

**FINAL REPORT OF THE WORK DONE ON THE MINOR RESEARCH
PROJECT**

Title of Research Project

**A SURVEY OF TRADITIONAL MEDICINAL PLANTS IN
HARAPANAHALLI TALUK OF DAVANAGERE DISTRICT,
KARNATAKA**

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INTRODUCTION

The use of medicinal plants products could be traced back as the beginning of human civilization. The application of plants as medicines dates back to prehistoric period. There is evidence since early Vedic period of plants being used for a wide range of medicinal purposes. They have in fact been used in a continuous unbroken tradition for over four millennia. *Rigveda*, the oldest repositories of human knowledge written between 4500-1500 B.C. mention the use of 67 plants for therapeutic use. *Yazurveda* enlists 81 plants whereas *Atharvanaveda* written during 1200 B.C. describes 290 plants of medicinal value. *Charaka Samhita* (900 B.C.) describes 341 medicinal plants and *Susruta Samhita* (600 B.C.) mentions 395 medicinal plants (Pullaiah, 2002).

In A.D. 77, the Greek surgeon Dioscorides published "*De Materia Medica*", which was a catalog of about 600 plants in the Mediterranean. It also included information on how the Greeks used the plants, especially for medicinal purposes. In 1542 Leonhart Fuchs, a Renaissance artist, led the way back into the field. His "*De Historia Stirpium*" cataloged 400 plants native to Germany and Austria. John Ray (1686–1704) provided the first definition of "species" in his "*Historia Plantarum*". In 1753 Carl Linnaeus wrote "*Species Plantarum*", which included information on about 5,900 plants.

The 19th century saw the peak of botanical exploration. Alexander von Humboldt collected data from the New World, and the James Cook's voyages brought back collections and information on plants from the South Pacific. Edward Palmer collected artifacts and botanical specimens from people in the North American West (Great Basin) and Mexico from 1860s to 1890s. During this period, the field of "aboriginal botany" was established which drew attention of all forms of the vegetable world used by aboriginal people for food, medicine, textiles, ornaments and more (Powers, 1873). Leopold Glueck, a German physician was the first individual to study the emic perspective of the plant world at the end of 19th century. His published work on traditional medicinal plants used by the rural people in Bosnia (1896) was considered as first modern ethnobotanical work (Choudhary *et al.*, 2008). The term "ethnobotany" was first used by a botanist named Harshberger, John W. (1896) while he was teaching at the University of Pennsylvania. He defined Ethnobotany as the science of denoting the uses of plants by the aboriginal people. Ethnobotanical knowledge encompasses both wild and domesticated plant species and is rooted in observation, relationship, needs, and traditional ways of knowing. Such

knowledge evolves over time, and is therefore always changing and adding new discoveries, ingenuity and methods.

Beginning in the 20th century, the field of ethnobotany experienced a shift from the raw compilation of data to a greater methodological and conceptual reorientation. This is also the beginning of academic ethnobotany. Richard Evans Schultes is considered as the father of modern ethnobotany for his studies of indigenous peoples' uses of plants in America. His botanical fieldwork among Native American communities led him to be one of the first to alert the world about destruction of the Amazon rainforest and the disappearance of its native people. He collected over 30,000 herbarium specimens and published numerous ethnobotanical discoveries. His book "*The Plants of the Gods: Their Sacred, Healing, and Hallucinogenic Powers*" co-authored with chemist Albert Hofmann, is considered as his greatest popular work (Richard Schultes and Albert Hofmann, 1979).

It is evident that the Indian people have tremendous passion for medicinal plants and they use them for wide range of health related applications. Drugs obtained from these plants are believed to be much safer and exhibit a remarkable efficacy in the treatment of various diseases (Ajit Sharma et al., 2013). The World Health Organization has estimated that 80% of the populations of developing countries being unable to afford pharmaceutical drugs rely on the plant based traditional medicines to sustain their primary health care needs (Balakrishnan et al., 2009). A great deal of information about the traditional uses of plants is still intact with rural and tribal peoples. But the native healers are often reluctant to accurately share their knowledge to outsiders (Sood et al., 2001). The traditional knowledge of the indigenous people not only comprises the information about the food value of the plants, but also their specific medicinal uses (Leonti et al., 2003). At present medicinal plants are highly threatened due to over exploitation, unsustainable harvesting for trade, habitat destruction, human encroachment and application of inappropriate technologies. In view of this, an attempt has been made to collect ethno botanical information on medicinal plants used in the Harapanahalli taluk of Karnataka. Documenting the traditional knowledge is important for the conservation of edible medicinal plants as well as their sustainable utilization.

Traditional medicine

Now, the medicinal plants are extensively utilized throughout the world in two distinct areas of health management. They are traditional system of medicine and modern system

of medicine. The traditional system of medicine mainly functions through two distinct streams (1) Local or folk or tribal stream and, (2) Codified and organized Indian system of medicines like Ayurveda, Siddha and Unanni. During the last few decades, use of traditional medicine has expanded globally and has gained popularity. It has not only continued to be used for primary health care of the poor in developing countries, but has also been used in countries where conventional medicine is predominant in the national health care system. According to WHO, traditional medicine is defined as “the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses”. Practices of traditional medicine vary greatly from country to country, and from region to region, as they are influenced by factors such as culture, history, personal attitudes and philosophy. The traditional herbal medicines are relatively safer and cheaper than synthetic or modern medicine (Akinnibosun *et al.*, 2009).

REVIEW OF LITERATURE

Ethno botanical studies on traditional medicinal plants have been conducted by various researchers in different parts of our country. During the 1980's Ministry of Environment and Forests, Government of India also launched an all India coordinated project to document ethno botanical uses of plants by indigenous people in India which was participated by many research institutions and universities of the country. From the study, the department recorded 200 plant species from Arunachal Pradesh used for treatment of 44 different diseases (Hynniewta, 1984), 286 plant species from Assam for treatment of 40 different diseases, 526 plant species from Nagaland for treatment of 83 different diseases and 194 plant species from Tripura for treatment of 50 diseases and ailments (Hynniewta, 1987). Jain and Sumitra Srivastava (2001) gave graphic review of Indian ethno botanical literature of about 1250 publications during 1982 to 2000. According to the All India coordinated project on Ethno biology about 7500 wild plant species are used for medicinal purpose by the tribal communities and 950 are found to be new claims and are worthy of scientific scrutiny (Pullaiah, 2002). Dubey and Gayetri (2001) have conducted ethnobotanical study on Gond tribe of Madhya Pradesh. Similar works have been done by Chaudhary and Hutke (2002) on Melghat tribes of Maharashtra and Singh (2003) on Santhal parghanas tribe of Jharkhand. Dam *et al.* (2000) have studied

the ethnobotany of Thar Desert in North Western India. Jain *et al.* (2003) have conducted ethno-medico-botanical survey of Raipur district in Chhattisgarh. Ayyanar and Ignacimuthu (2005) have studied the medicinal plants used for treating snake bite and skin diseases in Tamil Nadu. Rajan *et al.* (2001) have described the folk practices of Paniyas in Nilgiri district of Tamilnadu. Shukla *et al.* (2001) have worked on herbal folk medicine of Chhuri Hills, Bilaspur district in Madhya Pradesh. Bhagwati and Vandana (2005) have recorded a total of 113 medicinal plant species used for various ailments by rural women of Garhwal Himalaya in Uttaranchal. Praveen Kumar Sharma *et al.* (2005) have documented about 35 medicinal plant species used by the Malani ethnic community of Kullu district in Himachal Pradesh. Ashalata Devi *et al.* (2005) have made ethnobotanical study of Manipur state. Sanjay Kr Uniyal *et al.* (2006) have documented medicinal plants used by the tribal communities of Chhota Bhangal in Western Himalaya.

Subramanyam Ragupathy *et al.* (2008) have studied traditional aboriginal knowledge of medicinal plants in the Velliangiri holy hills of Tamil Nadu. Venkataswamy *et al.* (2010) have made ethnobotanical study of medicinal plants used by Malasar tribals in Coimbatore district of Tamil Nadu. Dash *et al.* (2008) have worked on medicinally useful orchids of Niyamgiri Hill ranges in Orissa. Rakhi Gupta *et al.* (2010) have surveyed ethnomedicinal plants used by Gond tribe of Bhandara district in Maharashtra. Sahu *et al.* (2011) have studied medicinal plants of the coastal districts of Orissa. Vijay Wagh *et al.* (2011) have documented ethnomedicinal plants used for curing dysentery and diarrhea by tribals of Jhabua district in Madhya Pradesh. Anima Panda and Malaya Misra (2011) have conducted ethnobotanical survey of medicinal plants used by local herbal healers in South Orissa. Koushalya Nandan Singh (2012) has made a detailed study on ethnobotanical uses of plant biodiversity from the Indian western Himalaya. Elavarasi and Saravanan (2012) have documented the medicinal plants used in the treatment of diabetes by tribal people of Kolli Hills in Namakkal district of Tamil Nadu. Khan *et al.* (2012) have made ethnobotanical study of Poonch valley in Aazad Kashmir. Sathiyaraj *et al.* (2012) have documented antifertility medicinal plants used by the local people of Vellore district in Tamil Nadu. Prayaga Murty Pragada *et al.* (2012) have documented ethnomedicinal plants used in the treatment of dysentery in North Coastal Andhra Pradesh. Jitin Rahul (2013) has made ethnobotanical survey of medicinal plants used in Bundelkhand region of Uttar Pradesh. Kumar Rajesh *et al.* (2013) have made ethnobotanical study of Dudhwa National Park in Uttar Pradesh. Rajeswar Pegu *et al.* (2013) have conducted ethnobotanical study of

wild edible plants in Poba reserved forest of Assam. Bilal Ahmad Baig *et al.* (2013) have worked on distribution pattern and current conservation status of threatened medicinal plants of Menwarsar Pahalgam in Kashmir Himalayas. Rana *et al.* (2013) have documented the ethnobotanical knowledge of Nanda Devi Biosphere reserve in Uttarakhand.

In Karnataka, a very few people have contributed to the field of ethnobotanical research in the earlier period. But now, a considerable amount of good progress has been made in many districts of the state. Rao (1977) has recorded the plants of folklore medicine in Mysore district. Pushpalata (1990) has studied folk medicine from rural area of Bangalore district. Ethnobotanical works were carried out in various districts of Karnataka state such as, South Kanara (Iyengar *et al.*, 1986), Tumkur (Yoganarsihman *et al.*, 1982), Chikmagalur (Gopakumar *et al.*, 1991), Kodagu (Kalyanasundaram Indira, 1995) and Uttar Kannada (Harsha *et al.*, 2003). Similar works have also been carried out in Shimoga (Parinitha *et al.*, 2004; Rajkumar and Shivanna, 2010), Bidar (Prashantkumar and Vidyasagar, 2008), Chitradurga (Hiremath and Taranath, 2010) and Gulbarga district (Ghatapanadi *et al.*, 2011).

Ethnobotanical studies of Soligas tribe have been made by Hosagoudar and Henry (1996). Bhandari *et al.* (1995) have conducted ethnobotanical study on Siddis of Uttar Kannada district. Harsha *et al.* (2002) have reported 45 plant species used by the Kunabi tribe of Uttar kannada. Harish Kumara *et al.* (2009) have made a case study on traditional knowledge system (medicine) in Arakalgud taluk of Hassan district and recorded 82 plant species belonging to 44 families. Nagabhushan Harihar and Kotresha (2010) have worked on wild medicinal plants of Kappat Hills in Gadag district and documented 43 species belonging to 39 genera and 31 families. Prakasha *et al.* (2010) have documented the indigenous medicinal plants used by the people of NR Pura taluk in Chikmagalur district. Guruprasad (2011) has conducted survey of ethnomedicinal plants from Chamundi hills of Mysore. Shivakumar and Vidyasagar (2013) have documented ethnomedicinal plants used in the treatment of skin diseases in Hyderabad-Karnataka region. Recently, Yogesh Kumar *et al.* (2014) have reported the ethnomedicinal plants used by the traditional herbal healers of Tarikere taluk in Chikmagalur district.

STUDY AREA

Harapanahalli, one of the taluks in Davanagere district of Karnataka state is located at 14.8° North latitude and 75.98° East longitude (Fig. 1). It has an average elevation of 633 meters above the sea level. The population in Harapanahalli taluk is 3, 02,003 as per the survey of census during 2011 by Indian Government. There are 1, 54,289 males (51%) and 1, 47,714 females (49%) in the taluk. The total geographical area of the study area is 143024 ha. Major part of the taluk lies in Krishna basin and is drained by Tungabhadra River. The taluk enjoys dryness in the major part of the year and hot summer. In general south west monsoon contributes 58% of total rain fall and north east monsoon contributes 22% of rain fall. The remaining 20% rain fall is received as sporadic rains in summer months. Normal annual average rainfall is 656 mm. Major part of taluk is covered by Red sandy loam soil and followed by black soil. Major crops cultivated in this region are Maize, Jowar, Ragi, Sunflower, Groundnut and Cotton. People of the study area exhibit a vast diversity in their culture, tradition and living system.



