



Medicinal Plants used by the Ranchi Community of Kadamtala region of Middle Andaman, Andaman & Nicobar Islands

Udayan P S^{1*} and Satheesh George²

¹P.G. Department of Botany and Research Centre, Sree Krishna College, Ariyannur, Guruvayur, Thrissur, Kerala, India

². Department of Botany St. Joseph's College, Devagiri, Calicut, Kerala, India

Received: 29.08.2020

Revised and Accepted:
27.10.2021

Key words: Kadamtala, Ranchi tribes, Middle Andaman, Medicinal plants

Abstract

Herbal medicines are used for the treatment of various diseases because it is easily available, cheap and less toxic. In developing countries, a large proportion of the population relies on traditional practitioners to meet health care needs. The present study was an attempt to document the medicinal plants used by the Ranchi traditional community inhabiting the Kadamtala forest of Middle Andaman. The Andaman and Nicobar Islands represents one of the richest repositories of biodiversity in the whole of South and South East Asia. Uses of 44 plant species belonging to 34 families encompassing 40 genera were recorded during the survey. These 44 species are employed to treat a total of 27 ailments. Rutaceae and Euphorbiaceae were the dominant families used for medicinal purpose by the Ranchi's. The families Amaranthaceae, Caesalpiniaceae, Zingiberaceae, Malvaceae, Lamiaceae, Solanaceae and Asteraceae were also commonly used. The primary source of medicinal plants used by the Ranchi's were herbs followed by trees, shrubs and climbers. The traditional medicines were used for the treatment of simple diseases like cough and throat pain to fatal diseases such as cancer. The most frequently used plant parts were leaves followed by fruits. Flowers, bark, tuber, bulb, root, stem, latex, rhizomes and whole plant decoctions were also used for treating various ailments. Information on the medicinal uses, plant parts used, herbal preparations and mode of administration collected from the traditional healer together with their botanical identity is presented. The study showed that traditional medicines play a crucial role in the health care system of Ranchi community. The efficacy and safety of all the reported ethnomedicinal plants need to be evaluated by phytochemical and pharmacological studies for the discovery of potential new drugs.

1. Introduction

Medicinal plants continue to play a central role in the healthcare system of large proportions of the world's population. Utilization of medicinal plants by the ancient civilizations of China, Egypt and Indus Valley has been reported (Kritikar & Basu, 1935). Currently, the natural products continue to be widely used through traditional systems of medicine on many accounts and the usage of medicinal plants has been increasing tremendously in Asian as well as Western countries. Herbal medicines are more acceptable in developing countries where it has a long and uninterrupted history of use. According to World Health Organization, 80% of the people living in rural areas depend on medicinal herbs as primary healthcare system. In India, about 1.5 million practitioners of herbal medicine use around 25,000 plant-based formulations, of which only 10 per cent are used in drug and pharmaceutical industries Mehrotra & Mehrotra (2005). Further, it has been established that herbal drugs obtained from plants are safe in treating various ailments with few side effects (Ayyanar & Ignacimuthu, 2005). The folk medicinal traditions play a reflecting and prominent role in human and environmental interaction Chopra *et al.*, (1956). The All-India Ethnobiological Survey (AEIS) carried out by the Ministry of Environment and Forests, revealed that 7,500 plant species are used by 4,635 ethnic communities for healthcare across the country (Dubey *et al.*, 2004). In most of the Indian systems of medicines, the botanical source of a raw drug is often attributed to one species. Over the years, the increased demand has led to overexploitation of medicinal plants. Many have become rare or even depleted from their natural habitats (Gadgil & Guha, 1992; and Haeuber, 1993). Additionally,

