; in the past, people used to protect their skin similarly to glycerine using the extract of this plant. This practice is highly reduced as plants are diminishing in the wild. Plants used for skin diseases are not commonly used by local people. Most of these are used under the supervision of traditional knowledge experts. For the treatment of eczema, *Calotropis gigantea* (L.) W.T.Aiton, *Dioscorea bulbifera* L., *Jatropha curcas* L., *Vitex negundo* L., and *Senna tora* (L.) Roxb. are used. These plants are rubbed against the diseased body parts. In the case of antiseptic use, parts of *Jatropha curcas* L., *Ageratum conyzoides* L., *Artemisia vulgaris* L., etc., are taken and made into a paste or applied directly over the diseased parts.

Figure 4: Plant use pattern (A) *Microtaena patchouli* in the home garden; (B) *Drymaria cordata* in the home garden; (C) *Allium, Carica* and *Ficus* leaves collected for hair care; (D) *Azadirachta* leaves infused in water; (E) *Allium* leaves crushed for hair care; (F) Preparation of *Chinghi*, hair lotion (G) *Chinghi*, traditional hair lotion, (H) *Aloe vera* applied on heads; (I) *Allium* applied on hair

3.3. Ethnobotanical Indices

Ethnobotanical indices such as use value, factor for informant consensus and fidelity level were calculated for the documented plants.

3.3.1. Use Value

Use Value (UV) indicates the importance of each plant in the community based on the number of uses cited by informants. The Use Values (UV) of the species ranged from 0.43 to 0.03 (Table 1). *Citrus* × *aurantiifolia* had the highest UV value, indicating its extensive use and versatility in the community. *Microtoena patchoulii*, *Phyllanthus emblica*, and *Allium tuberosum* also with high UV values reflected their broad range of applications. The popularity of *Microtoena*, *Citrus* and *Ageratum* in hair lotion is due to their unique fragrance that lingers for a long time. In other countries, these plants are also used as traditional perfumes for their relaxing or energizing effects (Ito & Ito, 2011). Among plants with low UV values are *Cassia fistula* L., *Chenopodium album* L., and *Dioscorea bulbifera* L. with lowest UV values, suggesting they are seldom used or recognized for their applications.

Table 1. Use Value of the ethnobotanical plants

Species	UV
Citrus × *aurantiifolia* (Christm.) Swingle	0.43
Microtoena patchoulii (C.B.Clarke ex Hook.f.) C.Y.Wu & S.J.Hsuan	0.41
Phyllanthus emblica L.	0.38
Allium tuberosum Rottler ex Spreng.	0.36
Carica papaya L.	0.36
Calotropis gigantea (L.) W.T.Aiton	0.34
Alocasia macrorrhizos (L.) G.Don	0.29
Meyna spinosa Roxb. ex Link	0.29
Oxalis debilis Kunth	0.29
Ageratum conyzoides L.	0.28
Vitex negundo L.	0.28
Curcuma longa L.	0.26
Aloe vera (L.) Burm.f.	0.19

Species	UV
Leucocasia gigantea (Blume) Schott	0.17
Plantago asiatica subsp. *erosa* (Wall.) Z.Yu Li	0.17
Sapindus mukorossi Gaertn.	0.17
Artemisia vulgaris L.	0.16
Mussaenda glabra Vahl	0.16
Azadirachta indica A.Juss.	0.14
Euphorbia antiquorum L.	0.14
Dichrocephala integrifolia (L.f.) Kuntze	0.12
Holmskioldia sanguinea Retz.	0.12
Senna tora (L.) Roxb.	0.12
Citrus × *limon* (L.) Osbeck	0.10
Andrographis paniculata (Burm.f.) Nees	0.09
Ocimum tenuiflorum L.	0.09
Argemone mexicana L.	0.07
Piliostigma malabaricum (Roxb.) Benth.	0.07
Blumea densiflora DC.	0.07
Garcinia pedunculata Roxb. Ex Buch-Ham.	0.07
Jatropha curcas L.	0.07
Oryza sativa L.	0.07
Portulaca oleracea L.	0.07
Coix lacryma-jobi L.	0.05
Coriandrum sativum L.	0.05
Drymaria cordata (L.) Willd. ex Schult.	0.05
Melia azedarach L.	0.05
Nicotiana tabacum L.	0.05
Ophiopogon intermedius D.Don	0.05
Pogostemon cablin (Blanco) Benth.	0.05
Cassia fistula L.	0.03
Chenopodium album L.	0.03
Dioscorea bulbifera L.	0.03