MATERIALS AND METHODS

The information on traditional medicinal plants used for treating various human ailments was obtained during the field survey of the study area. The surveys were conducted during November 2013 to August 2015 using ethno-botanical and Participatory Rural Appraisal (PRA) methods. For this purpose, frequent field trips were made to 16 villages of different pockets of the taluk. A total of 32 herbal healers (26 men and 06 women) of age group between 42 and 84 years belonging to various communities such as

Swamiji, Pandit, Kuruba and tribes like Valmiki, Korava and Lambani were interviewed and recorded the information in a questionnaire developed by Ethnobotanical Society of India. Data on the local names of medicinal plants, habit, parts used, medicinal uses, method of drug preparation, dosage and food value if any, were noted. The ethnic as well as the cultural importance of the drug plants were also recorded. The botanical specimens of all reported medicinal plants were photographed, collected and identified by referring to various Flora. Voucher specimens were made by using standard plant press, authenticated and deposited at the Herbarium centre maintained in the department of Botany, A D B First grade college, Harapanahalli, Davanagere district, Karnataka.

RESULTS

The data obtained from the survey is compiled in Table-1, where the plant species are arranged in alphabetical order. A total of 92 species belonging to 82 genera and 45 families have been reported for the treatment of human diseases. For each species scientific name, family, local name, habit, parts used, mode of drug preparation and dosage are provided. Among the 45 families recorded, the dominant families were Euphobiaceae, Fabaceae, Liliaceae with five species each; Amaranthaceae and Rutaceae with 4 species each. Rest of the each family is represented by 3 or 2 or one species. Forty-eight species (52.17 %) herbs, 22 species (23.91%) trees, 10 species (10.86%) shrubs and 12 species (13.04%) were climbers. Different parts of the plants were used in the treatment of diseases. Leaves were the most used (39.13%) part, followed by stem (15.21%), roots (13.04%), fruits (13.04%), seeds (10.86%), whole plant (4.34%) and flowers (4.34%) in decreasing order. The herbal preparations were in the form of juice, decoction, powder, curry and paste. The mode of administration of drug includes both oral and external application based on the nature of disease and the method of treatment.

Table1: List of medicinal plants used in the treatment of human ailments in Harapanahalli taluk of Davanagere district, Karnataka.

Sl. No.	Name of the Plant Species	Family	Local name	Medicinal uses
1	<i>Abelmoschus esculentus</i> (L.) Moench	Malvaceae	Bendae gida	Fresh fruits paste mixed with sugar is given orally 3 times a day for 3 to 4 days to treat white discharge in women.
2	<i>Abrus precatorius</i> L.	Fabaceae	Biligulaganji	Few leaves ground with little salt to get paste and given with water twice a day for 2 days to

				cure stomach pain.
3	<i>Abutilon indicum</i> (L.) sweet.	Malvaceae	Thurubigida	Twenty ml of leaf decoction is given twice a day for 3 days for treating stomach pain.
4	<i>Acacia arabica</i> (Lam.) Willd.	Mimosaceae	Kari jali	Two teaspoonful of stem bark decoction is given twice a day for 2 weeks to reduce sugar level in blood.
5	<i>Acacia farnesiana</i> (L.) Willd.	Mimosaceae	Kasturijali	Few leaves ground with cold water and filtered. The filtrate is mixed with little sugar and given thrice a day for 1 or 2 weeks in case of Leucorrhoea.
6	<i>Acalypha indica</i> L.	Euphorbiaceae	Kuppigida	Twenty ml of whole plant extract is given twice a day for one week to treat asthma.
7	<i>Achyranthes aspera</i> L.	Amaranthaceae	Uttarani	Twenty ml of leaf juice is given with buttermilk twice a day for three days to cure dysentery.
8	<i>Adhatoda zeylanica</i> Medic.	Acanthaceae	Aadusogae	Ten ml leaf extraction with jaggery or honey is given twice a day for 3-5 days to treat asthma and bronchitis.
9	<i>Aegle marmelos</i> (L.) Corr.	Rutaceae	Bilvapatre	Few fresh leaves are eaten daily morning half an hour before breakfast for 3 months to control diabetes.
10	<i>Allium cepa</i> L.	Liliaceae	Nirulli	Small pieces of onion kept in honey overnight are given orally in the morning for 21 days to cure asthma. Inhalation of fresh bulb vapor relieves breathing problems.
11	<i>Allium sativum</i> L.	Liliaceae	Belulli	Garlic paste is used for jaundice. Two to three cloves are eaten with little salt at night for 3 days to cure cough.
12	<i>Aloe vera</i> (L.) N Burm.	Liliaceae	Lolesara	About 10 gm fresh leaf gel taken daily morning orally for 40 days to cure piles.
13	<i>Amaranthus tricolor</i> L.	Amaranthaceae	Rajgiri soppu	About 50 ml of leaf juice is given twice a day for 4 to 5 days in case of jaundice. Leaf curry is eaten for treating constipation
14	<i>Amaranthus blitum</i> L.	Amaranthaceae	Kirukasalesoppu	Leaf juice or curry is given for dissolving kidney stones. It is also used for treating constipation.
15	<i>Andrographis paniculata</i> (Burm.f.) Wall.	Acanthaceae	Nelabevu	About 20ml of leaf juice is given daily morning in empty stomach for 41 days.
16	<i>Anethum sowa</i> Roxb.	Apiaceae	Sabbakshi	Eating the plant raw or in the

				form of curry prevents and controls the cancer. Fruits are used to remove worms in the stomach and also to cure fever.
17	<i>Annona squamosa</i> L.	Annonaceae	Sitaphal	About 15 ml of stem bark decoction is given twice a day for 2 to 3 days to cure dysentery. Leaf extract is given to reduce stomach pain.
18	<i>Argemone mexicana</i> L.	Papaveraceae	Datturi	One or two gm of root bark is given with betel leaves twice a day for three days to cure malarial fever.
19	<i>Argyreia elliptica</i> (Roth) Choisy.	Convolvulaceae	Uganiballi	Latex paste is applied over chronic wounds for cure.
20	<i>Aristolochia bracteolata</i> Lam.	Aristolochiaceae	Kattigarike	Few leaves are crushed to get paste which is mixed with butter and applied on piles for cure. Leaf juice is dropped in ear for pain relief.
21	<i>Aristolochia indica</i> L.	Aristolochiaceae	Eshwariballi	Root paste of this plant is given orally with carum (ajwan) within an hour in case of snake bite for cure.
22	<i>Asparagus racemosus</i> Willd.	Liliaceae	<i>Shatavari</i>	Hundred gm of roots are boiled in 400 ml of water till it is reduced to 100 ml. It is then cooled and filtered. The filtrate is given with goat milk twice a day for 10-14 days for treating all types of menstrual problems.
23	<i>Azadirachta indica</i> A. Juss.	Meliaceae	<i>Bevu</i>	Five to ten ml of leaf juice is given twice a day for three days to cure jaundice.
24	<i>Balanites roxburghii</i> Planch	Balanitaceae	Ingalara	About 5 gm Fruit pulp powder is given with little salt twice a day for three to five days to cure fever.
25	<i>Basella alba</i> L.	Basellaceae	Basalaesoppu	Leaf juice is given for treating fever and dysentery
26	<i>Boerhaavia diffusa</i> L.	Nyctaginaceae	Sanadika	About 5 gm of whole plant powder is given with buttermilk twice a day for 5 days to cure jaundice.
27	<i>Cajanuscajan</i> (L.) Mills.	Fabaceae	Togarigida	Few leaves are ground with water and given twice a day for 3 to 4 days to treat constipation and piles. The decoction of the seed is given for destroying worms in the stomach.
28	<i>Canthium parviflorum</i> Lam.	Rubiaceae	Karaegida	The leaf extract or fruit juice is taken with butter milk twice a

				day for 3 days in case of stomach pain, constipation and fever.
29	<i>Capparis zeylanica</i> L.	Capparaceae	Tottilaballi	Ten to fifteen fresh leaves are ground with little garlic and black pepper and made into small pills of 2 gm each. One pill is taken twice a day for a week in case of cough and asthma.
30	<i>Carica papaya</i> L.	Caricaceae	Parangi gida	Few leaves pounded with pepper and garlic to make into pills of pea size. Two pills per day are given with milk for 4 to 5 days in case of jaundice.
31	<i>Carissa carandas</i> L.	Apocynaceae	Kavala gida	Few fruits are ground with cumin seeds to make a paste which is given orally with butter milk daily twice for a week to cure constipation and piles.
32	<i>Cassia auriculata</i> L.	Caesalpiniaceae	Honnarika	Flower buds are shade dried and powdered. About 10 gm of this powder is given with honey twice a day for one month for diabetes.
33	<i>Cassia italica</i> (Mill.) Lam.	Caesalpiniaceae	Nelaavare	One spoonful leaf powder is taken with warm water daily night before going to bed for constipation and piles until cured.
34	<i>Celosia argentea</i> L.	Amaranthaceae	Kolanisoppu	Leaf juice is given to cure stomach ulcers while its decoction is gargled for mouth ulcers.
35	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Vondelaga	Few leaves are eaten daily morning for 21 days to cure mental disorders and to improve memory power. About 10 ml of leaf juice is given twice a day for a week to treat jaundice.
36	<i>Cinnamomum zeylanicum</i> Bl.	Lauraceae	Dalchinni chekke	About 5 g of stem bark powder is taken with water daily once for diabetes. It is also given with honey for stomach pain.
37	<i>Cissus quadrangularis</i> L.	Vitaceae	Mangroli	Stem paste is applied on the spot of bone fracture for reunion. Leaf juice is given orally for digestive problems.
38	<i>Citrus medica</i> L.	Rutaceae	Nimbaegida	Tender leaves ground with coconut oil is applied for muscular and joint pains.

				Lemon juice in hot water is given thrice a day for 3 days to treat dysentery.
39	<i>Coccinia grandis</i> (L.) Voigt	Cucurbitaceae	Thondae balli	Ripened fruits are crushed with buttermilk and taken orally for 3 to 4 days in case of dysentery. Leaf extract is poured in ear for throat infection.
40	<i>Cocculus hirsutus</i> (L.) Diels	Menispermaceae	Dagadi balli	Half a teaspoon of root powder is taken with water twice a day for diabetes. Leaf decoction is given for constipation, piles and for treating kidney stones.
41	<i>Cocos nucifera</i> L.	Arecaceae	Tenginamara	About 100 ml of root decoction is given 3 to 4 times a day with sufficient drinking water for dissolving kidney stones.
42	<i>Coleus amboinicus</i> Lour.	Lamiaceae	Doddapatre	Few leaves are eaten daily twice for 3 to 4 days to cure cough and asthma. Leaf decoction is given orally for treating urinary disorders
43	<i>Coriandrum sativum</i> L.	Apiaceae	Kottumbari	About 50 ml of leaf or seed decoction is given orally thrice a day for 3-4 days to treat irregular menstruation in women. Fifty ml plant extract is given orally twice in a week for 3 weeks to treat asthma.
44	<i>Curcuma longa</i> L.	Zingiberaceae	Arishina	One spoonful of turmeric powder and little pepper is given with honey or milk at night for 3-5 days to cure cough and cold. Plant rhizome paste is applied over palm and feet followed by warming it with a hot iron plate daily once for three alternative days in a week to cure jaundice.
45	<i>Cynodon dactylon</i> (L.) pers.	Poaceae	Kariki	Thirty ml root extract is given with little sugar and cardamom for dysentery until cured.
46	<i>Dichrostachys cinerea</i> (L.) Wt. &Arn.	Mimosaceae	Vadavinagida	Fresh leaves of this plant and leaves of <i>Tribulus terrestris</i> , 5 gm each are crushed together and given with tender coconut water for 3 days to treat painful menstruation.
47	<i>Dolichos biflorus</i> . L.	Fabaceae	Hurali	About 50 g of seeds boiled in 200 ml of water, crushed and then filtered. The filtrate is taken with goat milk twice a day

				for 2 weeks to dissolve the stones of urinary tract.
48	<i>Elettaria cadamomum</i> Maton	Zingiberaceae	Elakki	Whole fruit is taken with ripen banana daily night for constipation and piles. Seeds are eaten with sugar candy and honey for treating jaundice.
49	<i>Erythrina indica</i> Lam.	Fabaceae	Alwana	Bark paste is applied over the affected area for treating skin diseases.
50	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Halukudisoppu	Whole plant is ground with little salt and taken with goat milk twice a day for a week to treat respiratory problems.
51	<i>Feronia elephantum</i> Corr.	Rutaceae	<i>Bealavala</i>	Stem bark paste is applied over piles for cure.
52	<i>Ficus recemosa</i> L.	Moraceae	<i>Attimara</i>	Half a teaspoon of unripe dried fruits powder is given twice a day for two months to treat diabetes.
53	<i>Ficus religiosa</i> L.	Moraceae	<i>Aralimara</i>	Five gm dried fruits powder is given thrice a day for 3-4 weeks in case of irregular menstruation.
54	<i>Gloriosa superba</i> L.	Liliaceae	Gouriballi	Plant tuber paste is applied over the infected part for treating skin diseases.
55	<i>Gynandropsis pentaphylla</i> DC	Capparaceae	GollaJiddu	Leaf paste is applied over the cuts and wounds for cure.
56	<i>Hibiscus cannabinus</i> L.	Malvaceae	Pundisoppu	About 15 to 20 ml of leaf decoction with little cumin is given twice a day for 3 to 4 days in case of fever and urinary problems.
57	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	<i>Dasavala</i>	Few dried flowers powder is mixed with little sugar and ghee to make a paste. This paste is given orally for 2-3 days in case of Leucorrhoea.
58	<i>Leptadenia reticulata</i> (Retz.)Wt&Arn.	Asclepiadaceae	Aaleballi	Tender twigs latex is inhaled daily two or three times to get relief from cold and cough.
59	<i>Leucas aspera</i> (willd.) spreng	Lamiaceae	<i>Thumbe</i>	Ten ml of leaf extract with little rock salt is given twice a day for stomach pain until cured.
60	<i>Mangifera indica</i> L.	Anacardiaceae	Mavinamara	Decoction of the bark is given with 50ml of water and 10ml of honey twice a day for 1 to 2 weeks to treat all types of menstrual disorders. Two to three dried seeds of this plant are pounded with same number

