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**Original Research Article**

# Ethnomedicinal plants for oral health care in Shekhawati region of Rajasthan, India

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**ABSTRACT**
Maintaining good oral hygiene is crucial for overall health and well-being. Traditional practitioners frequently utilize medicinal plants to maintain dental hygiene. Presenting a database of indigenous knowledge on medicinal plants used for oral care among the local traditional healers in Rajasthan's Shekhawati region is the main goal of this study. Information about the various plant kinds utilized for dental care and their modes of administration was gathered through interviews with local traditional healers and rural communities during a survey conducted in 2023–24. Total 27 plant species from 24 genera and 19 families were counted in the study. Twigs, roots, leaves, seeds, latex, and occasionally entire plants were among the different plant parts employed in oral healthcare. The tribal people and rural residents of this area continue to practice their ancient religion and rely on local flora to treat a variety of illnesses despite the process of modernization, but the younger generation is hesitant to embrace this richness of knowledge. As a result, it is essential to properly document this indigenous knowledge in order to conserve it and to save information for potential future research and medicine development. The study highlights how these plant species must be clinically evaluated before being used therapeutically.

## 1. Introduction

A person's general health and well-being are greatly influenced by their oral hygiene. One of the most significant global public health issues is oral diseases. Dental caries, periodontal disorders, and oral and pharyngeal malignancies are the most common and serious oral diseases in the world [1-2]. According to the 2017 Global Burden of illness Study, caries of the permanent teeth is the most prevalent oral illness, affecting over 3.5 billion people globally [3]. The prevalence of dental caries in children and adults, primary and permanent teeth, and coronal and root surfaces has alarmingly increased worldwide, according to scientific reports over the last ten years. Oral hygiene and dental care are essential components of overall health, and neglecting them can lead to a variety of oral health issues [4]. Because they cause pain and discomfort, oral problems have a substantial impact on a person's quality of life. Dental emergencies pose a risk to oral health, have an impact on people and society, and raise treatment costs. Bacterial infections, dietary choices, and lifestyle ignorance are the main causes of dental illnesses [5].

For thousands of years, Indian traditional medicine has employed medicinal plants to preserve dental hygiene and wellness. Several professionals have reported using *Azadirachta indica*, *Acacia nilotica*, and *Salvadora persica* in dental care [6–8]. Plant components can be utilized to clean teeth, prevent dental cavities, treat mucosal disorders, and treat periodontal diseases. According to several studies, rural people in various parts of India utilize the stems, leaves, and fibers of some plants as a toothbrush to clean their teeth and to treat dental conditions such toothaches, decay, pyorrhea, and bad odors [9].

The fundamental oral health care needs of Rajasthan's rural and folk populations are met by plant resources. Instead of using plastic-bristle brushes to clean teeth and massage gums, it is widespread practice to utilize plant parts, particularly soft twigs or chewing sticks of *Acacia nilotica* and *Azadirachta indica* [10].

Although a number of ethnomedical studies have been conducted throughout Rajasthan, the Shekhawati region has never had a systematic documenting of traditional medicine for the treatment of oral illnesses. Therefore, the goal of the current study was to investigate and record the variety of medicinal plants and traditional oral health remedies utilized by the local folklore.

## 2. Materials and methods

Rajasthan is renowned for its rich cultural mosaic and wildlife. The state is situated in India's northwest (Figure 1).

It can be divided into a number of distinct areas. One such important area is Shekhawati, which is in northeastern Rajasthan. It is a historically significant territory that includes desert, semi-arid transitional plains, and the hilly Aravalli region. Sikar (7,742 km) and Jhunjhunu (5,928 km) are the two primary districts that make up the Shekhawati area. They are located between 27°21' and 28°12' north latitude and 74°44' and 75°25' east longitude, respectively. The area is mostly arid or semi-arid, with the exception of a few mountainous areas including Lohargal, Harshnath, Khetri, Babai, Manasa Mata, and Shakambhari. This region has a severe and harsh climate. This area is known for its scorching summers and freezing winters.