3.3.2. Factor for Informant Consensus (FIC)

Factor for Informant Consensus (FIC) was used to determine plants of particular intercultural relevance and to agree on their use. High values correspond only when plant species are consensus in a particular disease category. From the data (Table 2), it was observed that Hair disease category have high consensus (0.98) on the use of plants among the informants, followed by trichological care and Infectious or parasitic diseases with lowest FIC value.

Table 2. FIC of the plants reported in the survey

Category	N_{ur}	N_t	FIC
Dermatological care	34	5	0.88
Hair Disease	42	2	0.98
Skin diseases	90	16	0.83
Infectious or parasitic diseases	51	14	0.74
Trichological care	181	20	0.89

High FIC values (close to 1) indicate strong agreement among informants, implying well-recognized and possibly effective species. Moderate FIC values (around 0.7-0.8) suggest reasonable agreement with some variability, indicating a broader range of effective species or more diverse traditional knowledge. Lower FIC values (below 0.6) indicate less agreement and a wider variety of species used, suggesting less consensus on their effectiveness. All use categories have FIC values ranging from 0.98 to 0.74. The highest value is observed in the application of for hair diseases. A notably high value is also observed in trichological care, with an FIC value of 0.89 and a high number of use reports. There was a strong consensus among informants on the species used for general hair care. The majority of medicinal plants used in skin care treatments were primarily employed to improve skin complexion (Gamage et al., 2021). There is also very high consensus among informants regarding the use of specific species for treating hair loss.

3.3.3. Fidelity Level (FL)

Some plants have multiple utilities as mentioned by the informants. Their importance for each use type was determined through the calculation of the Fidelity Level index. This index was estimated to quantify the importance of the species for a given purpose (Table 3). In the present study, highest fidelity levels were observed in many plants including *Andrographis paniculata*

for smallpox, *Chenopodium album* for vitiligo, *Coriandrum sativum* for pimple and *Ophiopogon intermedius* as a hair lotion, etc. Low fidelity level was observed in cases such as *Calotropis gigantea* for use in leprosy, *Vitex negundo* for eczema, etc. The high fidelity levels highlight their cultural significance, and the confidence placed in them by the traditional community.

There are several plants used for different purposes exhibiting the versatility in traditional practices. Notable species include *Ageratum conyzoides,* which is used both for hair lotion and as an antiseptic, *Allium tuberosum,* known for its use in treating hair loss, and *Alocasia macrorrhizos,* commonly used as a hair lotion. Different uses of the same plants reflect their cultural or economic value, depending on the specific use pattern (Mao et al., 2018). For example, Fidelity Level for *Calotropis gigantea* in eczema, furuncle, leprosy, ringworm, and vitiligo varies, indicating that some uses are more widely recognized than others. Species with high fidelity levels can be prioritized for further scientific research to validate their traditional uses and explore their potential benefits in modern medicine (Sutjaritjai et al., 2022).

3.4. Plant-based traditional knowledge on cosmetics

The ethnobotanical field survey showed that the use of traditional herbal products is closely related with the cultural traditions of the people. The use of specific plants for hair lotion is often deeply rooted in the cultural norms, values, and beliefs. The use of rice water lotion is not recommended by women during their menstrual period. Restrictions are also observed in other parts of India where many Hindu girls and women face restrictions during their menstrual period (Garg & Anand, 2015). Just after the completion of the period, women wash themselves using hair lotion and other traditional soaps. This washing is considered to be a symbol of purification of the women before resuming normal social and religious activities (Garg & Anand, 2015).