				of seeds of <i>Syzygiumcumini</i> to get a powder. This powder is given thrice a day for 21 days to treat diabetes.
61	<i>Mentha spicata</i> L.	Lamiaceae	Pudina	Leaf juice with ginger powder is given with honey daily 3 times to cure chronic cough. The leaves are also used for treating cancer
62	<i>Momordica charantia</i> L.	Cucurbitaceae	HagalaKayi	Twenty to thirty ml of fruit juice is given daily morning in empty stomach for 3 months in case of diabetes mellitus.
63	<i>Mucuna pruriens</i> (L.) DC.	Fabaceae	Nasugunni	Few soaked seeds are eaten daily morning for 21 days to treat all types of digestive disorders.
64	<i>Murraya koenigii</i> (L.) Spreng.	Rutaceae	Karibevu	Few leaves are eaten daily night before going to bed for diabetes. About 100 ml of decoction prepared by boiling of leaves with cumin, jaggery and ginger is given orally thrice a day for cold and cough
65	<i>Ocimum americanum</i> L.	Lamiaceae	Nayithulasi	Fifty ml leaf decoction is given twice a day for 3 days to treat whooping cough.
66	<i>Ocimum sanctum</i> L.	Lamiaceae	Thulasi	About 4 spoonful of leaf juice is given daily for jaundice until cured. Leaf juice mixed with little lemon and onion juice is used for skin diseases
67	<i>Opuntia dellenii</i> (Ker-Gawl.) Haw.	Cactaceae	Papasukalli	Ripened fruits juice is boiled with little sugar, cooled and stored in a bottle. Two spoonful of this juice is given orally twice a day for 21 days to cure piles.
68	<i>Oxalis corniculata</i>	Oxalidaceae	Pullampurachi	Leaf juice is given orally for treating fever, dysentery and urinary tract problems.
69	<i>Pergularia daemia</i> (Forsk.) Chiov.	Asclepiadaceae	kuntiginaballi	Leaves ground with garlic and little salt are made into small of 2 gm each. Two pills are given twice a day for 3 days to treat asthma.
70	<i>Phoenix dactylifera</i> L.	Arecaceae	Uttutti	About 8 to 10 seeds are powdered and boiled in 4 cups of water till it reduced to half cup and given orally for dysentery.
71	<i>Phyllanthus acidus</i> (L.)	Euphorbiaceae	Nelligida	Fruit powder and the seed

	skeels.			powder of <i>Syzygium cumini</i> are mixed together and one spoonful of this mixture is taken twice a day for diabetes.
72	<i>Phyllanthus amarus</i> Schum. & Thonn	Euphorbiaceae	Nelanelli	A handful of fresh twigs or 5 g of plant powder is taken daily morning in case of diabetes. About 5 g of shade dried plant powder is given with butter milk twice a day for 4 to 5 days to treat jaundice
73	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	BettadaNelli	Fruit juice is given orally for jaundice. Dry fruits after removing seeds are ground with equal amount of turmeric powder. One spoonful of this mixture is given twice a day for diabetes.
74	<i>Portulaca oleracea</i> L.	Portulacaceae	Goli soppu	Leaf juice is given orally for stomach pain and dysentery. Leaf paste is applied for insect bites and skin diseases.
75	<i>Psidium guajava</i> L.	Myrtaceae	Perala gida	Few leaves are ground and taken with buttermilk orally twice a day for a week to cure piles. Fresh fruits are eaten with lemon juice for treating constipation.
76	<i>Punica granatum</i> L.	Punicaceae	Dalimbae	Three to four young twigs are eaten with little salt twice a day for one week to cure chronic stomach pain and dysentery.
77	<i>Raphanus sativus</i> L.	Brassicaceae	Radish	Two to three g of seed powder is given with a cup of butter milk for a week to treat constipation and piles.
78	<i>Ricinus communis</i> L.	Euphorbiaceae	Oudala	About ten ml leaf juice is given orally once a day for three days to cure jaundice.
79	<i>Saccharum officinarum</i> L.	Poaceae	Kabbu	A cup of sugar cane juice is given twice a day for three days to cure jaundice.
80	<i>Sesamum orientale</i> L.	Pedaliaceae	Yellugida	About 50g of seeds are ground with jaggery, boiled and filtered. The filtrate is given orally for 4 to 5 days in case of irregular menstruation.
81	<i>Solanum nigrum</i> L.	Solanaceae	Kaki hannu	Few vegetative buds and flowers are ground with cumin and boiled in butter milk. It is then cooled and given daily morning before breakfast for

				two months in case of anemia.
82	<i>Syzizium cumini</i> (L.) Skeels	Myrtaceae	Neralemara	One spoonful of seed powder is taken with little ginger powder and honey twice a day for in case of diabetes. Few young leaves are ground and given with water daily morning for a week to cure menstrual problems.
83	<i>Tamarindu sindica</i> L.	Caesalpiniaceae	Hunasegara	About 15 to 20 ml of root decoction is given twice a day for 3 to 4 days in case of stomach pain and ulcers. Leaf paste is applied for various types of skin diseases.
84	<i>Terminalia chebula</i> Retz.	Combretaceae	Alalemara	About ten gm of fruit powder is taken with hot water daily 2 times for dysentery until cured.
85	<i>Tinospora cordifolia</i> (willd) Miers	Menispermaceae	Amrutaballi	About ten ml of leaf juice is given twice a day for five days to treat jaundice.
86	<i>Tribulus terrestris</i>	Zygophyllaceae	Negginamullu	About 2 gm of dry fruit powder is given with a cup of warm water twice a day for 41 days to destroy kidney stones.
87	<i>Tridax procumbens</i> L	Asteraceae	Tekesoppu	Leaf extract is applied over cuts and wounds for cure.
88	<i>Trigonella foenum-graecum</i> L.	Fabaceae	Menthiasoppu	Few seeds are soaked in 50 ml of water for overnight. In the morning, the water after removing seeds is given orally for diabetes mellitus.
89	<i>Tylophora indica</i> (Burm.f.) Merr.	Asclepiadaceae	Aadumuttadaballi	Five to ten ml of plant root extract is given twice a day for 5 days to treat asthma.
90	<i>Zalea decandra</i> (L.)N.Burm.	Aizoaceae	Biliganajili	Roots are powdered and boiled in 500 ml water till it reduces to 250 ml. It is filtered and made into two equal parts and taken twice a day in case of cough and cold for 3-5 days.
91	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Shunti	Two to five g of ginger powder is taken with hot water daily twice for indigestion until cured. Ginger juice with honey is given for treating cough and cold.
92	<i>Ziziphus maritiana</i> Lam.	Rhamnaceae	Bare gida,	Half a teaspoon of seed powder is taken with little honey for diabetes. The fruit juice is given for constipation.

DISCUSSION

The plant species reported in the present study were cross checked with the available literature. Some of these plant species were already identified for the same purpose but the parts used, method of drug preparation and dosage were different. Application of stem paste of *Cissus quadrangularis* L. for the reunion of fractured bones is practiced in Coimbatore district of Tamil Nadu (Venkataswamy *et al.*, 2010). Use of *Punica granatum* L. for the treatment of stomach pain and dysentery is reported from the East Godavari district of Andhra Pradesh (Rudrapal *et al.*, 2012). The medicinal plants cited in the present research project have different kinds of curative properties in other regions as well. For example *Psidium guajava* L. is used for treating diarrhea and dysentery in Arunachal Pradesh (Baruah *et al.*, 2013). *Allium cepa* L. is used for treating ulcers and *Canthium parviflorum* Lam. is used for treating dog bite and cat bite in Gadag district of Karnataka (Harihar and Kotresha, 2012). *Centella asiatica* (L.) Urban is used for treating fever and diarrhea in Chamarajnar district of Karnataka (Gireesha and Raju, 2013). *Allium sativum* L. is used for treating oral candidiasis in Hyderabad Karnataka region (Rekha Sharanappa and Vidyasagar, 2014). *Capparis zeylanica* L. is used for treating diabetes in Medak district of Andhra Pradesh (Reddy *et al.*, 2010) and for treating dysentery in Chhatisgarh (Jain *et al.*, 2008). *Momordica charantia* L. in North Maharashtra (Badgajar and Patil, 2008) and *Ziziphus mauritiana* Lam. in Pakistan (GulJan *et al.*, 2009) are used for treating jaundice.

Abrus precatorius L. and *Aloe vera* (L) N. Burm. are used to treat indigestion in Tamil Nadu (Revathi and Parimelazagan, 2010) and for respiratory disorders in Cameroon (Focho *et al.*, 2009). *Zingiber officinale* Rosce and *Aegle marmelos* (L) corr. are used for gastrointestinal disorders in Arunachal Pradesh (Kagyung *et al.*, 2010). *Abutilon indicum* (L.) Sweet. for skin diseases, *Cynodon dactylon* (L) Pers. as diuretic and *Ficus religiosa* L. is used as cordiotonic in Tamil Nadu (Venkataswamy *et al.*, 2010). *Terminalia chebula* Retz. is used for treating respiratory disorders in Andhra Pradesh (Reddy *et al.*, 2006). *Aloe vera* (L.)N Burm., *Hibiscus rosa-sinensis* L.(Retz.) R. Br. and *Azadirachta indica* A. Juss. in north Karnataka (Bankar *et al.*, 2007); *Andrographis paniculata* (Burm f.) Wall.in Tamil Nadu (ChellaiahMuthu *et al.*, 2006) and *Syzygium cuminii* Skeels. in Pakistan (Mushtaq Ahmad *et al.*, 2009) are used for the treatment of diabetes. Stem of *Tinospora cordifolia* Miers. for treating Malaria and bark of *Ficus racemosa* L. is used for treating

menstrual disorders in Shimoga district of Karnataka state (Rajkumar and Shivanna, 2010). Leaves of *Aegle marmelos* (L.) Corr. and *Tylophora indica* (Burm f.) Merr. are used for treating asthma in Andhra Pradesh (Reddy *et al.*, 2006). Similarly some of the other reported plants are used for treating various diseases in different parts of the world.

All these reported medicinal plants were collected from the wild or cultivated fields and only a few of them such as, seeds of *Mucuna pruriens*, roots of *Withania somnifera*, fruits of *Terminalia chebula*, *Elettaria cadamomum* Maton, *Phoenix dactylifera* L. and barks of *Cinnamomum zeylanicum* Bl., were purchased from the market and used in the preparation of drugs. The dominant wild species were; *Cassia auriculata*, *Acalypha indica*, *Tribulus terrestris*, *Achyranthes aspera*, followed by *Coccinia grandis*, *Pergularia daemia* and *Argemone Mexicana*. On the other hand, dominant cultivated species were; *Momordica charantia*, *Phyllanthus emblica*, *Tamarindus indica*, *Punica granatum*, *Saccharum officinarum*, *Amaranthus tricolor* followed by *Annona squamosa*, *Carica papaya*, and *Ricinus communis*. Medicinal plants used in the Harapanahalli taluk were found in both plains (e.g. *Phyllanthus amarus*, *Centella asiatica*) and hills (e.g. *Carissa carandas*, *Terminalia chebula* and *Dichrostachys cineria*). However, the rare and endangered plants reported by the traditional healers were; *Leptadenia reticulata*, *Mucuna pruriens*, *Andrographis paniculata*, *Canthium parviflorum* Lam., *Cissus quadrangularis* L. and *Gloriosa superba* L.

It is found that ethno medicinal knowledge is becoming restricted only to the elders; traditional practitioners and local farmers, while young people are totally ignorant of this wealth. Advancement in science and technology has changed the social values and therefore, younger generation are transforming at a much faster rate into the new tradition. Medicinal plants knowledge is going to be obsolete because of the interference of modern cultural changes. This situation appears to occur in many parts of the country and world. It is therefore very important to document the native flora along with their ethno medicinal recipes before extinction of the indigenous knowledge.