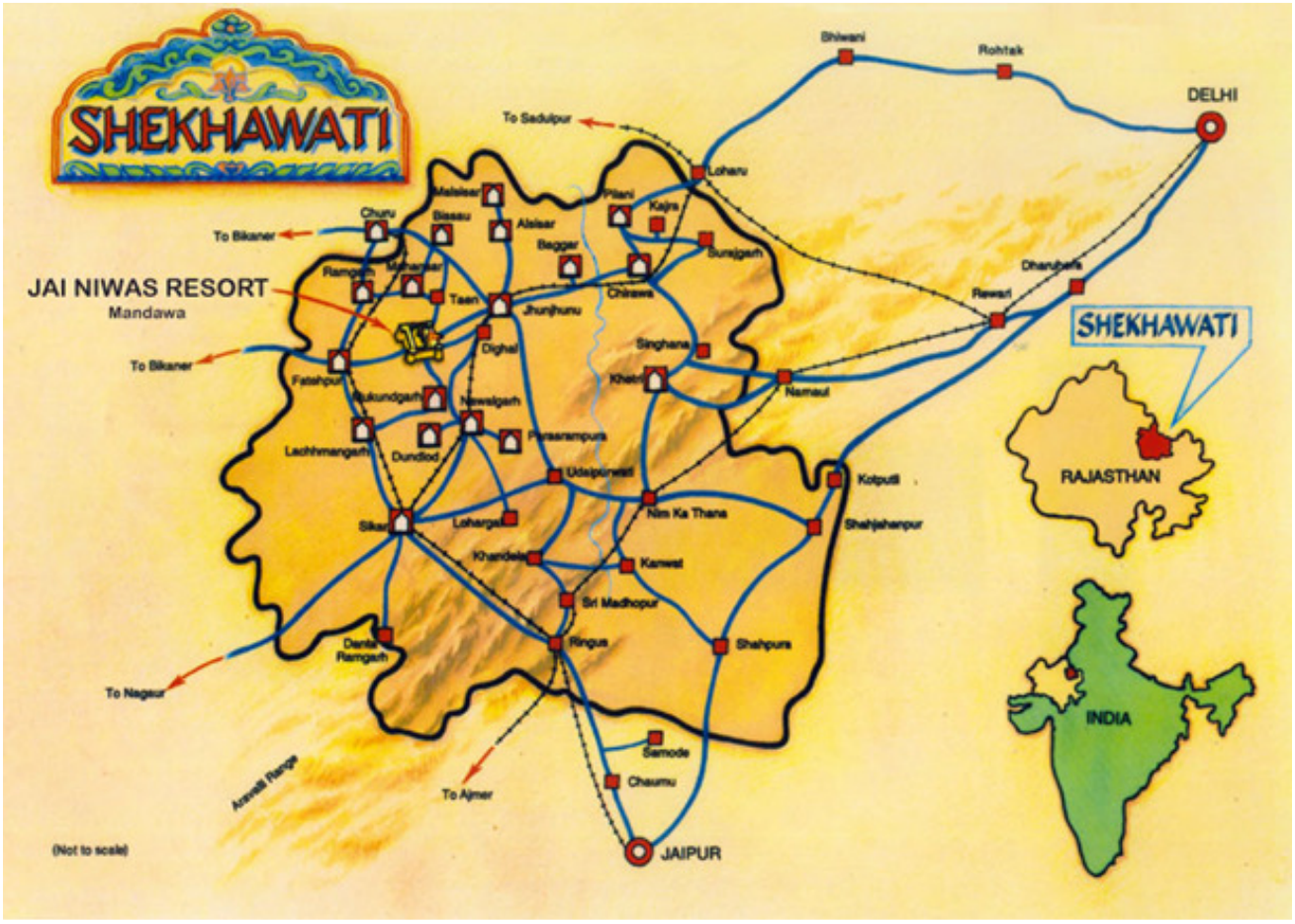


**Figure 1:** Map of Rajasthan showing Shekhawati region.

**Figure 2:** An interview with folk people.

**Figure 3:** A tribal women brushing teeth with Neem stick.


**Figure 4 (A-I):** Plants used in oral care in Shekhawati, Rajasthan.

**Table 1:** In the Shekhawati region of Rajasthan, ethnomedical herbs are utilized as a treatment for oral health issues.

