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Dental care of Andaman and Nicobar folks: medicinal plants use as tooth stick

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ABSTRACT

Objective: To identify and understand the utilization and prioritization of medicinal plants used as tooth sticks by the select communities of Andaman and Nicobar islands. **Methods:** The information was collected through questionnaires and discussions among the informants in their local language regarding the plant parts used. **Results:** A total of 11 plant species belonging to 10 genera and 8 families were enumerated as tooth sticks, used by the Chota Nagpuri and Tamil inhabitants of Andaman and Nicobar islands to treat dental caries. **Conclusion:** The most important plant species harvested for tooth sticks belongs to the family Euphorbiaceae (3 species) and important as the tribal have used these plants since time immemorial and found effective in their teeth and gums health and this study has scopes on the conservation of certain medicinal plants, through sustainable utilization.

1. Introduction

The scientific knowledge of ethnobiological knowledge reciprocally relates human beings with their environment. Sustainable utilization of the locally available resources and the conservation methods they adapt are the basic concerns of ethnobiology[1]. India is one of the greatest emporiums of ethno botanical wealth and harbours 53 millions of tribal population formed as 550 ethnic communities and it has a century old heritage of medicinal plants and herbal medicines for alleviating ailments and promotion of health and happiness[2]. Primitive societies have depended on the herbal remedies for the treatment of disease and disorders since the time immemorial[3-7].

The biodiversity rich Andaman & Nicobar Islands encompasses more than 2 500 flowering plants and these islands abode six major tribal groups, four being Negroid and two Mongoloid origin[8]. The negroids are the Jarawas (309), Onges (94), Sentinalese (100) and the Great Andamanese (54). The Mongoloids are the Nicobarese (21 172) and the Shompens (389)[9]. These ethnic communities use a number of plant species for their sustenance[10]. Besides these native peoples, the Islands are also inhabited by various groups of people from India, Sri Lanka, Bangladesh and Myanmar. They were brought here as a convicts and forest laborers before independence by the British rulers. After independence the population was increased many fold due to the economy and employment opportunity. The ethnobotanical research was very high during the last two decades and most of the works are focused on the native peoples, but the research work related to the peoples settled before and after independence is meager. So the study was undertaken to the peoples of Chota Nagpuri and Tamilians, who were inhabited in the remote areas of Little Andaman Island.

Chota Nagpuri (Ranchi) community has several components, viz. Munda, Oraon, Ekka, Tigga, Kiro and Mintz and mainly tribes from the Jharkhand and Chattisgarh regions. More peoples arrived after and before 1947 to clear land for new wave of settlers. Now most of the peoples become forest laborers and concentrated in the South and Little Andaman Islands. They have developed rich ethnobotany from local plants. The Tamil peoples are mainly recent immigrants

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and most of them from Ramnad and Pudukottai districts of Tamilnadu. Now most of them become good traders and some are working in the forest department as laborers in many remote areas. They also have their own ethnobotanical knowledge.

Oral hygiene measures have been practiced by different populations and cultures around the world since antiquity[11]. Since dental caries is Ubiquitous with a wide spread prevalence, this is considered as one of the most important public health problems. Due to high cost and lack of resources at primary levels prevention is better in dental caries. Since the origin is related to bacteria, antibacterial is mainstay of treatment. Lack of high efficacy with antibacterial agents, unwanted effects and resistance to these agents are drawing attention of scientists to search for new and better drugs[12-14]. Plants products are currently gaining attention for treatment of various ailments. So now a day's most of the peoples are turning into the natural system of medicines and natural products like herbal tooth pastes etc. In view of this fact, the present work was intended to study the importance of tooth stick in oral health care practices among the inhabitants of Andaman and Nicobar Archipelago.