CONCLUSION

In the present minor research project, 92 medicinal plant species used for the treatment of various diseases of human beings such as stomach pain, constipation, piles, dysentery, jaundice, diabetes, fever, asthma, menstrual disorders, snake bite, skin diseases etc., were reported and documented. The reported plant species include both wild and cultivated ones. Majority of them were herbs, some of them trees and shrubs and few were climbers.

The effective and significant plants prescribed by the most of the traditional medicinal practitioners were *Acalypha indica* L., *Achyranthes aspera* L., *Aegle marmelos* (L.) Corr., *Argyreia elliptica* (Roth) Choisy., *Cynodon dactylon* (L.)Pers., *Punica granatum* L., *Capparis zeylanica* L., *Coccinia grandis* (L.) Voigt., *Ocimum americanum* L., *Tylophora indica* Merr., *Leucas aspera* (willd.) spreng, *Phyllanthus amarus*, *Momordica charantia* L. *Ricinus communis* L., *Tridax procumbens* L. and *Zalea decandra* N. Burm.

The rural people of Harapanahalli taluk are highly dependent on the traditional herbal medicine because of their poor socio-economic conditions and availability of effective drug plants. The data collected is expected to serve as a useful tool for the establishment of herbal drug industries and improve the economy of the region. It also provides some valuable information to phytochemists and pharmacologists in screening of individual plant species and assessing active substances against human diseases.

SUMMARY

- Harapanahalli is one of the important taluks in Davnagere district of Karnataka state possessing a rich heritage of medicinal plants.
- People of this area exhibit a vast diversity in their culture, tradition and living system. Majority of them depend on local traditional herbal medicine to cure their various ailments.
- During the research project, a total of 32 traditional herbal healers (26 men and 06 women) of age group between 42 and 84 years were identified from the different villages of the taluk.
- Frequent field trips were undertaken to collect the information on traditional medicinal plants from these herbal healers during different seasons of the years from November 2013 to August 2015.
- Based on the traditional information, a total of 92 plant species were identified and collected from different places of the taluk.
- The detailed information on local name, part of the plant used, dosage, mode of preparation, side effects if any, etc., was gathered and compared with the literature.
- All the plant species were brought to the laboratory and authenticated with the help of floras. The herbaria were prepared and deposited in the department of Botany.
- The photographs of the traditional healers and medicinal plants along with part used were taken and documented.
- The collected information may serve as a good source for further research work in the field of pharmaceutical science.
- Awareness on the importance and conservation of traditional medicinal plants was created among the local people of the taluk.

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Adathoda zeylanica Medic



Achyranthes aspera L



Zaleya decandra (L.) N. Burm



Andrographis paniculata Nees



Amaranthus tricolor L.



Centella asiatica (L.) Urban



Coriandrum sativum L.



Aristolochia indica L.



Aristolochia bracteolata Lam



Tridax procumbens L



Pergularia daemia (Forsk.) Chiov



Tylophora indica (N. Burm) Merr



Cassia auriculata L.



Tamarindus indica L.



Canthium Parviflorum Lam.



Gynandropsis pentaphylla DC.



Capparis zeylanica L.



Carica Papaya L.



Coccinia grandis (L.) Voigt



Argyreia elliptica (Roth) Choisy



Momordica charantia L.



Acalypha indica L.



Phyllanthus acidus (L.) skeels.



Leucas aspera (Willd.) Link



Phyllanthus amarus Schumach & Thonn



Phyllanthus emblica L



Abrus precatorius L.



Abutilon indicum (L.) Sweet.



Ricinus communis L.



Ficus racemosa L.



Ocimum americanum L.



Ocimum sanctum L.



Asparagus racemosus Willd.



Aloe vera (L.) N. Burm



Hibiscus rosa-sinensis L.



Allium cepa L.



Hibiscus cannabinus L.



Balanites roxburghii Planch.



Azadirachta indica A. Juss



Acacia arabica (Lam.) Willd.



Tinospora cordifolia (Willd.) J. Hook. & Thoms



Cocculus hirsutus (L.) Diels



Dichrostachys cinerea (L.) Wt & Arn.



Citrus medica L.



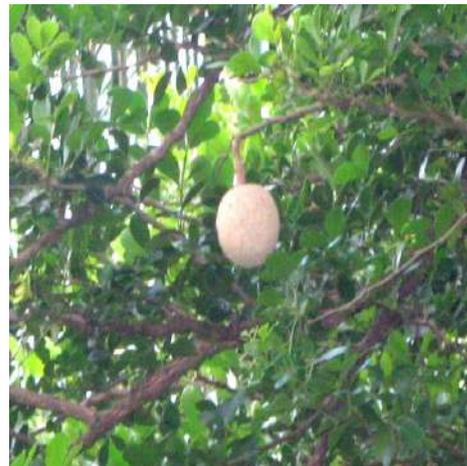
Boerhavia diffusa L.



Aegle marmelos (L.) Corr.



Psidium guajava L.



Feronia elephantum Corr.



Argemone mexicana L.



Sesamum orientale L.



Punica granatum L.



Zizyphus mauritiana Lam.



Saccharum officinarum L.



Plumbago zeylanica L.



Murraya koenigii (L.) Spreng.



Syzygium cumini (L.) Skeels



Cyperus rotundus L.



Cynodon dactylon (L.) Pers.



Withania somnifera (L.) Dunal



Solanum nigrum L.



Cissus quadrangularis L.



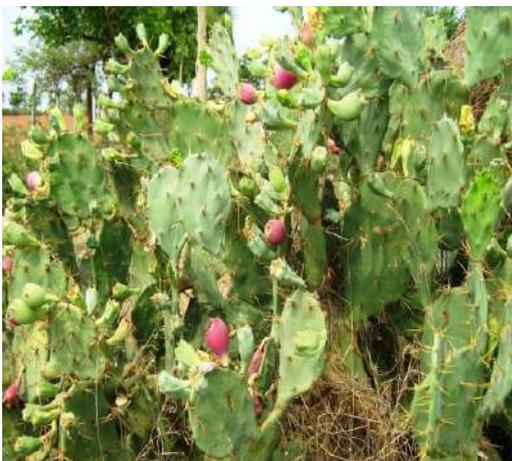
Zingiber officinale Roscoe



Curcuma longa L.



Tribulus terrestris L.



Opuntia dillenii (Ker-Gawler) Haw.



Leptadenia reticulata (Retz.) Wt & Arn.



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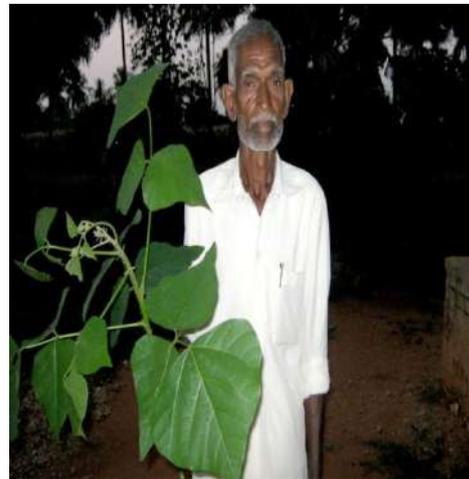
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Pandit Ramadas



Karegoudru

TRADITIONAL KNOWLEDGE ON EDIBLE MEDICINAL PLANTS OF HARAPANAHALLI TALUK IN DAVANGERE DISTRICT OF KARNATAKA, INDIA

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ABSTRACT

An ethnobotanical survey of traditional medicinal plants in Harapanahallilli taluk of Davangere district in Karnataka, India was conducted during November 2013 to October 2014. Forty six edible plant species belonging to 43 genera and 32 families were found to be used as effective remedy against various diseases by the rural and ethnic people. Among these *Amaranthus blitum* L., *Capparis zeylanica* L., *Coccinia grandis* (L.) Voigt, *Momordica charantia* L. and *Cinnamomum zeylanicum* Bl. were most commonly used edible medicinal plant species in the study area. The scientific name, family, local names of these plants along with the form of use in food and

medicinal uses are given in the present paper.

KEYWORDS: Traditional knowledge, Edible medicinal plants, Harapanahalli, Karnataka, India.

INTRODUCTION

The use of medicinal plants products could be traced back as the beginning of human civilization. The earliest documentation of medicinal plants in Hindu culture or in India is found in “Rigveda”, which is said to have been written between 4500 B.C. and 1600 B.C. and is supposed to be the oldest repository of human knowledge. ^[1] It is evident that the Indian people have tremendous passion for medicinal plants and they use them for wide range of health related applications. Drugs obtained from these plants are believed to be much safer and exhibit a remarkable efficacy in the treatment of various diseases. ^[2] The World Health Organization has estimated that 80% of the populations of developing countries being unable to afford pharmaceutical drugs rely on the plant based traditional medicines to sustain their

primary health care needs. ^[3] A great deal of information about the traditional uses of plants is still intact with rural and tribal peoples. But the native healers are often reluctant to accurately share their knowledge to outsiders. ^[4] The traditional knowledge of the indigenous people not only comprises the information about the food value of the plants, but also their specific medicinal uses. ^[5] At present edible medicinal plants are highly threatened due to over exploitation, unsustainable harvesting for trade, habitat destruction, human encroachment and application of inappropriate technologies. In view of this, an attempt has been made to collect ethnobotanical information on edible medicinal plants in the Harapanahalli taluk of Karnataka. Documenting the traditional knowledge is important for the conservation of edible medicinal plants as well as their sustainable utilization.

MATERIALS AND METHODS

Harapanahalli, one of the taluks in Davanagere district of Karnataka state is located at 14.8° North latitude and 75.98° East longitude (Fig. 1). It has an average elevation of 633 meters above the sea level. The population in Harapanahalli taluk is 3, 02,003 as per the survey of census during 2011 by Indian Government. There are 1, 54,289 males (51%) and 1, 47,714 females (49%) in the taluk. The total geographical area of the study area is 143024 ha. Major part of the taluk lies in Krishna basin and is drained by Tungabhadra River. The taluk enjoys dryness in the major part of the year and hot summer. In general south west monsoon contributes 58% of total rain fall and north east monsoon contributes 22% of rain fall. The remaining 20% rain fall is received as sporadic rains in summer months. Normal annual average rainfall is 656 mm. Major part of taluk is covered by Red sandy loam soil and followed by black soil. Major crops cultivated in this region are Maize, Jowar, Ragi, Sunflower, Groundnut and Cotton. People of the study area exhibit a vast diversity in their culture, tradition and living system.



Fig.1: Location map of the study area.

The information on edible medicinal plants used for treating various human ailments was obtained during the field survey of the study area. The surveys were conducted during November 2013 to October 2014 using ethno-botanical and Participatory Rural Appraisal (PRA) methods. For this purpose, frequent field trips were made to 16 villages of different pockets of the taluk. A total of 32 herbal healers (26 men and 06 women) of age group between 42 and 84 years belonging to various communities such as Swamiji, Pandit, Kuruba and tribes like Valmiki, Korava and Lambani were interviewed and recorded the information in a questionnaire developed by Ethnobotanical Society of India. Data on the local names of edible plants, habit, form of use in food, parts used, medicinal uses, method of drug preparation and dosage were noted. The ethnic as well as the cultural importance of the drug plants were also recorded. The botanical specimens of all reported medicinal plants were photographed, collected and identified by referring to the Flora of Davangere district, ^[6] Flora of Karnataka ^[7] and the Flora of Presidency of Madras. ^[8] Voucher specimens were made by using standard plant press, authenticated and deposited at the Herbarium centre maintained in the department of Botany, A D B First grade college, Harapanahalli.

RESULTS AND DISCUSSION

The results of the ethnobotanical survey are compiled in Table 1. A total of 46 edible medicinal plant species belonging to 43 genera and 32 families were identified for the treatment of human ailments in the study area. All these plant species are arranged in alphabetical order. For each species, scientific name, family, local name, form of use in food and medicinal uses along with parts used, mode of drug preparation and dosage are provided. The most dominating families were Apiaceae, Amaranthaceae and Zingiberaceae with 3 species each followed by Euphorbiaceae, Fabaceae, Myrtaceae, Arecaceae, Cucurbitaceae, Malvaceae, Rutaceae, Lamiaceae and Liliaceae with 2 species each. Twenty two species (47.82%) are herbs, 12 species (26%) are trees, 7 species (15.21%) are shrubs and five species (10.86%) are climbers. Of the plants cited, 30 (65.21%) are cultivated species, 11 (23.91%) are wild and five (10.86%) are semi-cultivated. Different plant parts were used for the treatment of diseases. Leaves were the most used (39.13%) followed by fruits (21.73%), seeds (15.21%), stem (8.6%), bark (6.5%), roots (6.5%) and flowers (2.17%) in decreasing order. The herbal preparations were in the form of curry, juice, decoction, powder and paste. Even though all plant species used by the traditional healers for the treatment of human diseases are available in the study area, the occurrence of *Canthium parviflorum* Lam. and *Cissus quadrangularis* L. is scarce. Plant species such as, *Cinnamomum zeylanicum* Bl.,

Elettaria cadamomum Maton and *Phoenix dactylifera* L. are not available as wild or cultivated in the study area. However, the useful parts of these plants are purchased from the market.

Table-1: Edible medicinal plants used by the traditional healers of Harapanahalli taluk in Davangere district of Karnataka, India.

