



(RESEARCH ARTICLE)



Cosmetic ethnobotany practiced by tribal women of Nandurbar district of Maharashtra

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Abstract

The Satpuda ranges communities have historically relied on native plant resources for sustenance, including healthcare, nutrition, and housing. Tribal women traditionally employed local herbs for cosmetic applications. However, with modernization, this indigenous knowledge is gradually fading among younger generations. Hence, this study aims to document the traditional cosmetic practices and uses of plants by local women in Maharashtra's Nandurbar district, focusing on significant plants identified through research.

Keywords: Satpuda ranges; Medicinal Plant; Population; Tribal women; Ethno botany and Cosmetic uses

1. Introduction

Cosmetic ethnobotany, a fascinating field of study, unveils the intricate relationship between indigenous communities and the botanical resources that surround them. Among these communities, tribal women, particularly in regions like Nandurbar district of Maharashtra, India, exhibit a profound knowledge of plants and their applications in skincare and beauty rituals. With a heritage deeply intertwined with nature, these women have developed unique practices that not only enhance their physical appearance but also serve medicinal purposes (Anderson et al. 2011).

The use of locally sourced plant materials for cosmetic purposes reflects a rich cultural tradition passed down through generations (Ralte et al. 2024). Understanding the cosmetic ethnobotany practiced by tribal women offers insights not only into their cultural heritage but also into the potential therapeutic properties of these botanicals. This exploration not only celebrates the wisdom of indigenous knowledge but also underscores the importance of preserving and respecting traditional practices in the realm of cosmetics and beyond (Anderson et al. 2011).

Rooted in generations of wisdom, these practices not only cater to aesthetic needs but also harness the medicinal properties of indigenous flora to address common skin and hair concerns (Haq et al. 2023). By delving into these age-old traditions, this study endeavors to preserve and honor the rich cultural heritage of Nandurbar's tribal communities while also exploring potential avenues for integrating their botanical wisdom into modern cosmetic science, fostering cross-cultural appreciation and sustainable utilization of nature's bounty (Lima et al. 2023).

The study area, Nandurbar District, lies within the Deccan plateau in the Northern part of Maharashtra State, spanning an area of 5034.23 sq.km. It is positioned between latitudes 21.0 N to 21.320 N and longitudes 73.340 E to 74.310 E, characterized by the presence of the Tapi river valley and the Satpura ranges. Ethnically diverse tribal groups such as Bhils, Gamits, and Kokanis inhabit the hilly terrain, each with their own distinct dialects (Khairnar et al. 2018; M. B. Patil et al. 2018; Patil et al. n.d.).

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The climate is generally dry, with slightly increased humidity during the monsoon season, and temperature variations between 12 to 48°C throughout the year. The region's main rivers include the Tapi, along with its tributaries, while the Narmada flows along its northern border. Soil composition varies, with silty clayey soil along riverbanks and predominantly black cotton soil across most of the district, providing fertile grounds for agriculture. Forest cover, although reduced since the 1970s, still includes notable species such as Teak and Palash. As of the 2011 census, the district's population stood at 1,648,295, with around 16.71% residing in urban areas (*Census of India 2011*; A. Khan and Hafiz 2023; P. A. Khan and Patil 2016).

Table 1 Population Distribution of District

Tahsil	Total Population	ST Population	SC Population	Tribal Recesses
Akkalkuwa	245861	209586	1755	Padvi, Kokani, Mavchi etc.
Dhadgaon	195754	1133	6	Vasave, Padvi, Gavit etc.
Nandurbar	367446	1141933	47985	Gavit, Kokani, Padavi etc.
Navapur	271852	8830	1802	Bhill, Vasave, Mavchietc.
Shahada	407778	220975	20189	Pawara, Tadvi, Valvi etc.
Taloda	159654	8256	1128	Padavi, Kokani etc.