deforestation and extinction of many species and incorrect identification of many plants has resulted in adulteration and substitution of raw drugs. Considering the rapid rate of deforestation and loss of biodiversity, there is a need for accurate scientific documentation of the knowledge and experience of these herbalists. Ethnobotanical studies that search to rescue traditional botanical knowledge related to a specific flora have shown to be an important tool to record plant data (Brandao *et al.*, 2009). WHO has reported that in developing countries, it is often the only accessible and affordable treatment available (WHO, 2005). Therefore, collection of ethnobotanical information and documentation of traditional knowledge has gained prominence from the prospective of drug development (Ragupathy & Newmaster, 2009). Also, many Indian traditional medicinal preparations are not available in a standardized form due to lack of genuine plant material and quality control, research and development of herbal drugs etc. Hence these traditional remedies need to be confirmed through scientific investigations to identify those that may provide alternatives for modern drugs. Further studies are needed to verify efficacy and safety of these drugs. Therefore, an attempt has been made to ascertain the detailed information on traditional healing properties of some medicinal plants used for the prevention and treatment of various diseases used by the Ranchi traditional settlers in the Kadamtala forest areas of Middle Andaman.

In the past, during British regime, the colonial authorities of the Andaman Islands were in need of persons who would work as labourers for laying roads, felling trees and performing all kinds of manual works. A large number of persons from Chotanagpur tribal belt area of the present Jharkhand state of the Indian mainland had been recruited



and sent to the Andamans to work as forest labourers. They originally belonged to various places and groups like Oraon, Kharia, Munda, Mahli Turi Ghasi, Cheek, Dom etc. But in Andamans they are labeled as 'Ranchis' after the principal township of their natal region. Their main settlement is at Baratang in Middle Andamans. Baratang has served as an important timber as well as minor forest produce source for the settlement. They are working in forest, public works department, etc. They are a heterogeneous group but the common factor of tribal life that strings them is their addiction to traditional tribal drink called 'Handia'. The Ranchi are marginalized particularly, as they are tribal in their original place but having been migrated to Andaman they are not classified as tribal here as they are not indigenous to the island.

Through a preliminary survey with the residents, a key informant was selected, characterized by being a person recognized by the community as holding knowledge about medicinal plants. During the survey, two traditional practitioners belonging to the Ranchi settlers, accompanied us for helping in locating the medicinal plants and documenting their uses. The present paper adds up further to the initiative on documentation of traditional knowledge by giving the uses on 44 plant species commonly used for their primary health care.

2. Materials and Methods

This ethnobotanical study was conducted in the Kadamtala forest of Middle Andaman of India. The name Kadamtala has probably been derived from the earlier presence of 'Kadam' trees (*Anthocephalus cadamba*), which are common in damp places and are used in the match wood industry. Andaman and Nicobar groups of islands are situated in the Bay of Bengal, mid way between peninsular

India and Myanmar, spreading like a broken necklace in the North-South direction and it covers South, Middle, North, Little Andaman and Nicobar Islands. Islands are located between 6° 45' and 13° 41' North latitudes, and 92° 12' and 93° 57' East longitude. There are in all 349 islands, which can be distinguished into two groups geographically. Islands located north of 10° N latitude are known as Andaman group of Islands while islands located south of 10° N latitude are called Nicobar group of Islands. Total geographic area of Andaman and Nicobar Islands is 8249 sq. km. of which Andaman group of islands cover 6408 sq.km. while Nicobar group cover 1841 sq.km. Out of 349 islands only 38 islands are inhabited by human beings (24 in Andaman and 12 in Nicobar Islands).

Due to a tropical hot and humid climate with heavy rains, all the major islands support very luxuriant and rich vegetation. The forests cover 86.2% of the total geographic area of Andaman and Nicobar Islands and the major forest types are evergreen, semi-evergreen and moist deciduous forests. The soil is mild to moderately acidic with high humus on top. The climate is tropical warm, moist and equable. The temperature ranges from 18° C to 34° C. An average annual rainfall 3000 mm per year is mainly received from southwest and northeast monsoons which extent over a period of eight months.

The information on various medicinal plants presented in this paper was gathered during the month of December in the year 2007 from Philmon Dung Dung, a 50-year-old Ranchi tribe of Bihar settled community, residing in Middle Andaman. He explained in detail the medicinal uses and gave the local names of every plant collected. The information includes the plant parts used, formulations and the ailments used to treat with these formulations. Additional questions were

asked to know the different routes of drug administration and whether a single plant was used to treat multiple ailments. Each species in fresh condition was identified with the help of standard floras. (Gamble, 1936; Henry *et al.*, 1987; Hooker, 1884).