Sl. No.	Plant Species	Family	Local name	Form of use in food	Medicinal use
1	<i>Abelmoschus esculentus</i> (L.) Moench	Malvaceae	Bendae gida	Tender fruits are used in making curry and other forms of food dishes.	Fresh fruits paste mixed with sugar is given orally 3 times a day for 3 to 4 days to treat white discharge in women.
2	<i>Allium cepa</i> L.	Liliaceae	Nirulli	It is used as ingredient in making curry and other forms of food dishes.	Small pieces of onion kept in honey overnight are given orally in the morning for 21 days to cure asthma. Inhalation of fresh bulb vapor relieves breathing problems.
3	<i>Allium sativum</i> L.	Liliaceae	Belulli	It is used in making pickles and also as spice in food dishes.	Garlic paste is used for jaundice. Two to three cloves are eaten with little salt at night for 3 days to cure cough.
4	<i>Amaranthus blitum</i> L.	Amaranthaceae	Kirukasale soppu	Fresh twigs are used in making curry and other spicy dishes.	Leaf juice or curry is given for dissolving kidney stones. It is also used for treating constipation.
5	<i>Amaranthus tricolor</i> L.	Amaranthaceae	Rajgiri soppu	Fresh twigs and leaves are used in making curry and other spicy dishes.	About 50 ml of leaf juice is given twice a day for 4 to 5 days in case of jaundice. Leaf curry is eaten for treating constipation
6	<i>Anethum sowa</i> Roxb.	Apiaceae	Sabbakshi	Fresh twigs are used in making curry and other spicy dishes.	Eating the plant raw or in the form of curry prevents and controls the cancer. Fruits are used to remove worms in the stomach and also to cure fever.
7	<i>Annona squamosa</i> L.	Annonaceae	Sitaphal	Fresh fruit pulps are eaten and also used in making juice.	About 15 ml of stem bark decoction is given twice a day for 2 to 3 days to cure dysentery. Leaf extract is given to reduce stomach pain.
8	<i>Basella alba</i> L.	Basellaceae	Basalae soppu	Leaves are used in making curry and spicy dishes.	Leaf juice is given for treating fever and dysentery
9	<i>Cajanus cajan</i> (L.) Mills.	Fabaceae	Togari gida	Fresh tender twigs are used in making	Few leaves are ground with water and given twice a day for

				curry. Seeds are used in the preparation of spicy dishes.	3 to 4 days to treat constipation and piles. The decoction of the seed is given for destroying worms in the stomach.
10	<i>Canthium parviflorum</i> Lam.	Rubiaceae	Karae gida	Ripen fruits are eaten and also used in making juice.	The leaf extract or fruit juice is taken with butter milk twice a day for 3 days in case of stomach pain, constipation and fever.
11	<i>Capparis zeylanica</i> L.	Capparaceae	Tottila balli	Leaves and fruits are used in making curry.	Dry fruit pulp is pounded with little pepper and rock salt. This mixture is given orally with water for indigestion and constipation.
12	<i>Carica papaya</i> L.	Caricaceae	Parangi gida	Ripen fruits are eaten and also used in making juice.	Few leaves pounded with pepper and garlic to make into pills of pea size. Two pills per day are given with milk for 4 to 5 days in case of jaundice.
13	<i>Carissa carandas</i> L.	Apocynaceae	Kavalae gida	Raw fruits are used in making chutney and pickles. Ripen fruits are eaten and also made to juice.	Few fruits are ground with cumin seeds to make a paste which is given orally with butter milk daily twice for a week to cure constipation and piles.
14	<i>Celosia argentia</i> L.	Amaranthaceae	Kolani soppu	Leaves are used in making curry.	Leaf juice is given to cure stomach ulcers while its decoction is gargled for mouth ulcers.
15	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Vondelaga	Leaves are used in making curry.	Few leaves are eaten daily morning for 21 days to cure mental disorders and to improve memory power.
16	<i>Cinnamomum zeylanicum</i> Bl.	Lauraceae	Dalchinni chekke	Stem bark is used as spice in various food dishes.	About 5 g of stem bark powder is taken with water daily once for diabetes. It is also given with honey for stomach pain.
17	<i>Cissus quadrangularis</i> L.	Vitaceae	Mangroli	Leaves are used in making curry and other forms of food dishes.	Stem paste is applied on the spot of bone fracture for reunion. Leaf juice is given orally for digestive problems.
18	<i>Citrus medica</i> L.	Rutaceae	Nimbae gida	Fruits are used in making pickles and also in making juice.	Tender leaves ground with coconut oil is applied for muscular and joint pains. Lemon juice in hot water is given thrice a day for 3 days to treat dysentery.
19	<i>Coccinia grandis</i> (L.) Voigt	Cucurbitaceae	Thondae balli	Raw fruits are used in making curry while ripen fruits	Ripened fruits are crushed with buttermilk and taken orally for 3 to 4 days in case of

				are eaten for their juicy sweet pulp.	dysentery. Leaf extract is poured in ear for throat infection.
20	<i>Cocculus hirsutus</i> (L.) Diels	Menispermaceae	Dagadi balli	Leaves are used in making curry.	Half a teaspoon of root powder is taken with water twice a day for diabetes. Leaf decoction is given for constipation, piles and for treating kidney stones.
21	<i>Cocos nucifera</i> L	Arecaceae	Tengina mara	Coconut meat (copra) is used in making chutney and in many types of food dishes.	About 100 ml of root decoction is given 3 to 4 times a day with sufficient drinking water for dissolving kidney stones.
22	<i>Coleus amboinicus</i> Lour.	Lamiaceae	Doddapatre	Leaves are used as spice in some of the food dishes	Few leaves are eaten daily twice for 3 to 4 days to cure cough and asthma. Leaf decoction is given orally for treating urinary disorders
23	<i>Coriandrum sativum</i> L.	Apiaceae	Kottumbari	Fresh leaves are used as spice for various food dishes.	About 50 ml of leaf or seed decoction is given orally thrice a day for 3-4 days to treat irregular menstruation in women.
24	<i>Curcuma longa</i> L.	Zingiberaceae	Arishina	Dried rhizome powder is used as spice in various forms of food dishes.	One spoonful of turmeric powder and little pepper is given with honey or milk at night for 3-5 days to cure cough and cold
25	<i>Elettaria cadamomum</i> Maton	Zingiberaceae	Elakki	Fruits or seeds used as spice in sweets and other forms of food dishes.	Whole fruit is taken with ripen banana daily night for constipation and piles. Seeds are eaten with sugar candy and honey for treating jaundice.
26	<i>Hibiscus cannabinus</i> L.	Malvaceae	Pundi soppu	Leaves are used in making pickles and curry.	About 15 to 20 ml of leaf decoction with little cumin is given twice a day for 3 to 4 days in case of fever and urinary problems.
27	<i>Mangifera indica</i> L.	Anacardiaceae	Mavina mara	Raw fruits are eaten in the form of pickles and chutney. Ripen fruits are used in making juice.	Decoction of the bark is given with 50ml of water and 10ml of honey twice a day for 1 to 2 weeks to treat all types of menstrual disorders.
28	<i>Mentha spicata</i> L.	Lamiaceae	Pudina	Leaves are used in making chutney and also as spice.	Leaf juice with ginger powder is given with honey daily 3 times to cure chronic cough. The leaves are also used for treating cancer
29	<i>Momordica</i>	Cucurbitaceae	Hagala Kayi	Raw fruits are used	Twenty to thirty ml of fruit

	<i>charantia L.</i>			in making curry and chips.	juice is given daily morning in empty stomach for 3 months in case of diabetes mellitus.
30	<i>Murraya koenigii (L.) Spreng.</i>	Rutaceae	Karibevu	Leaves are used as spice in making various forms of food dishes.	Few leaves are eaten daily night before going to bed for diabetes. About 100 ml of decoction prepared by boiling of leaves with cumin, jaggery and ginger is given orally thrice a day for cold and cough
31	<i>Opuntia dillenii (Ker-Gawl.) Haw.</i>	Cactaceae	Rakkas balli	Ripen fruit pulp is eaten and also used in making juice.	Two spoonful of ripen fruit juice with sugar is given orally twice a day for 21 days to treat all types of piles.
32	<i>Oxalis corniculata</i>	Oxalidaceae	Pullampurachi	Leaves are used in making curry and other forms of food dishes.	Leaf juice is given orally for treating fever, dysentery and urinary tract problems.
33	<i>Phoenix dactylifera L.</i>	Arecaceae	Uttutti	Fruit pulp is eaten and also used in making sweet food dishes.	About 8 to 10 seeds are powdered and boiled in 4 cups of water till it reduced to half cup and given orally for dysentery.
34	<i>Phyllanthus acidus (L.) Skeels.</i>	Euphorbiaceae	Nelli gida	Fruits are used in making pickles and also juice.	Fruit powder and the seed powder of <i>Syzygium cumini</i> are mixed together and one spoonful of this mixture is taken twice a day for diabetes.
35	<i>Phyllanthus emblica L.</i>	Euphorbiaceae	Bettada Nelli	Fruits are used in making pickles and also juice.	Fruit juice is given orally for jaundice. Dry fruits after removing seeds are ground with equal amount of turmeric powder. One spoonful of this mixture is given twice a day for diabetes.
36	<i>Portulaca oleracea L.</i>	Portulacaceae	Goli soppu	Fresh twigs are used in making curry and also dal.	Leaf juice is given orally for stomach pain and dysentery. Leaf paste is applied for insect bites and skin diseases.
37	<i>Psidium guajava L.</i>	Myrtaceae	Perala gida	Ripen fruits are eaten and also used in making juice.	Few leaves are ground and taken with buttermilk orally twice a day for a week to cure piles. Fresh fruits are eaten with lemon juice for treating constipation.
38	<i>Punica granatum L.</i>	Punicaceae	Dalimbae	Fresh and juicy seeds of ripen fruits are eaten and also used in making juice.	Three to four young twigs are eaten with little salt twice a day for one week to cure chronic stomach pain and dysentery.

39	<i>Raphanus sativus</i> L.	Brassicaceae	Radish	Root tubers are eaten fresh with food and also used in making food dishes.	Two to three g of seed powder is given with a cup of butter milk for a week to treat constipation and piles.
40	<i>Sesamum orientale</i> L.	Pedaliaceae	Yellu gida	Roasted seeds are used in making sweet as well as spicy dishes.	About 50g of seeds are ground with jaggery, boiled and filtered. The filtrate is given orally for 4 to 5 days in case of irregular menstruation.
41	<i>Solanum nigrum</i> L.	Solanaceae	Kaki hannu	Ripen fruits are eaten and also used for making juice.	Few vegetative buds and flowers are ground with cumin and boiled in butter milk. It is then cooled and given daily morning before breakfast for two months in case of anemia.
42	<i>Syzizium cumini</i> (L.) Skeels	Myrtaceae	Nerale mara	Ripen fruit pulps are eaten and also used in making juice.	One spoonful of seed powder is taken with little ginger powder and honey twice a day in case of diabetes. Few young leaves are ground and given with water daily morning for a week to cure menstrual problems.
43	<i>Tamarindus indica</i> L.	Caesalpiaceae	Hunasemara	Fresh fruits are used in making chutney. Ripen fruit pulp juice is used making variety of food dishes.	About 15 to 20 ml of root decoction is given twice a day for 3 to 4 days in case of stomach pain and ulcers. Leaf paste is applied for various types of skin diseases.
44	<i>Trigonella foenum graecum</i> L.	Fabaceae	Menthya soppu	Fresh tender twigs are used in making curry. Seeds are used as spice in various food dishes.	Few seeds are soaked in 50 ml of water for overnight. In the morning, the water after removing seeds is given orally for diabetes mellitus.
45	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Shunti	Fresh or dried rhizome is used as spice in various forms of food dishes.	Two to five g of ginger powder is taken with hot water daily twice for indigestion until cured. Ginger juice with honey is given for treating cough and cold.
46	<i>Ziziphus maritima</i> Lam.	Rhamnaceae	Bare gida,	Ripen fruit pulp is eaten and also used in making juice.	Half a teaspoon of seed powder is taken with little honey for diabetes. The fruit juice is given for constipation.

The plant species reported in the present study were cross checked with the available literature. Some of these plant species were already identified for the same purpose but the

parts used, method of drug preparation and dosage were different. Application of stem paste of *Cissus quadrangularis* L. for the reunion of fractured bones is also practiced in Coimbatore district of Tamil Nadu. ^[9] Use of *Punica granatum* L. for the treatment of stomach pain and dysentery is reported from the East Godavari district of Andhra Pradesh. ^[10] The medicinal plants cited in the present study have different kinds of curative properties in other regions as well. For example *Psidium guajava* L. is used for treating diarrhea and dysentery in Arunachal Pradesh. ^[11] *Allium cepa* L. is used for treating ulcers and *Canthium parviflorum* Lam. is used for treating dog bite and cat bite in Gadag district of Karnataka. ^[12] *Centella asiatica* (L.) Urban is used for treating fever and diarrhea in Chamarajnar district of Karnataka. ^[13] *Allium sativum* L. is used for treating oral candidiasis in Hyderabad Karnataka region. ^[14] *Capparis zeylanica* L. is used for treating diabetes in Medak district of Andhra Pradesh. ^[15] *Momordica charantia* L. in North Maharashtra ^[16] and *Ziziphus maruittiana* Lam. in Pakistan ^[17] are used for treating jaundice. In Karnataka, ethnobotanical studies on medicinal plants were conducted in different taluks of the districts like Kodagu, Uttara Kannada, Chikmagalur, South Canara, Tumkur, Bidar, Shimoga and Gulbarga. ^[18-25] However, in Harapanahalli taluk of Davangere district, ethnobotanical study has not yet been reported. Hence, the present study represents a contribution to the existing knowledge of folk remedies that are in current practice for the treatment of human ailments.