2. Materials and Methods

In September 2022, an ethno botanical survey was conducted in the Nandurbar district, focusing on ethnobotanically significant areas. Fieldwork was organized in phases to ensure comprehensive coverage of the region. Various equipment, including a field press, vasculum, knife, cutter, polythene bags, and camera, were utilized for collection purposes. Field data was meticulously recorded, capturing ecological details and information such as informant demographics and plant characteristics (botanical names, local names, family, and parts used) (D A Patil 2003; Patil and Khan 2017; Ralte et al. 2024).

Upon returning to the laboratory, collected specimens underwent a drying process using blotting or newspaper changes and preservation with a mercuric chloride solution. Subsequently, the specimens were pressed until completely dried and mounted on herbarium sheets. Identification was conducted using available floras and literature, primarily following the Bentham and Hooker classification system. Ethnobotanical data recorded in the field was cross-verified through repeated questioning of tribal doctors, local residents, and rural inhabitants. Field photographs were taken using an electronic camera to document plant specimens and their parts (Dr. Jim Duke 1994; Firoj Shaikh et al. 2023, 2023).

To ensure long-term preservation, collected plant materials such as fruits, seeds, tubers, and bark were stored in glass-stoppered wide-mouth jars using fixatives like Formalin and Alcohol (F.A.) and Formalin, Acetic acid, and Alcohol (F.A.A.), following preservation methods outlined by Diaz 2019 (Diaz 2019).

3. Results and Dissection

The ethno botanical survey conducted in September 2022 in the Nandurbar district yielded valuable results regarding the indigenous knowledge and utilization of plant resources by local communities. A total of 20 ethno botanically significant plant used in cosmetic were documented as follows (D A Patil 2003; A. Khan et al. 2023).

3.1. *Aloe barbadensis* (L.) Burm. f. (Asphodelaceae)

Localname: Korfad, Kumari-asav.

Scapiginferous perennial herbs with thick fleshy, leaf rosettes aggregated at the base near the ground. Leaves erect, numerous, glaucous, lanceolate, long acuminate, thorn edged. Flower vermilion tinged with yellow, in simple, erect racemes on a stout scape; lower flower falling off as the raceme elongates. Capsules ellipsoid- oblong, obtusely trigonous. Seeds black.

Flowers and Fruits: February-May. Fruits are rarely formed.

Ethno cosmetic uses and Administration (Kumar Mallick et al. 2023):

- Dandruff = Pulp used to treat dandruff.
- Smooth and shiny hair = Aloe pulp make hair smooth and shiny.
- Skin infection = Aloe pulp used to treat various skin infection.
- Glowing and pimple free skin = Regular use of aloe pulp on face, make face pimple free and glowing.
- Acne / Dark spot = Help to lighten dark circles, acne spot.
- Moisturizer = Pulp act as moisturizer for skin.
- Hair growth = Aloe pulp help in hair growth.
- Hair conditioner = Aloe pulp act as a conditioner for hair.
- Directly use pulp as it is.

3.2. *Acorus calamus* L., (Acoraceae)

Local name: Sweet flag, Vekhand.

Sweet Flag is a perennial herb 1-4ft tall, consisting of tufts of basal leaves that emerge directly from a spreading rootstock. The inflorescence is a cylindrical spadix. This spadix is covered with tiny greenish yellow flowers in a diamond shaped pattern. Each flower has 6 tepals and 6 stamens.

Flowering: March-May.

Ethno cosmetic uses and Administration: (Zhao et al. 2023)

- Hair remover = Make thick paste of sweet flag powder with cream and turmeric. Apply on the body and let it dry.
- Dark spot = Paste of rice flour, milk, lemon and sweet flag powder helpful in removal of dark spot.

3.3. *Allium cepa* L. (Amaryllidaceae)

Local name: Kanda, Pyaz, Onion.

Bulbous herb with fistular, bi-parous radical leaves. Flowers many, white, in dense umbels. Capsules sub-globose, membranous. Seeds-, black, trigonous.

Cultivated throughout the year for the bulbs. Native of West Asia.