Plants were collected, tagged and entered in the field data book together with important botanical notes for herbarium specimens. The species were then poisoned, processed and labeled by standard herbarium methods (Bridson & Foreman, 1998). All the species were identified and the voucher specimens have been deposited for future reference at the Centre for Medicinal Plants Research herbarium (CMPR) of Arya Vaidya Sala, Kottakkal.

3. Results and Discussion

Scientific names of plants arranged alphabetically, followed by local names, habit, family, herbal preparations, plant parts and their medicinal uses are listed in Table 1. A total of 44 plant species with therapeutic uses were recorded from Kadamtala forest areas of Middle Andaman (Fig. 1). They belong to 34 families distributed in 40 genera. Majority of the medicinal plants were from 9 families (45.5 %). Plant families with highest number of medicinal plants were from Rutaceae and Euphorbiaceae represented by 3 species each. The families Amaranthaceae, Caesalpinaceae, Zingiberaceae, Malvaceae, Lamiaceae, Solanaceae and Asteraceae were represented by 2 species. The other 25 families were represented by 1 species each (Plate 1). Herbs were the main growth forms of medicinal plants (36.4%) followed by trees (29.5%), shrubs (22.7%) and climbers (6.8%) (Fig.2). Andaman and Nicobar Islands are considered to be a hot spot of biodiversity of medicinal plants. Situated between two major biodiversity hot spots, namely the Indian sub-continent and the Malaysia-

Indonesia region, it is hardly surprising that the islands manifest biodiversity of extraordinary range within a limited geographical area **Balakrishnan, & Ellis (1996)**. The ecology of the Andaman forests is akin to those of the Southeast Asian region. They share many commonalities with those forests in terms of several key features of tropical rain forest ecology (Umesh Kumark *et al.*, 2010).

These 44 species were employed to treat a total of 27 ailments. The documented medicinal plants in this study were used for the treatment of simple diseases like tooth ache, throat pain, stomach aches to fatal conditions like snake bites, cancer etc. The practice of using natural products to treat ailments in an alternate or supplemental way to synthetic drugs is old, yet still has an important role in global health (Maciel *et al.*, 2002) Jaundice, diabetes, tuberculosis, stomach and intestinal disorders, urinary infection, snake bites, intestinal worms, ulcer, bone fractures, mumps, boils, sores, hyperlipidemia, wounds, Andaman fever, tooth ache, cough, throat pain and cancer were some of the medical conditions treated with the medicinal plants of Kadamtala forest. An appropriate dosage to prepare drug from different parts of plant were prescribed as a remedy to treat different kind of diseases and disorders. More than two herbs were reported in several preparations. It has been reported that more than 70% of the total population of Jarkhand state from which the Ranchi's had migrated from is exclusively dependent on the herbs and traditional healers for maintaining a reasonable level of health Tomar, (2002).

The plant parts used for making herbal preparations were leaves, fruits, flowers, bark, tuber, bulb, root, stem, latex and rhizomes. Whole plant decoctions were also taken orally by these tribes for the treatment



of diabetes, jaundice, indigestion, intestinal blocks and throat cancer. Leaves (10 species) were the main plant part used for treating majority of diseases followed by fruits (8 species). Herbal medicines were commonly prepared using water as the excipient. Mustard oil, honey, salt, turmeric powder and rice wash water were also occasionally used (Table 1). Oral route was found to be the dominant method of drug administration (70.5%) followed by topical application (29.5 %).

Whole plant decoctions of *Achyranthes aspera* L. and *Morinda citrifolia* L. fruit juice was used by the tribes for the treatment of cancer. There are reports on cancer chemo preventive action from methanolic extracts of leaves, alkaloid, nonalkaloid and saponin fractions of *Achyranthes aspera* L on Epstein-Barr virus early antigen activation induced by tumour promoter 12-O tetradecanoylphorbol-13-acetate in Raji cells (Chakraborty *et al.*, 2002). Studies have shown that *A. aspera* L also exhibited good antioxidant effect by preventing the formation of free radicals (Edwin *et al.*, 2008). *Morinda citrifolia* L. fruit juice has been reported to possess potent anti-cancer activity (Wang & Su, 2001). Anti tumour potential of *Morinda citrifolia* L. fruit juice against lung cancer has been confirmed in animal models (Eiichi Furusawa, 2003).