CONCLUSION

In the present investigation, 46 edible medicinal plant species used for the treatment of diseases were reported and documented. *Amaranthus blitum* L., *Capparis zeylanica* L., *Coccinia grandis* (L.) Voigt, *Momordica charantia* L. and *Cinnamomum zeylanicum* Bl. were the important species as prescribed by 25 traditional healers (78%). The people of Harapanahalli taluk are highly dependent on the traditional herbal medicine because of their poor socio-economic conditions and availability of effective drug plants. Hence, these plant species could be taken up for further pharmacological and clinical studies useful in the formulation of novel drugs for treating human diseases.

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Traditional medicinal plants used to treat human ailments in Harapanahalli taluk of Davangere district, Karnataka

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Abstract

An ethnobotanical survey was carried out in various villages of Harapanahalli taluk in Davangere district of Karnataka to collect the information of traditionally used medicinal plants by the tribal and rural communities. A total of 56 medicinal plants belonging to 32 families were used by the local people to cure their different ailments. Majority of the people, especially, older age class, including women heavily use these traditionally available medicinal plants as a remedy for health problems. They believe that these are easily available, less expensive, and have no side effects. The scientific name, family and local names of these plants along with their parts used, mode of preparation of drug and dosage is provided.

Keywords: Traditional medicinal plants, Harapanahalli, Davangere, Karnataka.

1. Introduction

Human beings were dependent on medicinal plants for their health problems since thousands of years. Even after the induction of 200 years of modern system of medicine, about 90% people in rural India take the help of local health practitioners for the treatment of various diseases [1]. The World Health Organization (WHO) has estimated that 80% of the populations in developing countries still rely on traditional medicines, mostly plant drugs, for their primary health care needs [2]. Demand for medicinal plant is increasingly felt, in both developing and developed countries due to growing needs of natural products being non-toxic and without any side-effects, apart from availability at affordable prices. The medicinal plant sector has traditionally occupied a pivotal position in the socio cultural, spiritual and medicinal areas of rural and tribal families [3]. The knowledge of medicinal plants has been accumulated in the course of many centuries based on different medicinal systems such as Ayurveda, Unani and Siddha. In India, it is reported that traditional healers use 2,500 plant species and 100 plant species serve as regular sources of medicine [4]. During the last few decades there has been an increasing interest in the study of medicinal plants and their traditional use in different parts of the world [5]. The present paper reveals the properties of medicinal plants used by traditional herbal healers for the treatment of several diseases like diabetes, fever, jaundice, skin diseases, snake bite, gastrointestinal, gynecological, respiratory and urinary problems in Harapanahalli taluk of Davangere district of Karnataka state. Documenting the indigenous knowledge through ethnobotanical studies is important for the conservation and utilization of biological resources.

2. Materials and Methods

Harapanahalli, one of the taluks in Davangere district of Karnataka state is located at 14.8 ° North latitude and 75.98 ° East longitude (Fig. 1). It has an average elevation of 633 meters above the sea level. The population in Harapanahalli taluk is 3, 02,003 as per the survey of census during 2011 by Indian Government. There are 1, 54,289 males (51%) and 1, 47,714 females (49%) in the taluk. The total geographical area of the study area is 143024 ha. Major part of the taluk lies in Krishna basin and is drained by Tungabhadra River. The taluk enjoys dryness in the major part of the year and hot summer. In general south west monsoon contributes 58% of total rain fall and north east monsoon contributes 22% of rain fall. The remaining 20% rain fall is received as sporadic rains in summer months. Normal annual average rainfall is 656 mm. Major part of taluk is covered by Red sandy loam soil and followed by black soil. Major crops cultivated in this region are Maize, Jowar, Ragi, Sunflower, Groundnut and Cotton. People of the study area exhibit a vast diversity in their culture, tradition and living system.

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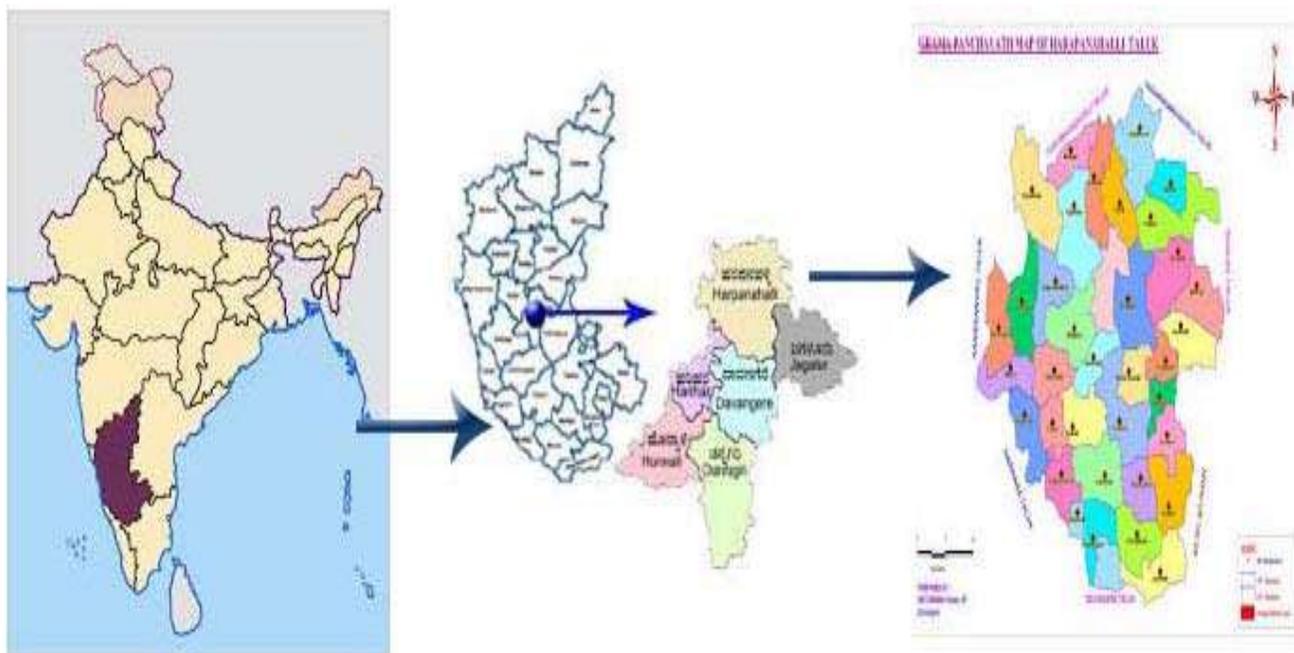


Fig 1. Location map of Harapanahalli taluk.

The information on traditional medicinal plants used for treating various human ailments was obtained during the field survey of the study area. The surveys were conducted during November 2013 to March 2015 using ethno-botanical and Participatory Rural Appraisal (PRA) methods. For this purpose, frequent field trips were made to 24 villages of different pockets in the taluk. A total of 36 herbal healers (28 men and 08 women) of age group between 42 and 84 years belonging to various communities such as Swamiji, Pandit, Kuruba and tribes like Valmiki, Korava and Lambani were interviewed and recorded the information in a questionnaire developed by Ethnobotanical Society of India. Data on the local names of medicinal plants, habit, parts used, traditional uses, method of drug preparation and dosage were noted. The ethnic as well as the cultural importance of the medicinal plants were also recorded. The botanical specimens of all reported medicinal plants were photographed, collected and identified by referring to the Flora of Davangere district [6], Flora of Karnataka [7] and the Flora of Presidency of Madras [8]. Voucher specimens were made by using standard plant press, authenticated and deposited at the Herbarium centre maintained in the department of Botany, A D B First grade college, Harapanahalli.

3. Results and Discussion

The data obtained from the survey is compiled in Table-1, where the plant species are arranged in alphabetical order. A total of 56 species belonging to 53 genera and 32 families have been reported for the treatment of human diseases. For each species scientific name, family, local name, habit, parts used, mode of drug preparation and dosage are provided. Among the 32 families recorded, the dominant families were Fabaceae with five species, Asclepiadaceae, Euphorbiaceae, Liliaceae, and Mimosaceae with 2 species each. Twenty four species (42.85 %) herbs, 11 species (19.64%) trees, 9 species (16%) shrubs and 12 species (21.42 %) were climbers. Different parts of the plants were used in the treatment of diseases. Leaves were the most used (44.64%) part, followed by roots (12.5%), fruits (10.71%), seeds (10.71%), stem (7.14%), bark (5.3%), and flowers (3.57%) in decreasing order. The herbal preparations were in the form of juice, decoction, powder and paste. Even though, all the recorded medicinal plants are available in the study area, the occurrence of *Andrographis paniculata* (Burm.f.) Wall, *Dichrostachys cinerea* (L.) Wt. & Arn. and *Gloriosa superba* L. is scarce.

Table 1: Traditional medicinal plants used in the treatment of human ailments in Harapanahalli taluk of Davangere district, Karnataka.

Plant name	Family	Local name	Habit	Part used & mode of administration
<i>Abrus precatorius</i> L.	Fabaceae	Biligulaganji	Climber	Few leaves ground with little salt to get paste and given with water twice a day for 2 days to cure stomach pain.
<i>Abutilon indicum</i> (L) sweet.	Malvaceae	Thurubigida	Shrub	Twenty ml of leaf decoction is given twice a day for 3days for treating stomach pain.
<i>Acacia arabica</i> (Lam.) Willd.	Mimosaceae	Kari jali	Tree	Two teaspoonful of stem bark decoction is given twice a day for 2 weeks to reduce sugar level in blood.
<i>Acacia farnesiana</i> (L.) Willd.	Mimosaceae	Kasturi jali	Shrub	Few leaves ground with cold water and filtered. The filtrate is mixed with little sugar and given thrice a day for 1 or 2 weeks in case of Leucorrhoea.
<i>Acalypha indica</i> L.	Euphorbiaceae	Kuppi gida	Herb	Twenty ml of whole plant extract is given twice a day for one week to treat asthma.
<i>Achyranthus aspera</i> L.	Amaranthaceae	Uttarani	Herb	Twenty ml of leaf juice is given with buttermilk twice a day for three days to cure dysentery.
<i>Adhatoda zeylanica</i> Medic.	Acanthaceae	Aadusogae	Shrub	Ten ml leaf extraction with jaggery or honey is given twice a day for 3-5 days to treat asthma and bronchitis.