From the present study, it was observed that traditional knowledge is not equally shared across different age groups. Older women could recall more plant species and their traditional uses compared to the younger generation. This observation aligns with other studies indicating that traditional knowledge is not evenly distributed across various age groups (Elansary et al., 2015; Sultan et al., 2024). This erosion of traditional knowledge may be attributed to modernization, as various over-the-counter hair and skin care products have led to decreased interest in traditional methods. Other studies have noted a similar decline in the use of plant-based traditional cosmetics among the younger generation, influenced by environmental, cultural and

economic changes (Aswani et al., 2018). The loss of traditional knowledge among younger generation necessitates the urgent documentation and preservation to protect ethnomedicinal practices.

4. Conclusion

The ethnobotanical knowledge of the Meitei community has developed through long-term interaction with their environment. The study provides significant insights into sustainable plant use and ecological conservation practiced by the community. The gradual decline of the traditional practices among the younger generation calls for the documentation of traditional knowledge. The conservation of TEK is important for the sustainability of these practices. Integration of TEK with modern conservation strategies can contribute in preserving both plant biodiversity and cultural heritage.

Conflicts of Interest

The authors declare that there is no conflict of interest.

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Table 3. Fidelity level of the medicinal plants used in cosmetic and hygienic purpose in Manipur

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
Acanthaceae	*Andrographis paniculata* (Burm.f.) Nees	Bhuvati	Leaves	Smallpox	Decoctions of leaves for treating smallpox.	1 – 2 times		100.00
Amaranthaceae	*Chenopodium album* L.	Monsaobi	Whole Plant	Vitiligo		One or two week		100.00
Amaryllidaceae	*Allium tuberosum* Rottler ex Spreng.	Maroi Nakuppi	Leaves	Hair Loss	Leaves of *Allium* and green *Carica papaya* fruit are crushed; juice extracts applied in the head after scrubbing the head with *Ficus* leaves	2-3 per week		100.00
Apiaceae	*Coriandrum sativum* L.	Phadigom	Leaves	Pimple	Leaves and sandalwood clay are mixed to make a paste and applied on pimples	Once every night till pimple disappeared		100.00

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
Apocynaceae	*Calotropis gigantea* (L.) W.T.Aiton	Anggot	Latex	Eczema	Latex directly applied	Five to six weeks		30.00
				Furuncle	Latex directly applied	Until recovery		15.00
				Leprosy	Latex directly applied in the initial stage	One or two weeks		5.00
				Ringworm	Latex directly applied	Five to six days		30.00
				Vitiligo	Latex directly applied	One or two weeks		20.00
Araceae	*Alocasia macrorrhizos* (L.) G.Don	Hongoo	Leaves, stem	Hair lotion for retarding grey hair, softening and smoothening	Leaves and stems are boiled with rice water; allowed to settle; wash the hair	1 week	Excessive dose may cause hair fall	100.00
	Leucocasia gigantea (Blume) Schott	Pangkhok	Leaves, Stem	Hair lotion for retarding grey hair; softening and smoothening	Leaves and stems are boiled; allowed to settle and used to wash the hair	1 week	Excessive dose may cause hair fall	100.00

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
Asparagaceae	*Ophiopogon intermedius* D.Don	Ching Charot	Leaves, Shoot, Root	Hair lotion	Leaves are boiled with rice wash water, cooled and applied on hair	Regularly	Overuse may cause hair fall	100.00
Asphodelaceae	*Aloe vera* (L.) Burm.f.	Ghritakumari	Leaves, Gel	Dandruff	Gel from the inner leaves directly applied	Regularly		45.45
				Pimple	Gel from the inner leaves directly applied	Two to three days		36.36
			Gel	Anti-wrinkle	Applied on the skin	Regularly		18.18
Asteraceae	*Ageratum conyzoides* L.	Khongjai Napi	Leaves	Hair lotion	Leaves are boiled with rice wash water, cooled and applied on hair	Regular		81.25
				Antiseptic	Leaves crushed and applied on the sepsis part	Two or three days		18.75