| S.N | Botanical Name | Local name | Family | Part used | Ethnomedicinal uses for oral care |
|---|---|---|---|---|---|
| 1 | *Abrus precatorius* L. | Chirmi, Ratti | Fabaceae | Leaf | To strengthen the gums and teeth, a leaf paste is administered. |
| 2 | *Acacianilotica* (L.) Willd. | Desi kikar | Fabaceae | Shoot, Bark | Twigs are used as a toothbrush to get rid of plaque and stop cavities from forming. Gum disorders can be treated with bark. |
| 3 | *Achyranthes aspera* L. | Modokato Apamarg | Amaranthaceae | Root, Whole Plant | To clean teeth and ease discomfort, roots are used like a toothbrush. For toothaches and pyorrhea, whole plant ash is used as tooth powder. |
| 4 | *Azadirachta indica* A. Juss. | Neem | Meliaceae | Shoot, Bark | The toothbrush is made of tender twigs. Gums are massaged with bark powder. |
| 5 | *Balanites aegyptiaca* Del. | Hingot | Zygophyllaceae | Shoot | The branches serve as a toothbrush. |
| 6 | *Barleria prionitis* L. | Piyabansa Bajradanti | Acanthaceae | Root, Leaf | Chewing on roots and leaves helps prevent tooth decay. |
| 7 | *Carica papaya* L. | Papita | Caricaceae | Leaf | Leaf pulp can be used to treat mouth ulcers and toothaches. |
| 8 | *Citrullus colocynthis* (L.) Schrad. | Tumba | Cucurbitaceae | Root | Infected teeth are treated with root paste. |
| 9 | *Cordia myxa* L. | Gundi | Ehretiaceae | Leaf, Fruit | Fruits and leaves can help with mouth ulcers. |
| 10 | *Cyperus rotundus* L. | Moth | Cyperaceae | Tuber | Gum disorders are treated using tubers. |
| 11 | *Emblica officinalis* Gaertn. | Anwla | Euphorbiaceae | Fruit | Fruits are used to cure mouth ulcers and bleeding gums. |
| 12 | *Ficus benghalensis* L. | Bargad | Moraceae | Root, Latex | As a toothbrush, roots are utilized. In order to alleviate gum bleeding and swelling, fresh latex is applied. |
| 13 | *Ficus religiosa* L. | Peepal | Moraceae | Shoot | To treat toothaches, chew on tender leaf twigs. |
| 14 | *Jatropha gossypifolia* L. | Ratanjoti | Euphorbiaceae | Shoot | As a mouthwash, the soft twigs are chewed. |
| 15 | *Lawsoniainermis* L. | Mehndi | Lythraceae | Leaf | To heal oral ulcers, fresh leaves are crushed and gargled. |
| 16 | *Mangifera indica* L. | Aam | Anacardiaceae | Shoot, Leaf | We use twigs as toothbrushes. Toothache is relieved by crushed young leaves. |
| 17 | *Moringa oleifera* Lamk. | Sejna | Moringaceae | Leaf, Seed | Canker sores and tooth infections are treated with dried leaves and seeds. |
| 18 | *Morus alba* L. | Sahtoot | Moraceae | Leaf | Chewing leaves can relieve toothaches. |
| 19 | *Ocimum sanctum* L. | Tulsi | Lamiaceae | Leaf | Chewing leaves keeps the tongue fresh by causing saliva to be secreted. also treat oral infections and ulcers. |
| 20 | *Psidium guajava* L. | Amrood | Myrtaceae | Leaf | Chewing on tender leaves helps relieve mouth blisters. |
| 21 | *Salvadora oleoides* Decne. | Jal, Pilu | Salvadoraceae | Root, Shoot | Teeth are cleaned using the roots and delicate branches. |
| 22 | *Salvadora persica* L. | Jal, Meswak | Salvadoraceae | Root, Shoot | Tender branches and roots are utilized as toothbrushes for gum inflammation treatment and oral hygiene. |
| 23 | *Solanum indicum* L. | Tindra | Solanaceae | Fruit | One way to treat toothaches is to roast fruits on fire and expose teeth to the smoke once a day. |
| 24 | *Solanum surattense* Burm. f. | Pasargteli,Kantkari | Solanaceae | Fruit | Dried fruit powder smoke is kept in the mouth to prevent dental cavities. |
| 25 | *Syzygiumcumini* (L.) Skeels | Jamun | Myrtaceae | Shoot | To treat dental caries, teeth are brushed once a day with soft twigs. |
| 26 | *Tephrosia purpurea* (L.) Pers. | Bansa | Fabaceae | Shoot | Brushes are made from tender shoots. |
| 27 | *Zizyphus mauritiana* Lamk. | Jhari | Rhamnaceae | Leaf | To treat oral wounds, a leaf decoction is gargled once a day. |