The two plants used by the tribes for poisonous snake bites were *Moringa pterygosperma* Gaertn. and *Pedilanthus tithymaloides* L. Bark extracts of *Moringa pterygosperma* Gaertn. has been reported to possess anti-inflammatory, analgesic and wound healing properties (Ganatra *et al.*, 2012). Crude extract (0.5%) of *P. tithymaloides* was found to stimulate wound healing with increased percentages of average epithelization, wound contraction and total wound healing Waroonluk *et al.*, (2010). Ranchi's bandaged the paste of the plant

Cissus quadrangularis L. over the broken body parts for bone setting in the case of fractures. It has been experimentally proved that paste of alcoholic extract of *Cissus quadrangularis* L. intramuscularly facilitated rapid healing of fracture in albino rats. Ethanol extract (95%) enhanced the development of cortical bone and trabeculae in fetal femur, which may be related to rich content of calcium, phosphorous and phytoestrogenic steroids and shown to influence early regeneration and quick mineralization of bone fracture healing process (Rao *et al.*, 2007). These reports give scientific validation of many of the herbal drugs used by the Ranchi tribes but the drug dosage, formulations, phytoconstituents, toxicity etc has to be evaluated to be used as safe and potential drugs.

4. Conclusion

Based on the surveys conducted, the ethnic community still depends on their indigenous knowledge which employs the use of medicinal plants to treat diseases and maintain good health. Thus, the inhabitants can be defined as conservative of a rich knowledge of plants that is continuously passed from generation to generation, making them extremely valuable for future scientific and cultural research. Even though numerous well accepted modern therapeutics are available today, people still prefer natural products because of the adverse side effects of synthetic products in therapy. However scientific evaluation of medicinal plants is important for the discovery of novel drugs and to assess the efficacy of conventional drugs of plant origin. Hence, it is essential to study and document the ethnic knowledge and undertake phytochemical and pharmacological studies which can provide valuable information in screening of individual species and support and validate their potential medicinal values.

The intense harvesting of leaves in traditional medicine does not present an alarming threat to the forest species. But in the case of herbal preparations using whole plants, the practice of completely uprooting a plant constitutes a severe threat to the species. Agricultural land expansion, wood for construction, timber production and firewood collection are other major threats to the plant species in this area. Moreover, the indigenous knowledge associated with the conservation and use of medicinal plants is also disappearing at an alarming rate (Regassa, 2013). Derogatory attitudes towards practitioners of traditional medicine have forced healers to keep their knowledge and practices to themselves (Zerabruk & Yirga (2012). Local cultivation of medicinal plants is an important strategy to overcome the scarcity of medicinal plants and can play an important role in economic development of the area. Hence, there is an immediate need to initiate systematic conservation measures to avert degradation of the ecosystems where these medicinal plants thrive.