Flowers and Fruits: February- April.

Ethno-cosmetic use and Administration: (Chakraborty et al. 2022)

- Onion also contains one of the natural oils. Sometimes used in hair oil.
- To reverse premature greying of hair/ dandruff.
- Cut and grind the onion. Make a juice. Apply that fresh juice directly on scalp. (Local woman)

3.4. *Allium sativum* L (Amaryllidaceae)

Local name: Garlic, Lasun, Losan, Lehsun

Bulb short with bulblets enclosed in a white or pink envelop. Leaves flat, linear. Flowers often replaced by bulbous, pinkish, in lax umbel in a long. Capsules oblong, ovoid, membranous. Seeds black.

Cultivated for bulbs. Native of Europe.

Flowers and Fruits: February and April.

Ethno-cosmetic uses and Administration: (Chakraborty et al. 2022)

- As a cleanser.
- To treat dark spots and various skin infection.
- To remove stretch marks.
- To remove whiteheads and blackheads.
- Dark spot = Make a garlic paste with half tomato and turmeric and apply it on face.
- Skin Problems = Garlic pastes with one spoon curd and one spoon honey with pinch of turmeric useful to treat skin problems.

3.5. Arabian jasmine (Oleaceae)

Local name: Mogra

Arabianjasmine is an evergreen shrub. The leaves are ovate and glabrous. The flowers are strongly scented. The flowers are white, and open at the night.

Ethno-cosmetic uses and Administration:

- Petal of the flower use to treat acne.
- Flower can be used as moisturizer.
- Acne problems = Make a flower paste with some aloe pulp and directly apply it on face.
- Moisturizer = Soaked flower or petals in lukewarm water for 50 min. Add some drop of the Glycerin after that strain the water and use directly as moisturizer. (Local woman).

3.6. Asparagus racemosus Wild (Asparagaceae)

Local name: Shatavari.

Asparagus racemosus is a climber having stems up to 4m long. Shatavari has small spine-needle like phylloclade that are uniform and shiny green.

Flower and fruits: July and September.

Ethno-cosmetic uses and Administration: (Alok et al. 2013)

- Use as (root) antiaging.
- It helps to soothe the scalp and promote hair growth.
- Remove pimples.
- Removes lip darkness.
- Pimples = Add half spoon of Shatavari powder (root powder) in honey and apply it on face as well as on lip.
- Skin disease = Fruit pulp with turmeric externally applied to cure skin disease.

3.7. Azadirachta indica A. Juss. (Meliaceae)

Local Name: Neem, Nimb, Nimada, Kadu-nim.

Tall trees, 15-18 cm tall; bark black. Leaves unipinnate, crowded near the ends of the branches; leaflets 9-15, obliquely lanceolate, serrate, acuminate. Flowers fragrant white, in axillary panicles shorter than the leaves. Drupes elliptic-oblong, yellow. Glabrous, 1-seeded.

Common everywhere planted along roadside. Flowers and Fruits: December-May.

Ethnocosmetic uses and Administration: (Baby et al. 2022; P. A. Khan and Patil 2016; Sujarwo et al. 2016)

- Cooling agent = Bark decoction is used as a tonic and cooling agent.
- To kill Lice / Ticks = Fruit paste is externally applied, to kill lice and ticks.
- Antiseptic / Healing lotion = Leaf decoction is used as an antiseptic and healing lotion.
- Cleansing agent = Leaf paste with aloe vera is used as stimulant, cleansing agent for body skin.

- Skin diseases = Leaf paste and seed oil with aloe vera and turmeric is externally applied, to cure various skin diseases.
- Skin problems = Infusion of bark and tender leaves is externally applied, to cure various skin diseases.
- Dandruff = Boil the leaves, flower with hot boiling water add lemon juice and strain the water for smooth and dandruff free hairs.
- Lice = A paste of flower and leaves is applied on head to destroy lice.
- Pimples, Dark spot = Leaf paste is applied with turmeric on face.
- Skin diseases = Leaf, seed, bark, and root boiled in oil are applied to treat skin disease.