In the summer, temperatures can reach 48 to 500 degrees Celsius, while in the winter, they can drop as low as 40 degrees. The months of July through October receive the majority of the 23 inches of annual rainfall. The climate is classified as hot and dry because to the extremely low relative humidity, with the exception of the monsoon season. Sandstorms and dust storms are frequent in this region. In the Shekhawati region of Rajasthan, an ethnomedical study was carried out in 2023–24 to record the use of local plants for oral health and the treatment of gum and tooth diseases. The Gurjar, Meena, Rebari, Nat, Sansi, Banwariya, Kalbeliya, and other tribes live in the Sikar and Jhunjhunu districts. Tribal people, Ayurvedic vaidyas, and informed persons between the ages of 25 and 70 participated in the interviews. The healers were selected at random from among the residents of the various Shekhawati region villages. Various traditional uses of plants in dental care were inquired about from tribal and folk people (Figure 2). The information was directly translated and printed in English, although the conversations were conducted in the indigenous "marwari" language. Prior to the study area survey, a questionnaire was created. Particular attention was paid to choosing isolated locations for data collection that were

inaccessible to medical facilities and where traditional plant medicine has been used for many years. The names and ages of the informants, the local names of the plants used, the sections of the plants used, the method of administration, and the conditions treated were among the data collected during the survey. Repeated inquiries with several local herbalists—more especially, the vaidyas and hakims—verified the collected facts. The information gathered is sorted by scientific name, then by local name, family, parts used, medicinal use, and preparation and administration method. Table 1 lists the plants utilized in oral healthcare. Figure 4 (A-I) displays photos of a few plants that were reported from the study area.

## 3. Results and discussion

The great variety of medicinal plants found in the Shekhawati region of Rajasthan is a gift from nature. It is admirable that the traditional healers in this area are aware of the therapeutic benefits of the plants that grow nearby [11]. The current study includes 27 plant species from 24 genera and 19 families that the locals in this area have long used for dental hygiene and health. The scientific name, family, local name, portion used, preparation, administration, and illness treatment of each species have been listed. The two families most frequently employed for oral health treatment were Fabaceae and Moraceae. Leaves (30%) and shoots (27%) were the most often used parts of the plant, followed by roots (16%), fruits (11%), bark (5%), latex (3%), seeds (3%), and the entire plant (3%). The plant was used as paste, juice, latex, powder, and smoke.

According to the current study, tribal people living in rural areas are knowledgeable about the local environment and natural resources. These people rely on plant items to treat a variety of oral health issues, such as tooth decay, dental caries, and pyorrhea. According to the report, people still prefer chewing sticks made from different plants to keep their teeth clean. Traditionally, people wash their teeth with fresh, soft sticks called datun. People chewing sticks of *Azadirachta indica*, often known as Neem datum, which transform into brush-like sticks that function as natural floss, were a familiar sight in villages throughout the Shekhawati region. Twigs that are flexible and thin are typically used. To clean the teeth and massage the gums, one end of these sticks is bitten until the twig breaks into bristles. Gingivitis can be avoided by chewing sticks of *Acacia nilotica*, often known as babool. Additionally, *Salvadora oleoides* and *S. persica* roots and sensitive twigs are utilized as chewing sticks. Miswak trees, or S. persica, have been utilized for millennia to encourage oral cleanliness and enhance dental health. The Holy Quran has made reference to its significance. The use of miswak as an efficient oral hygiene tool has also been supported and recommended by the World Health Organization [12]. *Jatropha gossypifolia*'s young stem is used as a toothbrush to treat gum boils and bleeding gums. To treat oral diseases, the leaves of *Abrus pecatorius*, *Cordia myxa*, *Mangifera indica*, and *Psidium guajava* are chewed and their decoction applied. Other plant parts used for oral health care include roots, bark, fruits, and seeds. The other significant herbs that the locals utilize to clean their teeth are *Achyranthes aspera*, *Barleria prionitis*, and *Tephrosia prurpurea*. Germs are eliminated by inhaling the smoke from *Solanum indicum* and *Solanum surattense* fruits.

Medicinal plants have long been utilized in dentistry and have been used all across the world [13–14]. The results of the current study are also supported by research done in Rajasthan and other regions of India [10, 15–18]. The biological activities and bioactive components of some of the medicinal plants revealed in this study are what give them their therapeutic qualities [19–20], which support and validate the use of these species for medical reasons in the study area.

## 4. Conclusions

Because of their close relationship, oral and overall health should be viewed holistically. According to data collected from the Shekhawati, Rajasthan, the tribal and rural residents of this region are well-versed in herbal plants and continue to use traditional indigenous medicines to address oral health issues and dental cavities. The younger generation's lack of interest raises the potential that this wealth of knowledge will soon be lost. Traditional knowledge based on plants has gained recognition as a useful approach for finding novel medication sources. The primary benefits of using herbal medication are its low toxicity, extended duration, cost-effectiveness, and convenience of availability. In addition to a few clinical studies for their potential therapeutic use, the data produced by this study must be assessed for appropriate biochemical analysis, toxicity level, phytochemical inquiry, extraction, and separation. Therefore, the study highlights that these natural remedies can provide a foundation for future dental research.

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