5. Acknowledgement

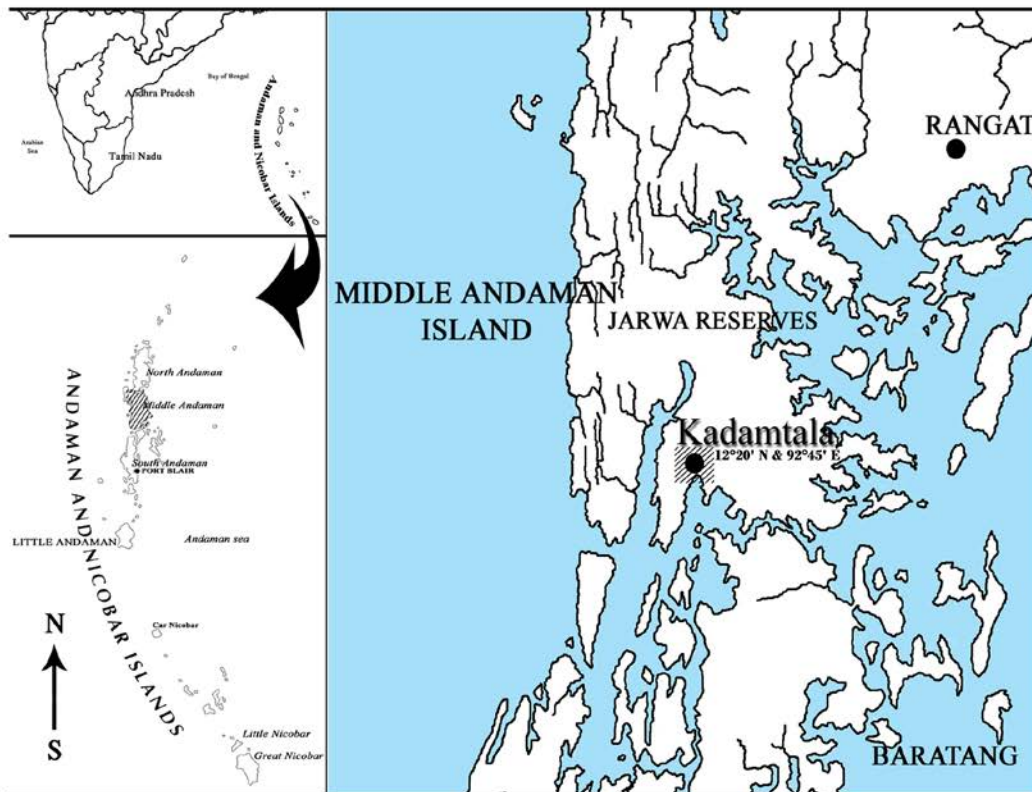
We express our sincere thanks and gratitude to individuals and organizations who contributed to this study: the Gas Authority of India (GAIL) for funding the project and authorities of Arya Vaidya Sala, Kottakkal and the Centre for Medicinal Plants Research (CMPR), Malappuram District, Kerala for facilities and encouragement; Dr. Harinarayanan M.K. and Tushar K V, Scientists, CMPR and Janardhanan N K, staff of Arya Vaidya Sala herbal garden; Smt. N Kala, IFS, Principal Chief Conservator of Forest, Andaman & Nicobar Islands; Ranchi tribal community for their cooperation during data collection and for sharing their indigenous knowledge.

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Map of Middle Andaman showing the study area (Kadamtala)



A Ranchi tribal man explaining the use of *Calotropis gigantea* (L.) R. Br. “Agvan” used for treating mumps



A hamlet of Ranchi tribes

Photographs of some plants used by the Ranchi tribes settled in Andaman Islands



Annona muricata
ANNONACEAE



Bauhinia racemosa
CAESALPINIACEAE



Cassia alata
CAESALPINIACEAE



Cissus quadrangularis
VITACEAE



Clitoria ternatea
FABACEAE



Curcuma zanthorrhiza
ZINGIBERACEAE



Cycas rumphii
CYCADACEAE



Morinda citrifolia
RUBIACEAE



Oroxylum indicum
BIGNONIACEAE



Punica granatum
PUNICACEAE



Terminalia chebula
COMBRETACEAE



Vernonia cinerea
ASTERACEAE

Table 1. Medicinal plants commonly used by Ranchi tribe's inhabiting Kadamtala forest of Middle Andaman

Sl. No.	Col. No.	Scientific Name & Family	Local Name	Habit	Mode of preparation, parts used and ethanobotanical uses
1	0776	<i>Achyranthes aspera</i> L. (Amaranthaceae)	Ultakhanda	Herb	Whole plant is boiled with heartwood powder of 'Raktachandana' (<i>Pterocarpus santalinus</i>) and the concentrated decoction is heated in ghee. Small quantities of this material is dipped with a piece of cotton and chewed little by little. Prolonged administration of this medicine is used to treat throat cancer. Same mode of administration is applied also for jaundice.
2	0780	<i>Aegle marmelos</i> (L.) Correa (Rutaceae)	Bhael	Small tree	Fruit pulp mixed with water, sugar and lime is taken orally for cooling the body.
3	0793	<i>Allium sativum</i> L (Liliaceae)	Lassum	Bulbous herb	Small pieces of garlic crushed in oil is applied on the legs as a leech repellent. Garlic is also taken internally for controlling gastric problems.
4	0791	<i>Alternanthera sessilis</i> (L.) R. Br. (Amaranthaceae)	Madrasbagi	Prostrate herb	Used as a leafy vegetable for good health and stamina.
5	0789	<i>Andrographis paniculata</i> (Acanthaceae)	Chirata	Herb	Whole plant decoction is taken internally for proper digestion and block in intestine. Administration of the decoction for 3 consecutive days is practiced for lowering blood sugar.
6	0779	<i>Annona muricata</i> L. (Annonaceae)	Khanda sarifa	Small tree	Fruits are used as a vegetable for culinary purpose.
7	0758	<i>Asparagus racemosus</i> Willd. (Asparagaceae)	Madevjat	Climber	Tubers are taken internally for stomachache, body strength and considered as a tonic.

