

Traditional uses of ethno-medicinal plants for the treatment of skin ailments in district Pithoragarh, Uttarakhand, India

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ABSTRACT

This study was conducted among the local people of Pithoragarh district (Uttarakhand) to document the ethnomedicinal plants used as remedies for various skin diseases. A total of 52 plant species from 36 families were listed for curing skin ailments such as allergies, infections, pigmentation, acne, pimples, burns, wounds, etc. It is noted that most of the plant formulations were applied externally in the form of paste. However, phytochemical analysis and pharmacognostic research on these recorded plants should be conducted to determine their therapeutic potential as a first step toward the development of effective drugs. This valuable knowledge about indigenous uses of the reported plant species must be conserved for sustainable use and future generations.

Introduction

India is known for its traditional medicinal system for primary health care from ancient times. In the Charak Samhita, approximately '340' herbal medicines with their traditional uses were documented (Mehra *et al.*, 2014). It is observed that the traditional knowledge of curing human ailments by ethnic communities relies on the Ayurveda, Unani, and Siddha systems of medicine (Bhat *et al.*, 2014). However, approximately 80% of the population worldwide believes in traditional medicinal systems due to their fewer side effects (Ojha *et al.*, 2020). Plants are rich in many bioactive molecules extracted from different parts of the plant, i.e., "roots, stems, leaves, flowers, fruits, and seeds". These components exhibit antiseptic, anti-inflammatory, antimicrobial, anticancer, anti-diabetic, and other properties (Gordon and David, 2001). Therefore, modern medical science also depends on secondary metabolites derived from plant resources for drug development (Kebede *et al.*, 2021). Kumaun

Himalayan region provides a variety of climates that sustain the growth of plant species used by conventional healers in folk medicine. Its more than two-thirds of the population depends on a variety of natural resources for food, fuel, timber, oil, fodder, and herbal medicine (Kapkoti *et al.*, 2014). Human skin is the largest sensory organ, forming the body's outer covering and making contact with the external environment. It also protects against pathogens like bacteria, fungi, and viruses that are the causative agents of skin diseases such as itching, acne, pimples, dermatitis, allergies, psoriasis, etc. (Sharma *et al.*, 2014). Skin diseases are common problems for all age groups and sexes that affect human health in various ways. People in developing countries are still facing skin-related issues despite the development of medical science because of a lack of hygiene, sanitation, awareness, and adequate guidance among health workers (Sharma *et al.*, 2014; Sharif *et al.*, 2018). Ethnomedicinal plants play a pivotal role in herbal

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therapy and are used to manage dermatological conditions throughout the world (Abbasi *et al.*, 2010). Therefore, the present study focuses on documenting ethnomedicinal knowledge of plants applied to skin disorders by the traditional herbalists (vaidyas) or local people in the district Pithoragarh (Uttarakhand).

Material and Methods

Pithoragarh district is situated within the Kumaun division of Uttarakhand state, with a total geographic area of 7110 sq. km and is bordered by the districts of Almora, Champawat, Bageshwar, and Chamoli. The area is located between latitudes 29.54587-29.62587° North and longitudes 80.17517-80.25517° East. Regular field visits were carried out for plant collection. Plants were identified by using regional flora and available literature. The data on documented plants were collected from the local people residing in the Pithoragarh district through discussion to explore the traditional knowledge about skin health. Later, the data were also compared to the related literature.

Results and Discussion

In the present study, 52 plant species (46 genera and 36 families) were listed, which were traditionally used by the local inhabitants of district Pithoragarh (Uttarakhand) for the treatment of various skin ailments (Table 1). Different habits of plant species have been recorded, such as herbs (54%), undershrubs (4%), shrubs (10%), climbers (11%), and trees (21%) (Figure 1). In this data, herbs were generally used by traditional healers because they are readily available for preparing herbal formulations (Parthiban *et al.*, 2016).

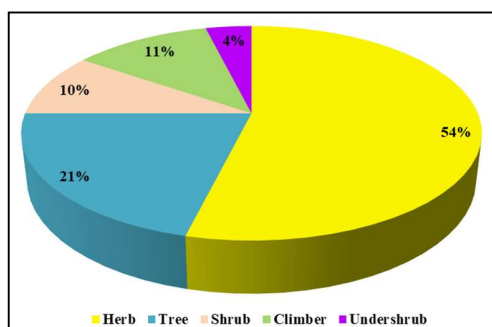


Figure 1: Habit of ethnomedicinal plants reported from study area

The most commonly used plant part was the leaves (32%), followed by the fruits (19%), seeds (13%), flowers (9%), roots (7%), whole plant (6%), stem (4%), tuber (4%), rhizome (4%), and bulb (2%) (Figure 2).