<i>Aegle marmelos</i> (L.) Corr.	Rutaceae	Bilvapatre	Tree	Few fresh leaves are eaten daily morning half an hour before breakfast for 3 months to control diabetes.
<i>Aloe vera</i> (L.) N Burm.	Liliaceae	Lolesara	Herb	About 10 gm fresh leaf gel taken daily morning orally for 40 days to cure piles.
<i>Amaranthus tricolor</i> L.	Amaranthaceae	Harvesoppu	Herb	About 15 to 20 ml leaf juice is given twice a day for alternate days of a week for treating jaundice
<i>Andrographis paniculata</i> (Burm.f.) Wall.	Acanthaceae	Nelabevu	Herb	About 20ml of leaf juice is given daily morning in empty stomach for 41 days.
<i>Argemone mexicana</i> L.	Papaveraceae	Datturi	Herb	One or two gm of root bark is given with betel leaves twice a day for three days to cure malarial fever.
<i>Argyria elliptica</i> (Roth) Choisy.	Convolvulaceae	Ugani balli	Climber	Latex paste is applied over chronic wounds for cure.
<i>Aristolochia indica</i> L.	Aristolochiaceae	Eshwari balli	Climber	Root paste of this plant is given orally with carum (ajwan) within an hour in case of snake bite for cure.
<i>Asparagus racemosus</i> Willd.	Liliaceae	<i>Shatavari</i>	Herb	Hundred gm of roots are boiled in 400 ml of water till it is reduced to 100 ml. It is then cooled and filtered. The filtrate is given with goat milk twice a day for 10-14 days for treating all types of menstrual problems.
<i>Azadirachta indica</i> A. Juss.	Meliaceae	<i>Bevu</i>	Tree	Five to ten ml of leaf juice is given twice a day for three days to cure jaundice.
<i>Balanites roxburghii</i> Planch	Balanitaceae	Ingalara	Tree	About 5 gm Fruit pulp powder is given with little salt twice a day for three to five days to cure fever.
<i>Boerhaavia diffusa</i> L.	Nyctaginaceae	Sanadika	Herb	About 5 gm of whole plant powder is given with buttermilk twice a day for 5 days to cure jaundice.
<i>Cassia auriculata</i> L.	Caesalpiniaceae	Honnarrike	Shrub	Flower buds are shade dried and powdered. About 10 gm of this powder is given with honey twice a day for one month for diabetes.
<i>Cassia italica</i> (Mill.) Lam.	Caesalpiniaceae	<i>Nela avare</i>	Herb	One spoonful leaf powder is taken with warm water daily night before going to bed for constipation and piles until cured.
<i>Capparis zeylanica</i> L.	Capparaceae	Tottila balli	Climber	Ten to fifteen fresh leaves are ground with little garlic and black pepper and made into small pills of 2 gm each. One pill is taken twice a day for a week in case of cough and asthma.
<i>Centella asiatica</i> (L.) Urbon	Apiaceae	Ondelaga	Herb	About 10 ml of leaf juice is given twice a day for a week to treat jaundice.
<i>Cocculus hirsutus</i> (L) Diel.	Menispermaceae	Dagdi balli	Climber	Half a teaspoon of root powder is taken with water twice a day for 21 days in case of diabetes.
<i>Coriandrum sativum</i> L.	Apiaceae	Kotumbari	Herb	Fifty ml plant extract is given orally twice in a week for 3 weeks to treat asthma.
<i>Curcuma longa</i> L.	Zingiberaceae	Harishina	Herb	Plant rhizome paste is applied over palm and feet followed by warming it with a hot iron plate daily once for three alternative days in a week to cure jaundice.
<i>Cynodon dactylon</i> (L.) pers.	Poaceae	Karrike	Herb	Thirty ml root extract is given with little sugar and cardamom for dysentery until cured.
<i>Dichrostachys cinerea</i> (L.) Wt. & Arn.	Mimosaceae	Vadavina gida	Shrub	Fresh leaves of this plant and leaves of <i>Tribulus terrestris</i> , 5 gm each are crushed together and given with tender coconut water for 3 days to treat painful menstruation.
<i>Dolichos biflorus</i> L.	Fabaceae	Hurali	Herb	About 50 g of seeds boiled in 200 ml of water, crushed and then filtered. The filtrate is taken with goat milk twice a day for 2 weeks to dissolve the stones of urinary tract.
<i>Erythrina indica</i> Lam.	Fabaceae	Alwana	Tree	Bark paste is applied over the affected area for treating skin diseases.
<i>Euphorbia hirta</i> L.	Euphorbiaceae	Halukudi soppu	Herb	Whole plant is ground with little salt and taken with goat milk twice a day for a week to treat respiratory problems.
<i>Feronia elephantum</i> Corr.	Rutaceae	<i>Bealavala</i>	Tree	Stem bark paste is applied over piles for cure.
<i>Ficus recemosa</i> L.	Moraceae	<i>Attimara</i>	Tree	Half a teaspoon of unripe dried fruits powder is given twice a day for two months to treat diabetes.
<i>Ficus religiosa</i> L.	Moraceae	<i>Arali mara</i>	Tree	Five gm dried fruits powder is given thrice a day for 3-4 weeks in case of irregular menstruation.
<i>Gloriosa superba</i> L.	Liliaceae	Gouri balli	Climber	Plant tuber paste is applied over the infected part for treating skin diseases.
<i>Gynandropsis pentaphylla</i> DC	Capparaceae	Golla Jiddu	Herb	Leaf paste is applied over the cuts and wounds for cure.
<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	<i>Dasavala</i>	Shrub	Few dried flowers powder is mixed with little sugar and ghee to make a paste. This paste is given orally for 2-3 days in case of Leucorrhoea.
<i>Leucas aspera</i> (willd.) spreng	Lamiaceae	<i>Thumbe</i>	Herb	Ten ml of leaf extract with little rock salt is given twice a day for stomach pain until cured.
<i>Leptadenia reticulata</i> (Retz.)Wt & Arn.	Asclepiadaceae	Aale balli	Climber	Tender twigs latex is inhaled daily two or three times to get relief from cold and cough.
<i>Mangifera indica</i> L.	Anacardiaceae	Mavu	Tree	Two to three dried seeds of this plant are pounded with same number of seeds of <i>Syzygium cumini</i> to get a powder. This powder is given

				thrice a day for 21 days to treat diabetes.
<i>Mucuna pruriens</i> (L.) DC.	Fabaceae	Nasugunni	Climber	Few soaked seeds are eaten daily morning for 21 days to treat all types of digestive disorders.
<i>Ocimum americanum</i> L.	Lamiaceae	Nayi thulasi	Herb	Fifty ml leaf decoction is given twice a day for 3 days to treat whooping cough.
<i>Opuntia dellenii</i> Haw.	Cactaceae	Papasukalli	Shrub	Ripened fruits juice is boiled with little sugar, cooled and stored in a bottle. Two spoonful of this juice is given orally twice a day for 21 days to cure piles.
<i>Pergularia daemia</i> (Forsk.) Chiov.	Asclepiadaceae	kuntigina balli	Climber	Leaves ground with garlic and little salt are made into small of 2 gm each. Two pills are given twice a day for 3 days to treat asthma.
<i>Punica granatum</i> L.	Punicaceae	Dalimbe	Shrub	Three to four young twigs are eaten with little salt twice a day for a week to cure chronic stomach pain.
<i>Ricinus communis</i> L.	Euphorbiaceae	Oudala	Shrub	About ten ml leaf juice is given orally once a day for three days to cure jaundice.
<i>Saccharum officinarum</i> L.	Poaceae	Kabpu	Herb	A cup of sugar cane juice is given twice a day for three days to cure jaundice.
<i>Sesamum indicum</i> L.	Pedaliaceae	Yellu	Herb	Fifty gm of seeds are ground with jaggery, boiled and then filtered. This filtrate is given for 4-5 days to treat irregular menstruation problems.
<i>Syzygium cumini</i> (L.) Skeels.	Myrtaceae	Nerale mara	Tree	One teaspoonful of seed powder is taken with 2-3 gm of ginger powder and 5 ml honey twice a day for one month in case of diabetes.
<i>Terminalia chebula</i> Retz.	Combretaceae	Alale mara	Tree	About ten gm of fruit powder is taken with hot water daily 2 times for dysentery until cured.
<i>Tinospora cordifolia</i> (willd) Miers	Menispermaceae	Amruta balli	Climber	About ten ml of leaf juice is given twice a day for five days to treat jaundice.
<i>Tribulus terrestris</i>	Zygophyllaceae	Neggina mullu	Herb	About 2 gm of dry fruit powder is given with a cup of warm water twice a day for 41 days to destroy kidney stones.
<i>Tridax procumbens</i> L	Asteraceae	Teke soppu	Herb	Leaf extract is applied over cuts and wounds for cure.
<i>Trigonella foenum-graecum</i> L.	Fabaceae	Menthe	Herb	Few seeds are soaked in 50 ml water for overnight. Next day morning, only water is taken orally in case of diabetes for a period of 40 days.
<i>Tylophora indica</i> (Burm.f.) Merr.	Asclepiadaceae	Aadumuttada balli	Climber	Five to ten ml of plant root extract is given twice a day for 5 days to treat asthma.
<i>Zalea decandra</i> (L.)N.Burm.	Aizoaceae	Biliganajili	Herb	Roots are powdered and boiled in 500 ml water till it reduces to 250 ml. It is filtered and made into two equal parts and taken twice a day in case of cough and cold for 3-5 days.
<i>Zingiber officinale</i> Rosce.	Zingiberaceae	Shunti	Herb	Two gm of plant rhizome powder is taken with hot water daily 2 times for indigestion until cured.

The medicinal plant species reported in the present study were cross checked with the available literature. Even though some of these plants were mentioned earlier, the parts used, mode of drug preparation, dosage and curative properties were different. For example: *Abrus precatorius* L. and *Aloe vera* (L) N. Burm. were used to treat indigestion in Gujarat ^[9], and for respiratory disorders in Cameroon ^[10]. *Capparis zeylanica* L. was used for treating dysentery in Chhatisgarah ^[11]. *Zingiber officinale* Rosce. and *Aegle marmelos* (L) corr. were used for gastrointestinal disorders in Arunachal Pradesh ^[12]. *Abutilon indicum* (L.) Sweet. for skin diseases, *Cynodon dactylon* (L) Pers. as diuretic and *Ficus religiosa* L. used as cordiotonic in Tamil Nadu ^[13], *Terminalia chebula* Retz. was used for treating respiratory disorders in Andhra Pradesh ^[14]. *Aloe vera* (L.) N Burm., *Hibiscus rosa-sinensis* L. (Retz.) R. Br. and *Azadirachta indica* A. Juss. in north Karnataka ^[15]; *Andrographis paniculata* (Burm f.) Wall. in Tamil Nadu ^[16] and *Syzygium cuminii* Skeels in Pakistan ^[17] were used for the treatment of diabetes. Stem of *Tinospora cordifolia* Miers. used for treating Malaria and bark of *Ficus racemosa* L. was used for treating menstrual disorders in Shimoga district of Karnataka state ^[18]. Leaves of *Aegle marmelos* (L.) Corr. and *Tylophora indica* (Burm f.) Merr. were used for treating asthma in Andhra Pradesh ^[19]. In Karnataka ethnobotanical studies on medicinal plants were conducted in Kodagu ^[20], Uttar Kannada ^[21], Chikmagalur ^[22], South Canara ^[23], Tumkur ^[24], Bidar ^[25], Bhadravati and Sagar taluk of shimoga ditrict ^[26, 27]. However, in Harpanahalli taluk of Davangere district no detailed study on ethnobotany of medicinal plants is reported. Hence, the present study represents a contribution to the existing knowledge of folk remedies that are in current

practice for the treatment of gastrointestinal disorders.

4. Conclusion

The present investigation reports 56 medicinal plant species used in the treatment of various human ailments. The rural people of Harapanahalli taluk are highly dependent on these medicinal plants as they are easily available and proved to be effective. The reported species include both wild and cultivated ones. The most significant plants prescribed by the majority of the traditional medicinal practitioners were *Achyranthes aspera* L., *Aegle marmelos* (L.) Corr., *Cynodon dactylon* (L.) Pers. *Punica granatum* L. *Capparis zeylanica* L., *Acalypha indica* L., *Ocimum americanum* L., *Tylophora indica* Merr. and *Zalea decandra* N. Burm. Hence, these plant species could be taken up for further pharmacological and clinical studies useful in the formulation of novel drugs for treating human diseases.

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Medicinal plants used in the treatment of different types of fever in Harapanahalli taluk of Davanagere district, Karnataka

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ABSTRACT

An ethnobotanical survey was undertaken to collect the information from the traditional healers on the use of medicinal plants in the treatment of various human diseases in Harapanahalli taluk of Davanagere district, Karnataka. During the survey, it is found that 14 plant species were used for treating different types of fever. Plant species such as *Azadirachta indica* A. Juss., *Aegle marmelos*(L.) Corr., *Tinospora cordifolia* (willd) Miers and *Zalea decandra*. Burm. were found to be most effective against the fever. The scientific name, family and local names of all these plants along with their parts used, dosage and method of drug preparation is provided in the present paper.

Keywords: Medicinal plants, Fever, Harapanahalli, Davanagere, Karnataka.

INTRODUCTION

Plants have been used in traditional medicine for several thousand years. Even after the induction of 200 years of modern system of medicine, about 90% people in rural India take the help of local health practitioners for the treatment of various diseases [1]. At present about 65% of the Indian population is dependent on the traditional system of medicine [2]. During the last few decades there has been an increasing interest in the study of medicinal plants and their traditional use in different parts of the world. Documenting the indigenous knowledge through ethnobotanical studies is important for the conservation and utilization of biological resources. Today according to the World Health Organization as many as 80% of the world's people depend on traditional medicine for their primary healthcare needs [3]. There are considerable economic

benefits in the development of indigenous medicines and in the use of medicinal plants for the treatment of various diseases [4]. Due to less communication means, poverty, ignorance and unavailability of modern health facilities, most people especially rural people are still forced to practice traditional medicines for their common health problems.

MATERIALS AND METHODS

Harapanahalli, one of the taluks in Davangere district of Karnataka state is located at 14.8° North latitude and 75.98° East longitude. It has an average elevation of 633 meters above the sea level. The total geographical area of the study area is 143024 ha. Major part of the taluk lies in Krishna basin and is drained by Tungabhadra River. The taluk enjoys dryness in the major part of the year and hot summer. In general south west monsoon contributes 58% of total rain fall and north east monsoon contributes 22% of rain fall. The remaining 20% rain fall is received as sporadic rains in summer months. Normal annual average rainfall is 656 mm. Major part of taluk is covered by Red sandy loam soil and followed by black soil. Major crops cultivated in this region are Maize, Jowar, Ragi, Sunflower, Groundnut and Cotton. People of the study area exhibit a vast diversity in their culture, tradition and living system.