8	0782	<i>Azadirachta indica</i> A. Juss. (Meliaceae)	Neem	Medium sized tree	Leaves and bark are ground to a paste and a small portion is taken internally for expelling intestinal worms.
9	0772	<i>Bauhinia acuminata</i> L. (Caesalpiniaceae)	Koyinar phool, Jungli neem	Small tree	Flowers are edible, used for culinary purpose.
10	0784	<i>Calotropis gigantea</i> (L.) R. Br. Asclepiadaceae	Agvan	Shrub	Latex of this plant is applied over wounds for fast healing. External application of latex is practiced for treating mumps. Leaf is smeared with mustard oil and gently pressed over the inflamed area for mumps. Similarly it is applied over vulva as a post-natal treatment.
11	0773	<i>Cassia alata</i> L. Caesalpiniaceae	Chottachakkol	Subshrub	A pinch of dried and powdered flowering twigs are taken internally for diabetes.
12	0766	<i>Catharanthus roseus</i> (L.) G Don (Apocynaceae)	Satabhahar	Herb	One leaf of this plant along with few tulsi leaves is administered in empty stomach early in the morning is practiced in diabetics.
13	0765	<i>Chromolaena odorata</i> (L.) King & Robins. (Asteraceae)	Hawaibutti	Shrub	The leaf juice is applied externally for cuts and wounds.
14	0781	<i>Cissus quadrangularis</i> L. (Vitaceae)	Harjora	Climber	Stem pieces ground with white portion of an egg are made into a paste and bandaged over the broken body parts. The plant is used for bone setting.
15	0775	<i>Citrus limon</i> (L.) Burm. f. (Rutaceae)	Nimba	Small tree	Fruits are edible and used for pickling.
16	0785	<i>Clitoria ternatea</i> L. (Fabaceae)	Neelkand	Climber	Flowers are offered to God in 'Sani pooja'. Flowers are ground to a paste and taken internally for curing stomach problems.
17	0788	<i>Crinum asiaticum</i> L. (Amaryllidaceae)	Jungli pias	Herb	Rhizome paste is applied externally over boils for relief in burning sensation.

18	0768	<i>Curcuma longa</i> L. (Zingiberaceae)	Haldi	Herb	Used as a strong wound healer. Rhizomes are ground with hot rice and applied externally over deep wounds, clean The wounds are cleaned everyday and fresh application of the medicine is continued till curing.
19	0786	<i>Curcuma zanthorrhiza</i> Roxb. (Zingiberaceae)	Vanyahaldi	Herb	Paste of rhizome is applied over wounds for fast healing. This is repeated in morning and evening until cure.
20	0751	<i>Cycas rumphii</i> Miq. (Cycadaceae)	Arguna	Shrub	Fruit kernel is eaten. A paste of fruit kernel is applied externally over chest for Andaman fever.
21	0778	<i>Cymbopogon citratus</i> (DC.) Stapf (Poaceae)	Chapathi	Herb	Leaves are added to tea for extra refreshment.
22	0769	<i>Hibiscus rosa-sinensis</i> L. (Malvaceae)	Poojaphool	Shrub	A freshly opened flower ground with 15-20 dry fruits of <i>Piper nigrum</i> L. is administered internally for treating urinary infection.
23	0760	<i>Hibiscus sabdariffa</i> L. (Malvaceae)	Kattabaji	Herb	Planted in the fields for shade, mainly for taking rest in between the farm work. Fruits are edible, used mainly for making fish curry.
24	0753	<i>Kalanchoe pinnata</i> (Lam.) Pers. (Crassulaceae)	Jatpathi	Herb	Fresh leaf juice is taken internally for curing stomachache.
25	0794	<i>Lagerstroemia speciosa</i> (L.) Pers. (Lythraceae)	Pema	Tree	Dried bark decoction is taken internally to control cholesterol.
26	0787	<i>Mentha piperata</i> L. (Lamiaceae)	Mentha	Herb	Mainly used in preparing chutney. It is considered as a good appetizer and tonic.
27	0755	<i>Mimosa pudica</i> L. (Mimosaceae)	Lajjuvanthi	Herb	Leaves are used for curing ulcer. Whole plant is ground well with <i>Alternanthera</i> spp. and taken internally in rice washed water in empty stomach for jaundice.