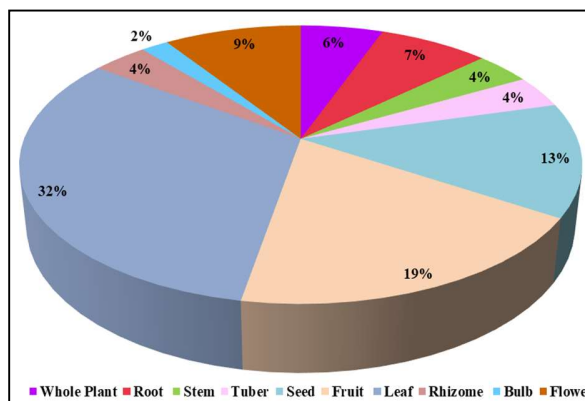


Figure 2: Percentage of plant part used for dermatological problems

It was depicted from the data that the leaves are valued for plant-based therapy because they are considered a rich source of easily extractable secondary metabolites and show maximum efficacy against skin illness (Ghorbani, 2005; Kayani *et al.*, 2015). Data also suggested that Asteraceae and Rosaceae (4 spp. each) were the dominant families, followed by Rutaceae and Solanaceae (3 spp. each). Besides these, 6 families were di-typic (two species each) and 26 families were monotypic (one species each) (Figure 3).

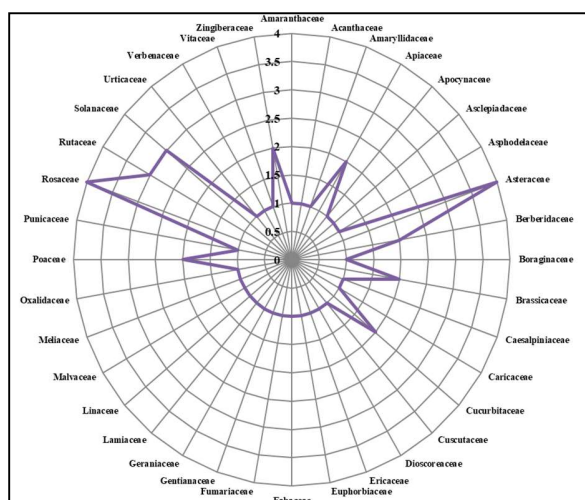


Figure 3: Families of ethnomedicinal plants reported from study area



Figure 4: A) *Lagenaria siceraria* B) *Oxalis corniculata* C) *Coriandrum sativum* D) *Curcuma longa* E) *Catharanthus roseus* F) *Prunus persica* G) *Vitis vinifera* H) *Rhododendron arboreum*

Ethnomedicinal plant species mentioned in this study have also shown their importance in indigenous systems of medicine like Ayurveda, Homoeopathy, Unani, and Siddha. In Ayurveda, gel obtained from the leaves of aloe vera is used to relieve sun tan, wounds, eczema, stretch marks, acne, burns, boils, etc. (Joseph and Raj, 2010). It also has anti-ageing properties as it stimulates collagen production in skin cells. *Curcuma longa* paste is traditionally applied to cuts, bruises, wounds, abrasions, skin eruptions, insect bites, bumps, and itches (Kumar and Sakhya, 2013; Sabale *et al.*, 2013). The native use of *Melia azadirach* for scabies, pustules, ringworm, allergy, and other skin diseases is documented in Ayurveda (Brishty *et al.*, 2020; Sharma *et al.*, 2013, Sultana *et al.*, 2014). The fruits, seeds, leaves, and pulp of *Cucumis sativus* have long been used extensively in traditional healthcare systems for a variety of skin problems like sunburn, itching, irritated skin, hyperpigmentation, and skin toning (Nema *et al.*, 2011). Therefore, these plants are currently advised on a global scale for preparing cosmetic items (Sotiroudis *et al.*, 2010).

Further, modern research has also proved the importance of recorded plants for the treatment of skin ailments. Parameshwaraiah and Shivakumar (1998) have evaluated the ethanolic extract of Brahmi (*Centella asiatica*) increases the rate of epithelization and enhances the growth of collagen

content in the skin. The extract of *Murraya koeingii* has a wide range of applications in treating skin irritations (Abeyasinghe *et al.*, 2021). Sumathi *et al.*, (2008) found that the fresh extract of *Cucumis sativus* contains many beneficial constituents that can be used in a variety of skin care products consisting of packs, toners, and others.

Conclusion

The ethnic groups of Pithoragarh district (Uttarakhand) possess remarkable ethnomedicinal knowledge to treat common skin problems in their daily lives by utilizing regional plants according to the current study. The study demonstrates that herbal treatments are considered important among rural people as plants are an excellent source of bioactive compounds and can be a safer and more affordable way to treat skin conditions. However, the traditional knowledge on plant usage is under threat due to urbanization and habitat destruction. Therefore, urgent attention is required for the resurgence of interest in traditional folk medicine by screening therapeutic phytochemicals and performing clinical research.