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
	Artemisia vulgaris L.	Laibakngou	Leaves, roots	Hair lotion	Leaves as component of hair lotion; applied after cooling	Regularly		77.78
			Leaves	Antiseptic	Leaves crushed and applied on the sepsis part	Two or three days		22.22
	Blumea densiflora DC.	Karpoor pambi	Leaves	Hair lotion	Leaves are added in the preparation of hair lotion	Regularly		100.00
	Dichrocephala integrifolia (L.f.) Kuntze	Lallukok	Leaves	Hair lotion	Leaves as component of hair lotion; applied	Regularly		100.00
Caricaceae	*Carica papaya* L.	Awa thabi	Fruit	Hair loss	Crushed and mixed with *Allium tuberosum* and applied	2-3 per week		100.00
Caryophyllaceae	*Drymaria cordata* (L.) Willd. ex Schult.	Tandan	Leaves	Scabies	Crushed and applied on the diseased area			100.00

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
Clusiaceae	*Garcinia pedunculata* Roxb. Ex Buch-Ham.	Heibung	Fruit	Eczema	Sliced fruits are applied on diseased area			100.00
Dioscoreaceae	*Dioscorea bulbifera* L.	Haa	Leaves, tuber	Eczema	Crushed leaves or sliced tubers applied on diseased part			100.00
Euphorbiaceae	*Euphorbia antiquorum* L.	Tengnou	Latex	Dermatitis	Latex is applied on diseased part	Two or three days		100.00
	Jatropha curcas L.	Awa Kege	Latex	Eczema	Latex is applied on eczema	Two or three times		75.00
				Antiseptic	Latex is applied on sepsis part	Three or four days		25.00
Fabaceae	*Piliostigma malabaricum* (Roxb.) Benth.	Chingthrao	Bark, Leaves, Flowers	Leprosy	Decoction of the plant parts used as bath			50.00
				Smallpox	Decoction of the plant parts used as bath			50.00
	Cassia fistula L.	Chahui	Root, Fruit	Leprosy	Decoction of the plant parts used as bath			100.00

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
	Senna tora (L.) Roxb.	Thaonam	Leaves, Seed	Eczema	Decoction of the plant parts used as bath			42.86
				Ringworm	Decoction of the plant parts used as bath			57.14
Lamiaceae	*Holmskioldia sanguinea* Retz.	Kharam Leithok Angangba	Leaves, flowers	Hair lotion	Leaves and flowers in rice wash water, cooled and applied	Regularly		100.00
	Microtoena patchoulii (C.B.Clarke ex Hook.f.) C.Y.Wu & S.J.Hsuan	Sangbrei	Leaves, roots	Hair lotion	Leaves added during preparation of hair lotion.	Regularly		100.00
	Ocimum tenuiflorum L.	Tulasi	Leaves	Pruritus	Crushed leaves are applied to diseased parts	Occasionally		100.00
	Pogostemon cablin (Blanco) Benth.	Khamella	Leaves	Hair lotion for sweet smell	Leaves are used in the boiling of rice wash water		Overuse may cause hair loss	100.00
	Vitex negundo L.	Urikshibi	Leaves	Eczema	Decoction of leaves are used as bath	One daily till cured		6.25