28	0757	<i>Morinda citrifolia</i> L. (Rubiaceae)	Noni	Tree	Refined fruit juice is administered regularly in tuberculosis and cancer.
29	0763	<i>Moringa pterygosperma</i> Gaertn. (Moringaceae)	Sajanaphali	Tree	Bark pieces are ground to a paste along with the shoots of <i>Alternanthera</i> spp. and applied externally in poisonous snake bites.
30	0756	<i>Murrya koengii</i> (L.) Spreng. (Rutaceae)	Karipathi	Small tree	Leaf paste is applied regularly during bath time over scalp and washed off after a few minutes for preventing graying of hair.
31	0767	<i>Ocimum tenuiflorum</i> L. (Lamiaceae)	Tulsi	Subshrub	Tulsi and honey is taken internally several times a day continuously for 4 days to cure cough.
32	0790	<i>Orxylum indicum</i> (L.) Benth. ex Kurz (Bignoniaceae)	Burmapali	Tree	Leaf paste applied over sore hands
33	0752	<i>Pedilanthus tithymaloides</i> (L.) Poir. (Euphorbiaceae)	Kankujara	Herb	Fresh latex is applied externally over snakebites.
34	0762	<i>Phyllanthus amarus</i> Schum. & Thonn. (Euphorbiaceae)	Nulichottapathi	Herb	Whole plant is ground well and taken internally 6 days in empty stomach for jaundice.
35	0774	<i>Phyllanthus emblica</i> L. (Euphorbiaceae)	Amla	Tree	Fruits are edible and consumed fresh or pickled.
36	0777	<i>Piper longum</i> L. (Piperaceae)	Pepper	Shrub	Dried fruit powder mixed with honey is taken internally for stomach pain and intestinal disorders.
37	0771	<i>Psidium guajava</i> L. (Myrtaceae)	Amirdu	Tree	Fruit are edible and is considered as a health tonic.
38	0759	<i>Punica granatum</i> L. (Punicaceae)	Anar	Shrub	Fruits give a cooling effect to the entire body system and is considered as a health tonic. Fruit rind is dried, powdered and administered in all types of intestinal disorders.

39	0770	<i>Solanum torvum</i> Sw. (Solanaceae)	Chottabigan	Shrub	Fruits are mixed with chili powder, salt and turmeric powder, vapour heated for a few minutes, dried in sun, fried in oil and consumed for good health.
40	0754	<i>Solanum virginianum</i> L. (Solanaceae)	Chota khanda biklanda	Shrub	The mature fruits placed in fire are applied for toothache.
41	0761	<i>Terminalia chebula</i> Retz. (Combretaceae)	Harrha	Tree	Fruits rind decoction is given for digestive disorders. It is considered as protective medicine for all types of diseases. Fruit rind is ground with <i>Cinnamomum tamala</i> leaves and chewed several times a day to relieve throat pain.
42	0792	<i>Thevetia peruviana</i> (Pers.) Merr. (Apocynaceae)	Ganeria ped, Jungli dalm	Shrub	Latex is applied externally as a wound healer.
43	0764	<i>Vernonia cinerea</i> (L.) Less. (Asteraceae)	Badapathi	Herb	Roots are used in treating certain conditions of jaundice.
44	0783	<i>Ziziphus mauritiana</i> Lam. (Rhamnaceae)	Bher	Stragglng shrubs	Ripe fruits are edible and tender fruits are pickled.