3.8. *Bombax ceiba* L. (Bombaceae)

Local name: Kate-savari, Sawar, Hawari.

Large handsome deciduous tree trunk with prickles. Leaves large digitately compound; leaflets 5-7, lanceolate, glabrous. Flowers large red, in the axil of fallen leaves, in cluster near end of branches, appear before the young leaves. Capsules woody, ellipsoid. Seeds numerous, enveloped in silky wool.

Flowers and fruits: April-June.

Ethno-cosmetic uses and Administration:

- Paste of prickles with neem leaves is externally applied, to cure pimples.
- Bark paste is externally applied with aloe vera to cure skin eruption.
- Skin problems = Prickles of the stem are rubbed on stone with water and paste externally applied to cure black spots, skin eruption, and pimples (Bablibai.H.Kokani, Balaamrai).

3.9. *Buchananiaco chinchinensis* (Lour.) Almeida. (Anacardiaceae)

Local name:Charoli, Charulo.

Small tree with cracked bark. Thick, coriaceous, broadly oblong, obtuse. Flowers greenish white, in terminal and axillary branched panicles. Drupes small, globose, fleshy, black when ripe.

Flowers and fruits: December-April.

Ethnocosmetic uses and Administration

- Skinproblems =Seed oil is externally applied, to cure various skin diseases.
- Skin diseases = Fruit powder with coconut oil is externally applied, to cure skin disease.

3.10. *Butea monosperma* (Lam) Taub. (Fabaceae)

Local Name: Palash, Flame of the forest.

Small trees, trunk crooked. Leaves trifoliolate; leaflets broadly ovate. Flower large in large, in groups of 2 or 3, orange, in large racemes. Pods thickened at the sutures, velvety hairy, indehiscent, splitting irregularly at the tip around the seeds.

Conspicuous plant in fields and forests around Nandurbar and elsewhere. It signals the beginning of summer season. Flowers and Fruits: March-June.

Ethnocosmetic uses and Administration

- Flower mainly used to treat skin related problems.
- The bark is used as poultice for pimples.
- To improve scalp leaves juice helpful.
- It is also useful in hair lice problems.
- Skin problems =Flower is soaked in water add few drops of lemon juice in it and that water is used for bathing purpose (DSC).

3.11. *Caesalpinia bonduc* (L.) Roxb. (Caesalpinaceae)

Local name: Kachakada, Sagar-goti.

Scandent shrubs armed with straight and hooked prickles. Pinnae generally 6 pairs; Flower yellow in terminal or supra-axillary racemes, Pods oblong-elliptic, short stalked, densely covered all over with wiry prickles. Seeds 1-2, oblong.

Flowers And Fruits: July-December.

Ethnocosmetic uses and Administration

- Skin care = Take seed oil with lemon juice in equal proportion. Add some honey. Mix it well. Apply on skin.
- Hair growth = For hair growth or to treat baldness regularly apply seed hair oil with coconut oil (Sugandha.H. Kokani).

3.12. *Carica papaya* L. (Caricaceae)

Local name: Papaya, Papai, Popai.

Small tree with soft succulent trunk and milky juice. Leaves very large, palminerved, palmately lobed. Flowers creamy yellow, dioecious; male flowers in long, drooping panicles and female flowers solitary or short in clusters. Fruits large, one celled, many seeded with a soft yellow sweet pulp.

Flowers And Fruits: More or less throughout the year.

Ethnocosmetic uses and Administration

- Skin glow = Cut the slice of papaya and apply directly on face in circular motion.
- Facial hair remover = Take papaya fruit pulp and 1 tbs spoon gram flour and 1 tbs spoon honey in it. Add pinch of turmeric. Mix well. Apply this pack on face for 20 min (Bablibai .S. Kokani, Balaamrai).
- Sunburn / Tanning = Milky fruit juice of unripe fruit is used as a cosmetic with aloe vera and honey to remove freckles and other blemishes of the skin.