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Table 1: Ethnomedicinal plants for the treatment of skin ailments in district Pithoragarh (Uttarakhand)

SN	Botanical Name	Common Name	Family	Habit	Plant Part Used	Traditional use
1.	<i>Achyranthes aspera</i> L.	Chirchita	Amaranthaceae	H	Leaf	Leaf powder is used for itchy skin.
2.	<i>Ajuga bracteosa</i> Wall. ex Benth.	Neelkanthi	Lamiaceae	H	Leaf	Leaf juice is applied on wounds.
3.	<i>Allium cepa</i> L.	Pyaj	Amaryllidaceae	H	Bulb	Its bulb paste is applied to skin allergies.
4.	<i>Aloe vera</i> (L.) Burm. f.	Ghrir kumari	Asphodelaceae	H	Leaf	Leaf gel is used for wrinkles and blemishes on the skin.
5.	<i>Artemisia nilagirica</i> (Clarke) Pamp.	Duana	Asteraceae	H	Leaf	Leaf paste is used for pigmentation.
6.	<i>Bauhinia variegata</i> L.	Kachnar	Caesalpiniaceae	T	Stem bark	Paste made from bark powder effectively treats acne and pimples.
7.	<i>Berberis aristata</i> DC.	Daru haldi	Berberidaceae	S	Root	Paste made from its root powder is used to manage acne and tan.
8.	<i>Berberis chitria</i> Buch.-Ham. ex Lindl.	Totar	Berberidaceae	S	Root	Root extract is useful for inflammation.
9.	<i>Bidens pilosa</i> L.	Kumar	Asteraceae	H	Whole plant	Plant paste is effective on burns and cuts.
10.	<i>Brassica campestris</i> L.	Sarson	Brassicaceae	H	Seed	Its seed oil is effective on itchy rashes and scratches.
11.	<i>Brassica juncea</i> (L.) Czern.	Lai	Brassicaceae	H	Seed	Its seed paste is applied for boils and baldness.
12.	<i>Calotropis procera</i> (Aiton) Dryan.	Aak	Asclepiadaceae	S	Root	Root bark decoction is used externally for eczema, leprosy.
13.	<i>Carica papaya</i> L.	Papita	Caricaceae	T	Fruit	Fruit is beneficial for pigmentation, acne, wrinkles, and tan.
14.	<i>Catharanthus roseus</i> (L.) G.Don	Sadabahar	Apocynaceae	H	Flower	Flower juice is applied to acne, dermatitis, and wounds. (Fig 4E)
15.	<i>Centella asiatica</i> (L.) Urb.	Brahmi	Apiaceae	H	Leaf	Paste made from leaves is used to manage acne, burns, wounds, and skin infections.
16.	<i>Citrus pseudolimon</i> Tanaka	Pahari nimbu	Rutaceae	T	Fruit	Fruit juice is good for skin health and its peel is used for pigmentation.
17.	<i>Citrus sinensis</i> (L.) Osbeck	Malta	Rutaceae	T	Fruit	Powder of fruit peel is used for blemishes and acne on skin.
18.	<i>Coriandrum sativum</i> L.	Dhaniya	Apiaceae	H	Leaf	Mixture of its leaf and lemon juice is effective on dry skin, acne, and pimples. (Fig 4 C).
19.	<i>Cucumis sativus</i> L.	Kakdi	Cucurbitaceae	Cl	Fruit	Fruit extract is used for skin hydration and to reduce pores.
20.	<i>Curcuma longa</i> L.	Haldi	Zingiberaceae	H	Rhizome	Its rhizome powder is used for skin diseases like dermatitis, eczema, psoriasis, alopecia, acne, and wounds. (Fig. 4D)
21.	<i>Cuscuta reflexa</i> Roxb.	Amarbel	Cuscutaceae	Cl	Stem	Stem paste is used as an ointment to treat itchy skin and infections.
22.	<i>Cynoglossum lanceolatum</i> Forssk.	Kuro	Boraginaceae	H	Leaf	Leaf paste is used for healing skin wounds.
23.	<i>Dicliptera bupleuroides</i> Nees	Somni	Acanthaceae	H	Leaf	Paste made from leaves is applied to skin wounds.
24.	<i>Dioscorea bulbifera</i> L.	Genthi	Dioscoreaceae	Cl	Tuber	Paste made from powdered dried tubers is employed on wounds.
25.	<i>Eleusine coracana</i> (L.) Gaertn.	Mandwa	Poaceae	H	Seed	Seed powder softens the skin and protects it from dullness and damage.
26.	<i>Eupatorium adenophorum</i> Sprengel	Kala bansa	Asteraceae	US	Leaf	Leaves are crushed and applied on wounds.
27.	<i>Fumaria indica</i> (Haus.) Pugs.	Pit-papra	Fumariaceae	H	Leaf	Leaf paste is used for healing skin wounds.
28.	<i>Geranium nepalense</i> Sweet	Bhand	Geraniaceae	H	Root	Paste made from root is used in itching and eczema.
29.	<i>Hibiscus rosa-sinensis</i> L.	Gudhal	Malvaceae	S	Flower, Leaf	Leaves and flower paste are good for hydrating and soothing