2. Materials and methods

The study was carried out among the communities inhabiting in Chota Nagpuri (Ranchi) and Tamil ethnic community, who were residing in little and South Andaman Islands. Frequent field trips were carried out in the areas and information regarding the tooth sticks is gathered from the old persons and the forest laborers. Herbal specimens were collected from the field and identified with the help of local flora and confirmed with the authentic specimens deposited in the Port Blair Herbarium (PBL). The plants used as tooth sticks were arranged in the alphabetical order with family name, plant parts used and the specific community utilizing the plant material as tooth stick.

3. Results

During the ethnobotanical survey, 11 plant species belonging to 10 genera and 8 families were enumerated as tooth sticks used by the Chota Nagpuri and Tamil inhabitants of Anadaman and Nicobar islands to treat dental caries (Table 1). Of these, seven plants are non-indigenous and already enumerated as tooth sticks in various reports, but remaining 4 plants, 3 of them are indigenous to Andaman Islands and enumerated first time the utility value as tooth sticks was found. Among the eleven plants used as tooth sticks, *Uvaria lurida* and *Pongamia pinnata* were predominantly used to clean the teeth, followed by *Azadirachta indica* and *Fius benghalensis*, whereas the remaining species were used occasionally. Concerning the plant part used as tooth stick, stem (81.81%) was principally used, when compare to root component (18.18%).

Family details of the enumerated species revealed that Euphorbiaceae was the most used family (3 species), followed by Moraceae (2 species), which could be considered as the co-dominant family, however, six families (Fabaceae, Acanthaceae, Meliaceae, Mimosaceae, Annonaceae and Smilacaceae) having only one species each. Species preference among the respondents showed that, Chota Nagpuri and Tamilians have their own tradition regarding the selection of tooth stick. Tender stems of *Pongamia pinnata* were used by both the community; species such as *Acacia nilotica*, *Achyranthes aspera*, *Azadirachta* indica, *Breynia vitis-idaea*, *Ficus benghalensis* and Streblus asper were solely used by Tamilians, whereas, the remaining species (*Jatropha curcas*, *Jatropha gossypifolia*, *Smilax bracteata*, *Uvaria lurida*) were exclusively used by the Chota Nagpuri of Andaman and Nicobar Islands.

Table 1.
Herbal tooth sticks used by the inhabitants of Andaman and Nicobar Island.

S.No.	Plant Name	Family Name	Parts used	Ethnic group
1	*Acacia nilotica* (L.) Willd. ssp. indica (Benth.) Brenan	Mimosaceae	Tender stem	Tamil
2	*Achyranthes aspera* L.	Amaranthaceae	Root	Tamil
3	*Azadirachta indica* A.Juss.	Meliaceae	Tender stem	Tamil
4	*Breynia vitis-idaea* (Burm.f.) C.E.C.Fisch	Euphorbiaceae	Mature stem	Tamil
5	*Ficus benghalensis* L.	Moraceae	Prop roots	Tamil
7	*Jatropha curcas* L.	Euphorbiaceae	Tender stem	Ranchi
8	*Jatropha gossypifolia* L.	Euphorbiaceae	Tender stem	Ranchi
9	**Pongamia pinnata* (L.) Pierre	Fabaceae	Tender stem	Ranchi & Tamil
10	**Smilax bracteata* Presl. var. verruculosa (Merr.) T. Koyama	Smilaceae	Mature stem	Ranchi
11	Streblus asper Lour.	Moraceae	Tender stem	Tamil
12	**Uvaria lurida* Hook.f. & Thoms.	Annonaceae	Mature stem	Ranchi

*Enumerated first time.

4. Discussion

It is generally accepted that oral hygiene maintenance through regular removal of dental plaque and food deposits

is an essential factor in the prevention of dental caries and periodontal disease. Despite the widespread use of toothbrushes and toothpastes, natural methods of tooth cleaning using chewing sticks selected and prepared from the twigs, stems or roots from a variety of plant species have been practiced for thousands of years in Asia, Africa, the Middle East and the Americas[15]. Ethnobotanical uses of plant species may vary from country to country and from culture to culture. The knowledge of plant based tooth stick used by the Chota Nagpuri and Tamilians of Andaman and Nicobar islands seems to be unique in its kind of the herbal species used and shows the diversification of knowledge from community to community.