3.13. *Chrysanthemum indicum* L.

Local name: Guldaudi, Shevanti.

The plant is 30-90 centimetres high and wide, which grows as a perennial herbaceous plant on ground. The stem stands upright. The leaves are broad ovate. The plant's texture is thick and leathery.

Ethno-cosmetic uses and Administration:

- Skin rejuvenation.
- Skin moisturizer.
- Skin rejuvenation = Use flower oil with rose water and few drops of lemon juice for rejuvenation of skin.
- Skin moisturizer = Soak some flower in water for few hours. Add few drops of glycerine in it. Strain the water and directly apply it on face as a moisturizer.
- (KiranThackrey, Talawpada).

3.14. *Cicer arietinum* L.

Local name: Chana, Harbhara.

The plant grows to 20-50 cm high and has small, feathery leaves on either side of the stem. One seedpod containing two or three peas.

Flowers And Fruit: December to February.

Ethno-cosmetic uses and Administration

- Skin glow/ Fairness/ Instant glow = Chick pea flour + Turmeric powder + Curd = Use this paste on face.
- Moisturizing mask = Chick pea flour + Milk + Pinch of Turmeric powder.
- Hyperpigmentation = Chick pea flour + Turmeric + Curd + Lemon juice
- Facial hair remover = Chick pea flour + Lemon juice + Honey + Turmeric powder.
- Hair and scalp mask = Whisk 1 egg + 2tb spoon chick pea flour.
- (KiranThackrey, Talawpada).

3.15. *Citrus limon* (L.) Osbeck Modernism

Local name: Limboo, Nimbu, Jambiri, Lemon.

The lemon is a species of small evergreen tree. A small thorny tree with pale greenish-yellow rough bark. Leaves are unifoliate with pellucid oil glands, petioles winged, leaflets elliptic oblong or elliptic ovate, glabrous.

Flowers And Fruit: Throughout the year.

Ethno-cosmetic uses and Administration:

- Elbow and knee lighter = Simply rub lemon with salt/ Sugar on elbow and knee.
- Blackhead treatment = Rub lemon with salt or sugar on blackhead rich area.
- Skin brightener = Lemon + Glycerine + Rose water.
- Smooth and shiny hair = Lemon powder + Sandalwood powder + Aloe vera pulp.
- Skin glowing = Lemon juice + Glycerine + Honey + Rose water.
- Nail treatment = Rub lemon and salt on nail.
- Dandruff = Apply lemon juice directly on scalp.
- Teeth whitener = A mixture of water and lemon juice.
- (Rajandani.B.Gaikwad, Talavpada).

3.16. *Citrus sinensis* (L.) Osbeck

Local name: Santri, Santra, Orange.

The tree of the sweet orange often reaches 6 meters in height. The broad, glossy, evergreen leaves are medium sized and ovate.

Ethno-cosmetic uses and Administration:

- Prevent acne = Make orange juice and directly apply it on face.
- Unclogs the pores = Grate the orange peel and apply it on face.
- Moisturise the skin = Orange powder + Rose water + Honey
- Orange scrub useful to remove blackheads = Orange juice + Sugar

3.17. *Curcuma caesia* Roxb.

Local name: Kali halad, Kali halad, Black turmeric.

Erect herb. Leaves arise from underground rhizome. Leaves are long. Leaves arise from underground rhizome.

Flowering And Fruiting: June – Oct.

Ethnocosmetic uses and Administration:

- Sun tannin = Turmeric + Gram flour + Citrus juice.
- Face pack = Turmeric + Sandalwood powder + Honey
- Dark circles = $\frac{1}{4}$ Turmeric + 2tbs Curd + 1spoon Honey
- Oily skin = Turmeric + Gram flour + Rose water
- Skin glow = Aloe gel + 2 tbs Curd + $\frac{1}{4}$ Turmeric

- Face cooling effect = Aloe gel + $\frac{1}{4}$ Turmeric.