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
				Allergy	Leaves are crushed and rubbed	Once		62.50
				Hair lotion	Leaves added during preparation of rice water; allowed to cool and applied on hair	Regularly		6.25
			Leaves	Smallpox	Decoction of the leaves used as bath			25.00
Meliaceae	*Azadirachta indica* A.Juss.	Neem	Leaves, fruits, Stem	Leprosy	Decoctions are strained and used in bath.	Until cured		37.50
			Leaves	Allergy	Crushed fresh leaves are applied as a poultice.	Once or twice		62.50
	Melia azedarach L.	Seizrak	Leaves	Allergy	Decoction of leaves are used in bath			100.00
Oxalidaceae	*Oxalis debilis* Kunth	Yensin	Leaves	Hair lotion	Leaves added in the boiling of rice wash	Regularly		100.00

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
					water to prepare hair lotion.			
Papaveraceae	*Argemone mexicana* L.	Yenkhumit	Leaves, latex	Pimple	Latex is applied to treat pimples.	Two to three days		50.00
			Leaves, latex	Skin rejuvenation	Latex is applied to treat pimples.			50.00
Phyllanthaceae	*Phyllanthus emblica* L.	Heikru	Fruit	Hair coloring and lotion	Fruits added to the boiling rice wash water to prepare hair lotion	Regularly		100.00
Plantaginaceae	*Plantago asiatica* subsp. *erosa* (Wall.) Z.Yu Li	Yempat	Leaves	Furuncle	Leaves are heated and applied on the infected part			40.00
				Hair lotion	Leaves added on rice water and boiled; after cooling applied on scalp	Regularly		60.00
Poaceae	*Coix lacryma-jobi* L.	Chaning	Seed	Smallpox	Seeds are used as bath for			100.00

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
					treating smallpox			
	Oryza sativa L.	Phou	Straw	Hair fortification	Ashes from burnt straw soaked in water for hours; water are strained and used	Occasionally		100.00
Portulacaceae	*Portulaca oleracea L.*	Leibak Kundo	Whole Plant	Hair lotion	Whole plant is added in the preparation of hair lotion	4-3 times a week		100.00
Rubiaceae	*Meyna spinosa* Roxb. ex Link	Heibi	Fruit	Body soap	Fruits are used as soap	Regularly		64.71
				Anti-wrinkle; to make skin soft and young	Fruits are used applied; Optionally, curd, sugarcane juice, lemon may be added to make a paste	Regularly during nighttime		35.29
	Mussaenda glabra Vahl	Hanurei	Leaves	Hair lotion	Leaves added in the boiling	Regularly		100.00

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
					of rice wash water to prepare hair lotion.			
Rutaceae	*Citrus* × *aurantiifolia* (Christm.) Swingle	Champra	Fruit	Hair lotion	Fruit skins added during the preparation of hair lotion	Regularly		48.00
				Pimple	Fruit is cut into halves; the cut halves are rubbed onto pimples	Until recovery		52.00
	Citrus × *limon* (L.) Osbeck	Heijang	Leaves	Hair lotion	Leaves are added as constituent in the preparation of hair lotion			100.00
Sapindaceae	*Sapindus mukorossi* Gaertn.	Kekru	Seed	Body soap	Scrub the seed with water; the resulting lather can be used as soap	Regularly		50.00
				Hair lotion	Scrub the seed with water; the resulting lather	Regularly		50.00

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
					are used as hair lotion.			
Solanaceae	*Nicotiana tabacum* L.	Hidak mana	Leaves	Furuncle	Roasted leaves applied on the boil	Three to four days		100.00
Zingiberaceae	*Curcuma longa* L.	Yaingang	Rhizome	Pimple	Turmeric, milk, lemon juice are mixed and applied on pimple	1-2 times		20.00
				Skin rejuvenation	Turmeric, milk, lemon juice, sandalwood mixed to form a paste; applied in the face as pack	1-2 times a week		53.33
				Hyperpigmentation	Turmeric, milk, lemon juice, sandalwood clay mixed to form a paste;	2-3 times a week		26.67

Family	Species	Vernacular Name in Manipuri	Plant parts	Use	Preparation	Dosage	Adverse Effects	Fidelity Level (%)
					applied in the face as pack			