Ethnomedicinal plants used for dental care in Sundargarh, Mayurbhanj, Angul and Balangir districts of Odisha, India

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The paper deals with 31 plant species belonging to 29 genera and 20 families comprising 40 ethnomedicinal uses for dental care (tooth ache, tooth decay, pyorrhea, foul smell and as tooth brush) by the different tribal and rural people in Sundargarh, Mayurbhanj, Angul and Balangir districts of Odisha. These uses were compared and cross-checked with the published ethnomedicinal data from Odisha and other states of the country and found that 12 uses of the referred plants had not been reported earlier. These plant species are arranged alphabetically with their botanical names, family and local name(s), followed by the method of uses for dental care along with field collection number(s) and uses cited by earlier workers.

Keywords: Ethnomedicinal plants, Dental care, Toothbrush, Odisha.

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Introduction

During the course of ethnobotanical survey of Sundargarh, Mayurbhanj, Angul and Balangir districts of Odisha, a total number of 374 ethnomedicinal plants were collected for the treatment of various diseases, disorders and ailments. Of these, 31 plant species were found to be used for dental care like tooth ache, tooth decay, pyorrhea, foul smell and as tooth brush to clean the teeth by the tribal and local people. Dental caries, tooth decay and pyorrhea are the common dental problems of the mouth observed in the area. Dental caries is a pathological condition of the teeth resulting in decalcification of the dentine or enamel and disintegration of the remaining organic material, often leading to loss of the teeth. Tooth decay is caused by intra oral factors, such as dental plaque of food and bacteria sticking to teeth, anatomy and position of teeth, dental appliances and restoration and lack of salivary flow and also by extra oral factors, such as high sugar intake, nutritional deficiency, soft foods and bottle feeding, etc. Accumulation of calculus (tartar) the scaly yellowish or brownish hard chalk like substances that forms at the gums around the teeth is the most common cause of gingivitis, which is the first stage of pyorrhea. The inflammation of the gum with foul smell is the main symptom of the pyorrhea.

Generally, the fresh tender sticks about 12-15 cm long and 0.5-1.0 cm in diam. are either collected directly from the plants or purchased from local vendors by the people of these districts. It is locally known as Datun or Dantkali or Karkat or Kathi. The stick is crushed at one end by the molar teeth and made in to a brush. Flexible fibers of the crushed end of the stick are used for cleaning the teeth surface and teeth crevices. Unfortunately, these practices are fast vanishing and now exist only among the old people in the rural and interior areas. Therefore, the objective of the present investigation is to collect, identify and to document such information from rural and tribal areas of the districts before their extinction. Subsequently, to find out new or less known uses for dental care by comparing the collected uses with already published literature. In recent past, a good number of research papers on various aspects of ethnobotany of Odisha including Sundargarh, Mayurbhanj, Angul and Balangir districts have been published by different workers1-29. However only a single paper has been published from the state on nine plants which were mentioned in folksongs for dental care30. A few papers have been published on plants used as toothbrush and for dental disorders from different

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parts of Andhra Pradesh (comprising 27 plants), Gujarat (29 plants), Bihar (30 plants) and Madhya Pradesh (17 plants) of the country.31-34

Materials and Methods

The ethnobotanical survey was carried out in 165 villages and forest areas of Sundargarh, Mayurbhanj, Angul and Balangir districts amongst the Ahir, Bathudi, Binjhal, Bhumij, Bhunya, Dal, Gauda, Gond, Ho, Juang, Kharia, Khond, Kisan, Kolha (Kol), Kond, Lodha, Lohar, Matiya, Mirdha, Misan, Munda, Oraon, PaudiBhunia, Puran, Rautia, Sabar (Sahara), Santhal tribe and non-tribal people during the years from 2006 to 2011. Frequent field trips were made to record the medicinal uses of wild plant species for various diseases or ailments, including dental disorders through personnel interview with the tribal and non-tribal people and further cross-checked with experienced herbalists (Kaviraj). About 14 herbalists were consulted and taken to the field for collecting voucher specimens and information about dental care medicinal uses of plants, their local names, parts used and methods of preparation with nature of treatment. The voucher specimens of the plants collected were identified with the help of keys and botanical description described in regional floras.35-38 After matching and verification with the authentic specimens housed in Central National Herbarium (CAL), these voucher specimens have been deposited in the Ethnobotanical Herbarium of Central Botanical Laboratory (CBL) Howrah. The latest botanical nomenclature has been checked with world renowned and widely accepted website http://www.theplantlist.org.39