Traditional uses of ethno-medicinal plants for the treatment

						skin.
30.	<i>Lagenaria siceraria</i> (Molina) Standl.	Lauki	Cucurbitaceae	Cl	Fruit	Fruit juice is beneficial for skin health and reduces wrinkles and premature aging. (Fig 4A)
31.	<i>Linum usitatissimum</i> L.	Alsi	Linaceae	H	Seed	Paste of seeds is used to tighten and hydrate the skin.
32.	<i>Lycopersicon esculentum</i> Mill.	Tamatar	Solanaceae	H	Whole Plant	Fruit juice is effective for sunburns, acne, scars, pores, and glow.
33.	<i>Melia azedarach</i> L.	Bakain	Meliaceae	T	Leaf	Leaf paste is used for wounds, pimples, itching, allergies, and other skin diseases.
34.	<i>Murraya koenigii</i> (L.) Spreng.	Kari patta	Rutaceae	S	Leaf	Leaf paste is beneficial for skin health, pigmentation, and irritation.
35.	<i>Oryza sativa</i> L.	Chawal	Poaceae	H	Seed	Rice water is used to brighten, tighten, and nourish the skin.
36.	<i>Oxalis corniculata</i> L.	Khati buti	Oxalidaceae	H	Leaf	Leaf paste is beneficial for wounds, warts and, inflammation. (Fig 4B)
37.	<i>Phyllanthus emblica</i> L.	Amla	Euphorbiaceae	T	Fruit	Fruit juice is beneficial to skin health and can reduce acne, wrinkles and pigmentation.
38.	<i>Prunus armeniaca</i> L.	Khubani	Rosaceae	T	Fruit	Fruit nourishes the skin and keeps it hydrated.
39.	<i>Prunus domestica</i> L.	Plum	Rosaceae	T	Fruit	Fruit is beneficial for skin health and reduces wrinkles, dark circles, acne and scars
40.	<i>Prunus persica</i> (L.) Batsch	Aadoo	Rosaceae	T	Fruit	Fruit is beneficial for skin health and reduces wrinkles and blemishes.(Fig 4F)
41.	<i>Punica granatum</i> L.	Darim	Punicaceae	T	Seed	Juice of seeds nourishes the skin and reduces wrinkles and ageing.
42.	<i>Rhododendron arboreum</i> Sm.	Burans	Ericaceae	T	Flower	Flower juice is used for skin health. (Fig 4H)
43.	<i>Rosa brunonii</i> Lind.	Kunja	Rosaceae	Cl	Flower	Flower juice is applied to skin irritations and wounds.
44.	<i>Solanum nigrum</i> L.	Makoi	Solanaceae	H	Leaf	Leaf paste is applied to itchy skin.
45.	<i>Solanum tuberosum</i> L.	Aaloo	Solanaceae	H	Tuber	Tuber juice is used for cuts, wounds, acne, and blemishes.
46.	<i>Swertia chirayita</i> (Roxb. ex Fleming) Karst.	Chiraita	Gentianaceae	US	Whole plant	Its decoction is used for skin rashes and itches.
47.	<i>Tagetes erecta</i> L.	Genda	Asteraceae	H	Flower	Flower paste is effective on burns, eczema, and wounds.
48.	<i>Trigonella foenum-graecum</i> L.	Methi	Fabaceae	H	Seed	Its seed paste is effective on acne, scars, and blemishes on the skin.
49.	<i>Urtica dioica</i> L.	Bichu ghas	Urticaceae	H	Leaf	Leaf extract is beneficial for skin allergies.
50.	<i>Verbena officinalis</i> L.	Vervain	Verbenaceae	H	Leaf	Leaf juice is effective remedy for burns and wounds.
51.	<i>Vitis vinifera</i> L.	Angoor	Vitaceae	Cl	Fruit	Grape fruit is good for skin health.
52.	<i>Zingiber officinale</i> Roscoe	Adrak	Zingiberaceae	H	Rhizome	Juice of rhizome is used for acne, scars and wrinkles.

Abbreviations: H- Herbs, US- Undershrubs, S- Shrubs, T- Trees, Cl- Climber

Conflict of interest

The authors declare that they have no conflict of interest.

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