3.18. *Daucus carota* L.

Local name: Carrot, Gajar

Carrot is a herbaceous, somewhat variable biennial plant that grows between 30 and 120 cm tall, and is roughly hairy with stiff, solid stem. The leaves are tripinnate. The flowers are small and dull white, clustered in flat, dense umbels.

Flowering And Fruiting: May- Dec.

Ethnocosmetic uses and Administration:

- Shiny and glowing skin = 1tbs Gram flour +Carrot juice + Honey.
- Dark spot = Directly apply carrot juice or grated carrot on skin to remove dark spot as well as to moisturize the skin.
- Antiaging / Antihairfall = Drink 1 glass of carrot juice regularly.
- Moisturizer / Sunburn= Carrot pulp + Honey.

3.19. *Eucalyptus oblique* L.

Local name: Nilgiri.

Tall tree having smooth bark. Leaves are arranged alternately. Flower buds in groups of seven to fifteen or more, white flowers, and cup-shaped or barrel-shaped fruit.

Flowering And Fruiting: Feb-July,

Administration

- Pimples = Apply Eucalyptus oil with coconut oil on face to remove pimples.
- Shiny and thick hairs = Eucalyptus oil with coconut oil used for dense and shiny hairs.
- Dandruff = Massage with eucalyptus oil with neem oil on scalp remove dandruff.

3.20. *Ficus benghalensis* L.

Local name: Banyan tree, Vad.

Evergreen, fast growing tree reaches up to height 20 m. It produces propagating roots, which grown downward as aerial roots. Leaves are green, elliptical.

Flowering And Fruiting: May/Spring, August.

Ethnocosmetic uses and Administration:

- Skin issues / Facial glow = Banyan leaves +Water + Neem leaves, make paste. Apply this paste on face. It would help to diminish the acne and eliminates the patches on the skin.
- Hair growth = Take a piece of aerial roots of banyan tree and boil them in hot boiling coconut oil. Use this oil regularly for black, long, and smooth hairs.

3.21. *Foeniculum vulgare* Mill.

Local name: Fennel, Badishep, Badishop, Sauf.

It is a hardy, erect, perennial herb. The flowers are yellow, produced in terminal compound umbels. Leaves are feathery.

Flowering And Fruiting:Feb – May

Ethnocosmetic uses and Administration

- Fairness = Boil fennel seeds in water. Let it cool. Use this water to face wash.
- Steam facial / It opens the block spore on face = 1 lit water + 1 spoon fennel seeds. Boil it and take steam.
- Dandruff / Itching = Fennel powder + Water + Lemon juice.

4. Conclusion

The ethnocosmetic uses of various plant species discussed in this study illustrate their significant potential in skincare and haircare practices. *Aloe barbadensis* stands out for its versatile applications, including treating dandruff, promoting hair growth, and improving skin health. Similarly, plants like *Acorus calamus*, *Allium cepa*, *Allium sativum*, and *Azadirachta indica* offer diverse solutions for various skin conditions, from acne to dark spots, owing to their natural properties. Furthermore, plants like *Arabian jasmine*, *Asparagus racemosus*, and *Bombax ceiba* provide additional benefits such as anti-aging effects, scalp soothing, and skin moisturization. Other plants like *Citrus limon*, *Citrus sinensis*, and *Daucus carota* contribute to skincare with their antioxidant-rich properties, offering solutions for acne prevention, skin brightening, and sunburn relief.

Additionally, plants like *Curcuma caesia* and *Foeniculum vulgare* offer holistic solutions for skin issues, including sun tanning, dark circles, and oily skin, highlighting the potential of botanical remedies in promoting overall skin health. Overall, these findings underscore the rich ethnobotanical knowledge embedded in traditional practices, providing valuable insights for modern cosmetic formulations and skincare routines.

Compliance with ethical standards

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All authors do not have any conflict of interest to declare.

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