These plant species have been arranged alphabetically according to their botanical names, family and local name(s), followed by the method of preparation and mode of uses along with voucher specimen number (s) in parenthesis and uses cited by earlier workers (Table 1). These collected uses were compared and cross-checked with the published ethnomedicinal data from Odisha and other states of the country and the unreported or less known uses of the enlisted plants have been indicated with asterisk (*) mark.30-34

Results and Discussion

It is revealed that 31 plant species with 40 ethnomedicinal data were collected from the area for dental care during the study. Of these, stem twigs (Plate 1) (14) are mostly used, followed by stem bark (7), flowers (4), roots, saps, fruits (3 in each), leaves, latex (2 in each), seed and whole plant (1 in each) for dental care in the studied area. As far as method of preparation and mode of uses is concerned, 14 used as tooth brush, 7 as decoction, 6 as fresh, 5 as powder, 3 as paste, 2 as smoke, 1 as tablet, 1 as extract, and 1 as ash for curing the disorder. Although, some plant species reported here for dental care are known from different parts of the country including Odisha, but the scrutiny of the relevant literature reveals that ethnomedicinal uses of 12 plants are not recorded earlier. It is also analysed that out of 40 ethnomedicinal data for dental care, 17 were collected from different localities of the Sundargarh district, 15 from the Mayurbhanj, 4 from the Angul and 4 from Balangir district. The plant brush seems more safe and hygienic as used fresh one in every occasion. Concurrently, other oral and stomach diseases might be cured as some of plant extracts goes into their internal system. The present ethnomedicinal investigation also revealed that the tribal people of Odisha have great faith in their traditional system of medicine and still depend upon natural plant resources to cure their various ailments. Simultaneously, it is observed that new generation is almost ignorant or least interested in ancient traditional method of healing. Therefore, it is felt that documentation of plant related indigenous knowledge throughout tribal area needs to be completed along with creation of awareness among the youngsters, so that rapid erosion of the valuable knowledge about plant resources can be checked to a certain extent. The data collected on dental protective plants needs to be systematically screened for verification of tribal claims and
**Table 1—List of the plant species and their uses for dental disorders in Sundargarh, Mayurbhanj, Angul and Balangir districts of Odisha, India (Contd.)**