It was also observed that some plants used as tooth stick in the study area are not used elsewhere. On the other hand some well known tooth stick plants are rarely used in the study area. For example, Neem (*Azadirachta indica*) is widely used as chewing stick throughout the world[16-19], however in the present study, it is being used only by Tamilians. Plant species such as *Pongamia pinnata*, *Smilax bracteata* and *Uvaria lurida* were used by the inhabitants of the study area are not used elsewhere, may be due to lack of knowledge exchange.

It is interesting to see that, some of the plants documented in the present study has been similar kind of utility value in other parts of the country/world. Tender twigs of Streblus asper is used as tooth brush among the indigenous community of Assam[20], North-Andaman Island[21] and also the ethnic tribes inhabiting the Nirmal division of Adilabad. Andhrapradesh, India[22]. Twig of *Jatropha curcas* is used as tooth brush to prevent microbes by Assamese[20] and cure gum problem among the local people of Macchegaun, Nepal[19].

Plants are the granary of bioactive compounds to cure various ailments[23-27]. It is evident that, the plants of the present study possess various bioactive compounds. Phytochemical screening of the stem bark of *A. nilotica* revealed that the plant contain terpenoids, alkaloids, saponins and glycosides[28]. Bioassay-guided fractionation of *Achyranthes aspera* led to the separation and identification of a saponin from ethyl acetate[29]. All parts of the neem tree-leaves, flowers, seeds, fruits, roots and bark have been used traditionally for the treatment of inflammation, infections, fever, skin diseases and dental disorders[30]. Different plant portions of neem was explored and more than 140 compounds, chemically diverse and with a vast array of biologically active nature were found sofar. The chemical compound 2-phenylethyl alcohol and 2-phenylaceto-nitrile was reported in *Breynia vitis-idaea*[31]. An examination of the ethanol extract of *Pongamia pinnata* resulted the isolation of isoflavones, pyranoflavonoids, furanoflavonoids, chalcones, and flavones[32,33]. Seven compounds were isolated and identified as salicylic acid, β-sitosterol, β-daucosterol, oleanolic acid, magnolol, quercetin, taxifolin from the leaves of Streblus asper[34]. Ethanolic extract of *Smilax bracteata* led to isolation of six new phenylpropanoid glycosides, smilasides G-L (1-6), along with eighteen known phenolic compounds, helonioside A, helonioside B, smilaside E, (1-p-O-coumaroyl-6-O-feruroyl)-b-Dfructofuranosyl-a-D-glucopyranoside, tricin, 5,7,40-trihydroxy flavanone, 4,6,40-trihydroxyaurone, vitexin, isovitexin, quercetin, 3-O-a-L-rhamnopyranosyl quercetin, 3,7-O-a-L-dirhamnopyranosyl quercetin, resveratrol, peceatannol, veraphenol, trans-scirpusin A, 2-b-D-glucopyranosyl-1,3,6,7-tetrahydroxy xanthone, and 5-O-caffeoylshikimic acid[35].

Tooth brushes play a vital role in the modern world to keep the tooth strong and healthy. Our ancestors have very strong teeth even after seventy to eighty year old; the only reason behind this secret is natural products, used by the elderly people. Since the last few decade most of the people are using artificial plastic tooth brushes, chemical pastes and the changed eating behaviour by taking high sugar content food and beverages, soft foods and high acid content drinks. These lead to a lot of dental problems like early teeth fall, tooth decay, pyorrhea and bad odour, etc., Natural tooth sticks are cheaper and economically beneficial, which could be used to alleviate such oral health problems. The tooth sticks have proved to be important for the oral and dental hygiene and hence are useful in decreasing dental caries. Screening of more such herbal resources with the indigenous knowledge behind the use and their sustainable utilization of such plant materials are of paramount important for the conservation of herbal resources for the mankind.

Conflict of interest statement

We declare that we have no conflict of interest.

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