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Family</th>
<th>Local Name(s)</th>
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</tr>
</thead>
<tbody>
<tr>
<td><em>Acacia nilotica</em> (L.) Delile</td>
<td>Mimosaceae</td>
<td><em>Bamur Gach</em> (Odiya)</td>
<td>Tender stem is used as toothbrush to clean the teeth (CBL-12447). Stem used as tooth brush&lt;sup&gt;32, 33, 34&lt;/sup&gt;.</td>
<td></td>
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<tr>
<td><em>Achyranthes aspera</em> L.</td>
<td>Amaranthaceae</td>
<td><em>Apmara</em> (Odiya)</td>
<td>Root decoction is given to gargle for 3 consecutive days to eradicate the pathogens and to treat toothache (CBL-12377). Root portion is used for cleaning the teeth&lt;sup&gt;30&lt;/sup&gt;. Stem and root used as tooth brush&lt;sup&gt;32-34&lt;/sup&gt;.</td>
<td></td>
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<tr>
<td><em>Annona squamosa</em> L.</td>
<td>Anonaceae</td>
<td><em>Atto</em> (Odiya), <em>Mandargam</em> (Santhali), <em>Sharifa</em> (Hindi), <em>Atta</em> (Bengali), <em>Madal</em> (Kolho)</td>
<td><em>Green leaves are boiled and the decoction is given to gargle for 1 week in the treatment of toothache (CBL-11800).</em></td>
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<tr>
<td><em>Azadirachta indica</em> A. Juss.</td>
<td>Meliaceae</td>
<td><em>Neem</em> (Odiya), <em>Limb</em> (Santhali)</td>
<td>Small slender twigs are used as toothbrush (Danthkati) to clean and to treat the infected teeth (CBL-11815, 34107). Stem used as tooth brush&lt;sup&gt;32-34&lt;/sup&gt;.</td>
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</tr>
<tr>
<td><em>Buchanania cochinchinensis</em> (Lour.) M.R. Almeida</td>
<td>Anacardiaceae</td>
<td><em>Char, Chinyar</em> (Odiya)</td>
<td><em>Soft twigs are used as toothbrush to clean the teeth (CBL-12357, 12402).</em> Latex used in toothache&lt;sup&gt;34&lt;/sup&gt;.</td>
<td></td>
</tr>
<tr>
<td><em>Calotropis procera</em> (Ait.) Dryand.</td>
<td>Asclepiadaceae</td>
<td><em>Araka, Atang, Arak gachh</em> (Odiya)</td>
<td><em>Latex (one drop) is applied on a piece of cotton and put around the infected teeth for removing purpose (CBL-12320).</em> Latex used in toothache&lt;sup&gt;34&lt;/sup&gt;.</td>
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</tr>
<tr>
<td><em>Flemingia chappar</em> Benth.</td>
<td>Fabaceae</td>
<td><em>Ranikathi, Ullo</em> (Odiya)</td>
<td><em>Tender stem is used as toothbrush to clean the teeth (CBL-12358, 11811).</em> Root decoction to rinse the oral cavity in toothache&lt;sup&gt;31&lt;/sup&gt; and pyorrhea&lt;sup&gt;33&lt;/sup&gt;.</td>
<td></td>
</tr>
<tr>
<td><em>Jatropha curcas</em> L.</td>
<td>Euphorbiaceae</td>
<td><em>Bindi, Jada, Bhendra</em> (Santhali), <em>Bandari, Bhenda, Jada</em> (Odiya)</td>
<td>Tender twigs are used as toothbrush and for the treatment of toothache and pyorrhea. The sap of the stem is applied on gums and teeth for fixing tightly. A sticky juice is obtained when petiole detached from the stem and is applied on a soft cloth and used to clean the gums and tongue of infants (CBL-19689). Stem used as tooth stick in pyorrhea&lt;sup&gt;33&lt;/sup&gt;. Latex is used in toothache&lt;sup&gt;34&lt;/sup&gt;.</td>
<td></td>
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<tr>
<td><em>Jatropha gossypifolia</em> L.</td>
<td>Euphorbiaceae</td>
<td><em>Jada, Rang Jada</em> (Odiya)</td>
<td>Latex is applied on a piece of cloths and cleans the tongue of infants (CBL-19756). Stem used as tooth stick in pyorrhea&lt;sup&gt;33&lt;/sup&gt;. Latex is used in toothache&lt;sup&gt;34&lt;/sup&gt;.</td>
<td></td>
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<tr>
<td><em>Madhuca longifolia</em> var. <em>latifolia</em> (Roxb.) A. Chev.</td>
<td>Sapotaceae</td>
<td><em>Mahulo, Mahul, Tolgachh</em> (Odiya)</td>
<td>Tender twigs are used as toothbrush for 15 days for strong and reset loose teeth (CBL-12342, 30040). Stem bark is powdered and applied during toothache (CBL-19738). Stem bark chewed to cure crossed teeth and to relive severe toothache&lt;sup&gt;31&lt;/sup&gt;. Stem used as tooth brush&lt;sup&gt;32&lt;/sup&gt; and for loose teeth&lt;sup&gt;33&lt;/sup&gt;.</td>
<td></td>
</tr>
<tr>
<td><em>Miliusa velutina</em> (Dunal) Hook. f. &amp; Thom.</td>
<td>Annonaceae</td>
<td><em>Um, Kahali</em> (Odiya)</td>
<td><em>Slender twigs are used as toothbrush and used for cleaning the teeth (CBL-30143).</em></td>
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</tbody>
</table>
Table 1—List of the plant species and their uses for dental disorders in Sundargarh, Mayurbhanj, Angul and Balangir districts of Odisha, India (Contd.)

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<tbody>
<tr>
<td>Mimusops elengi L.</td>
<td>Sapotaceae</td>
<td><em>Baud gachh</em> (Kolho), <em>Bakul, Maul shree, Bahudaphulo, Bawul, Bauda</em> (Odiya)</td>
<td>Stem bark is chewed to re-fix the loosening teeth. Bark is powdered with alums (<em>Fitkari</em>) and cleans the teeth for brightness and to treat the pyorrhea. Bark powder is slightly warmed and applied externally on decaying teeth to reduce pain. Subsequently, gargle should be done for brightness of the teeth (CBL-19631). Tender twigs (<em>Kathi</em>) are used as tooth stick to cleaning and tightening the teeth. All parts (<em>Panchang</em>) is boiled and after staining it is used for gargle in toothache and pyorrhea. (CBL-34258). Leaves are dried, powdered and used for cleaning and strong teeth (CBL-30001). Juice of stem bark and fruit given in dental caries(^1). Bark chewed and stem used as tooth stick in cavity and decaying(^3).</td>
<td></td>
</tr>
<tr>
<td>Phyllanthus reticulatus Poir.</td>
<td>Euphorbiaceae</td>
<td><em>Sikat, Jhijon</em> (Odiya), <em>Jhinjhit</em> (Santhali)</td>
<td>Tender twigs are used as toothbrush (<em>Datun</em>) to clean the teeth (CBL-12456, 19797).</td>
<td>Stem squeezed on to teeth to cure infected gums and severe tooth pains(^3).</td>
</tr>
<tr>
<td>Plumeria alba L.</td>
<td>Apocynaceae</td>
<td><em>Gulanchi</em> (Odiya)</td>
<td>A few pores are made on the stem of tree and a sap is exudes from the pore. The sap is collected and applied on gums in pyorrhea (CBL-19715).</td>
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</tr>
<tr>
<td>Pterocarpus marsupium Roxb.</td>
<td>Fabaceae</td>
<td><em>Piya Sal</em> (Odiya)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapindus trifoliatus L. syn. <em>S. emarginata</em> Vahl</td>
<td>Sapindaceae</td>
<td><em>Ritha</em> (Odiya)</td>
<td>Seed powder is used to clean teeth and useful in the pyorrhea (CBL-30069).</td>
<td></td>
</tr>
<tr>
<td>Senna sulfurea (Collad.) H. S. Irwin &amp; Barneby</td>
<td>Caesalpinaceae</td>
<td><em>Chakunda</em> (Odiya)</td>
<td>Soft stems are used as toothbrush to clean and to make teeth more white (CBL-12429).</td>
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</tr>
<tr>
<td>Shorea robusta Gaertn. (Plate 1)</td>
<td>Dipterocarpaceae</td>
<td><em>Sarjam</em> (Santhali, Kolho), <em>Sad, Rengal, Sal, Sargi</em> (Odiya)</td>
<td>Tender and soft stem twigs are used as toothbrush (<em>Karkat</em>) for treating pyorrhea and toothache. It is generally sold in the market @ Rs. 5 to 10 for about 20 sticks (CBL-11701, 30141). A twig is highly suitable as a tooth brush(^9). Resin powder used as tooth powder in toothache(^33).</td>
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</tr>
<tr>
<td>Sida acuta Burm.f.</td>
<td>Malvaceae</td>
<td><em>Bajra-muli</em> (Odiya), <em>Hepidpeuin</em> (Santhali)</td>
<td>*Stem twigs are collected and used as toothbrush (CBL-12376, 12407).</td>
<td></td>
</tr>
<tr>
<td>Solanum virginianum L. ex D. Don</td>
<td>Solanaceae</td>
<td><em>Ram Datun</em> (Odiya)</td>
<td>The stem is used as toothbrush in pyorrhea and toothache (CBL-12315).</td>
<td>Stem is used for cleaning the teeth(^30). The smoke obtained by burning of dried seeds is given through ear tract to cure toothache(^34).</td>
</tr>
</tbody>
</table>
for antimicrobial properties. Some of them like Acacia nilotica (L.) Delile, Achyranthes aspera L., Azadirachta indica A. Juss., Mimusops elengi L. and Vitex negundo L. are screened out and ascertained their antimicrobial activities against dental pathogens by different workers 40-41.

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