The information on traditional medicinal plants used for treating various human ailments was obtained during the field survey of the study area. The surveys were conducted during November 2013 to March 2015 using ethno-botanical and Participatory Rural Appraisal (PRA) methods. For this purpose, frequent field trips were made to different villages in the study area. Local traditional healers, farmers and other knowledgeable people were interviewed and recorded their information on the use of medicinal plants in a standard questionnaire. Data on the local names of medicinal plants, habit, parts used, traditional uses, method of drug preparation and dosage were noted. The ethnic as well as the cultural importance of the medicinal plants were also recorded. The botanical specimens of all reported medicinal plants were photographed, collected and identified by referring to the Flora of Davangere district [5], Flora of Karnataka [6] and the Flora of Presidency of Madras [7]. Voucher specimens were made by using standard plant press, authenticated and deposited at the Herbarium centre maintained in the department of Botany, A D B First grade college, Harapanahalli.

RESULTS AND DISCUSSION

Among the total plants reported in the survey, 14 plant species belonging to 13 families were found to be used for the treatment of different types of fever. For each species scientific name, family, local name, habit, parts used, dosage and mode of drug preparation are provided in the Table 1.

Table 1: Plants used in the treatment of different types of fever in Harapanahalli taluk of Davanagere district.

Plant species and family	Local name	Habit	Type of fever	Mode of preparation and dosage
<i>Aegle marmelos</i> (L.) Corr. Rutaceae	Bilva patre gida	Tree	Chronic	Few fresh leaves are eaten directly daily morning half an hour before breakfast for 15 days.
<i>Andrographis paniculata</i> (Burm.f.) Wall. Acanthaceae	Nelabevu	Herb	Unspecified	About 20ml of leaf juice is given daily morning in empty stomach for 4 days.
<i>Argemone mexicana</i> L. Papaveraceae	Datturi	Herb	Malaria	One or two gm of root bark is given with betel leaves twice a day for 3 days.
<i>Azadirachta indica</i> A. Juss. Meliaceae	Bevina mara	Tree	Unspecified	Five to 10 ml of stem bark decoction is given twice a day for 3 days.
<i>Balanites roxburghii</i> Planch. Balanitaceae	Inglarada gida	Tree	Unspecified	About 5 gm Fruit pulp powder is given with little salt twice a day for 3 to 5 days.
<i>Barleria prionitis</i> L. Acanthaceae	Mullu Jaji	Shrub	Unspecified	About 5 ml of root decoction is given twice a day for 3 days.
<i>Boerhaavia diffusa</i> L. Nyctaginaceae	Sanadika	Herb	Typhoid	About 5 gm of whole plant powder is given with buttermilk twice a day for 4 days.
<i>Carica papaya</i> Caricaceae	Papaya	Tree	Dengue	About 5 ml of leaf juice is given daily twice for 7 days.
<i>Gloriosa superba</i> L. Liliaceae	Koli kutuma	Herb	Chronic	Ten to 15 ml of shade dried rhizome decoction is given twice a day for 3 days
<i>Polyalthia longifolia</i> L. Annonaceae	Kambada mara	Tree	Unspecified	About 10 g of stem bark is boiled in 4 cups of water till it get reduced to one cup and filtered. About 10 ml of this decoction is given 3 times a day for 3 to 4 days.
<i>Plumbago zeylanica</i> L.	Chitra moola	Herb	Unspecified	About 6gm of root powder and little sugar

Plumbaginaceae				candy is given with warm water twice a day for 4 to 5 days
<i>Tinospora cordifolia</i> (willd) Miers Menispermaceae	Amruta balli	Climber	Chronic	Twenty ml of stem decoction with a cup of butter milk is given daily morning for 7 days.
<i>Withania somnifera</i> (L.) Dunal Solanaceae	Ashwagandha	Herb	Typhoid	Root powder ground with dry grapes and opium seeds making into pills of 10g each. Two pills are given twice a day for 21 days.
<i>Zalea decandra</i> (L.)N. Burm. Aizoaceae	Biliganajili	Herb	Unspecified	Root powder is boiled in half litre of water till it becomes to a quarter, which is made into two equal parts and given orally twice a day for 3 days.

The medicinal plant species reported in the present study were cross checked with the available literature. Even though some of these plants were mentioned earlier, the parts used, mode of drug preparation, dosage and curative properties were different. For example: *Aegle marmelos* is used for gastrointestinal disorders in Arunachal Pradesh [8]. *Azadirachta indica* in north Karnataka [9] and *Andrographis paniculata* in Tamil Nadu are used for the treatment of diabetes [10]. Stem of *Tinospora cordifolia* is used for treating Malaria in Shimoga district of Karnataka [11]. Similarly leaves of *Aegle marmelos* are used for treating asthma in Andhra Pradesh [12]. In Karnataka ethnobotanical studies on medicinal plants were conducted in various districts. However, in Harpanahalli taluk of Davangere district no detailed study on ethnobotany of medicinal plants is reported. Hence, the present study represents a contribution to the existing knowledge of folk remedies that are in current practice for the treatment of different types of fever.

CONCLUSION

The present investigation reports 14 medicinal plant species used in the treatment of different kinds of fever. The rural people of Harapanahalli taluk are highly dependent on these medicinal plants as they are easily available and proved to be effective. Hence, these plant species could be taken up for further pharmacological and clinical studies useful in the formulation of novel drugs for treating fever.

ACKNOWLEDGEMENT

I am thankful to all the traditional healers and rural people of Harapanahallitaluk in Davangere district of Karnataka state for sharing their valuable information on traditional knowledge of medicinal plants. I would also like to thank University Grants Commission, New Delhi for providing financial assistance to carry out this research project.

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UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002

Final Report of the work done on the Minor Research Project

1. **Project report No:** Final report
2. **UGC Reference No:** MRP(S)-102/12-13/KAKU037/UGC-SWRO dated 23-Sep-2013
3. **Period of report:** From 14-Nov-2013 to 14-Oct-2015.
4. **Title of research project:** “A survey of traditional medicinal plants in Harapanahalli taluk of Davanagere district, Karnataka”
5. (a) **Name of the Principal Investigator:** Dr. S.M. Siddalinga Murthy.
(b) **Department:** Botany
(c) **College where work has progressed:** ADB First grade college, Harapanahalli, Davanagere- district.
6. **Effective date of starting of the project:** 14-Nov-2013
7. **Grant approved and expenditure incurred during the period of the report:**
 - a. **Total amount approved Rs.** 138000/-
 - b. **Total expenditure Rs.** 138374/-
 - c. **Report of the work done:** Detailed report provided in bound copy
- i. **Brief objective of the project:**

The main objective of the project was to make scientific survey of traditional medicinal plants available in the study area, followed by their collection, authentication and preservation. In addition, interview of the traditional herbal practitioners to record the information on the medicinal use of these plants and also to create awareness regarding the conservation of medicinal plants.

ii. Work done so far and results achieved and publications, if any, resulting from the work:

Ethnobotanical survey has been conducted in different areas of Harapanahalli taluk during the project work. Frequent field trips have been made to the villages and interviewed the available traditional herbal practitioners. Information shared by these

practitioners on the traditional medicinal uses of medicinal plants was recorded. During the survey, 18 villages representing all the corners of the taluk were visited and interviewed 46 traditional herbal practitioners. A total of 92 traditional medicinal plants was collected, authenticated and preserved in the form of Herbaria at the department of Botany, ADB FG College, Harapanahalli. The medicinal uses of all these plants were recorded along with parts used, dosage, drug preparation and mode of administration.

Papers published/presented based on the results of the project work:

1. Traditional knowledge on edible medicinal plants of Harapanahalli taluk in Davanagere district of Karnataka, India, in *World Journal of Pharmacy and Pharmaceutical Sciences*. 2015; 4(1): 494-504.
2. Traditional medicinal plants used to treat human ailments in Harapanahalli taluk of Davanagere district, Karnataka, in *Journal of Medicinal Plants Studies*. 2015; 3(5): 27-31.
3. Medicinal plants used in the treatment of different types of fever in Harapanahalli taluk of Davanagere district, Karnataka. (Presented at the National Seminar)

iii. Has the progress been according to original plan of work and towards achieving the objective? If not, state reasons: Yes. Progress has been achieved according to the plan of original work

iv. Please enclose a summary of the findings of the study. One bound copy of the final report of work done may also be sent to the concerned Regional Office of the UGC.

Yes. Bound copy of the final report is enclosed

v. Any other information:

The minor research project conducted was found to be fruitful as it revealed the traditional knowledge on the local medicinal plants. It helped in creating awareness on the conservation of these valuable medicinal plants among the farmers and local people. These plants may be useful in the pharmaceutical industries for the production of novel drugs.

SIGNATURE OF THE PRINCIPAL INVESTIGATOR

PRINCIPAL

(Seal)

**UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002**

**PROFORMA FOR SUBMISSION OF INFORMATION AT THE TIME OF
SENDING THE FINAL REPORT OF THE WORK DONE ON THE PROJECT**

- 1. Title of the project:** “A Survey of Traditional Medicinal Plants in Harapanahalli Taluk of Davanagere District, Karnataka”
- 2. Name and Address of the Principal Investigator:** Dr. SM Siddalinga Murthy, Asst. Professor, House No-1/952, Teachers Colony, Harapanahalli-583131.
- 3. Name and Address of the Institution:** ADB First Grade College, Harapanahalli, Davanagere- Dist., Karnataka-583131.
- 4. UGC Approval Letter No. and Date:** MRP(S)-102/12-13/KAKU037/UGC-SWRO, 29-Mar-13.
- 5. Date of Implementation:** 14-Nov-2013
- 6. Tenure of the Project:** Two Years
- 7. Total Grant Allocated:** 138000/-
- 8. Total Grant Received:** 103000/-
- 9. Final Expenditure:** 138374/-
- 10. Title of The Project:** “A Survey of Traditional Medicinal Plants in Harapanahalli taluk of Davanagere district, Karnataka”.
- 11. Objectives of the Project:**
 - To make scientific survey of traditional medicinal plants available in the study area.
 - To interview the traditional herbal healers or practitioners of Harapanahalli taluk to get the information on medicinal use of plants.
 - Collection of traditional medicinal plants and their authentic taxonomic identification.
 - Preparation of standard herbaria of collected specimens and their preservation in the department of botany.
 - To create awareness among the local or rural people regarding the importance and conservation of medicinal plants.
- 12. Whether Objectives were achieved:** Yes achieved. Details are given below.

Ethnobotanical survey has been conducted in different areas of Harapanahalli taluk during the project work. Frequent field trips have been made to the villages and interviewed the available traditional herbal practitioners. Information shared by these practitioners on the traditional medicinal uses of medicinal plants was recorded. During the survey, 18 villages representing all the corners of the taluk were visited and interviewed 46 traditional herbal practitioners. A total of 82 traditional medicinal plants was collected, authenticated and preserved in the form of Herbaria at the department of Botany, ADB FG College, Harapanahalli. The medicinal uses of all these plants were recorded along with parts used, dosage, drug preparation and mode of administration.

13. Achievements from the project:

- The traditional medicinal plants available in the study area have been revealed.
- All the available traditional medicinal plant species were preserved in the form of photographs and herbaria for the future reference
- Herbal practitioners and other knowledgeable persons were identified and gathered information from them on the traditional medicinal uses of plants.
- Documentation of traditional knowledge on these medicinal plants has been carried out.
- Documenting the indigenous knowledge through ethno-botanical studies is important for the conservation of biological resources as well as their sustainable utilization.
- Awareness on the protection and conservation of these valuable medicinal plants has been created among the local people
- The specific medicinal uses of these local including endemic species has been brought to the notice of scientific world through publication.

14. Summary of the Findings

Harapanahalli is one of the important taluks in Davanagere district of Karnataka state possessing a rich heritage of medicinal plants. People of this area exhibit a vast diversity in their culture, tradition and living system. Majority of them depend on local traditional herbal medicine to cure their various ailments. During the research project, a total of 32 traditional herbal healers (26 men and 06 women) of age group between 42 and 84 years were identified from the different villages of the taluk. Frequent field trips were undertaken to collect the information on traditional medicinal plants from these herbal

healers during different seasons of the years from November 2013 to August 2015. Based on the traditional information, a total of 92 plant species were identified and collected from different places of the taluk. The detailed information on local name, part of the plant used, dosage, mode of preparation, side effects if any, etc., was gathered and compared with the literature. All the plant species were brought to the laboratory and authenticated with the help of floras. The herbaria were prepared and deposited in the department of Botany. The photographs of the traditional healers and medicinal plants along with part used were taken and documented. Documenting the indigenous knowledge through ethnobotanical studies is important for the conservation of biological resources as well as their sustainable utilization.

15. Contribution to the Society:

The collected information may serve as a basic source for progressive research work in the field of medicinal plants. The plants reported in this research project can be taken up for further pharmacological and clinical studies useful in the formulation of new drugs. Awareness on the importance and conservation of traditional medicinal plants was created among the local people of the taluk through this project. People of the study area recognized the value of disappearing wild medicinal as well as edible plants. During the field work many rural people realized the medicinal importance of plants and thereby shown their concern over the cultivation and protection of medicinal plants.

16. Whether Any Ph.D. Enrolled/Produced out of the Project: -No-

17. No. of Publications out of the Project: 2+1 (Papers attached in bound copy)

PRINCIPAL INVESTIGATOR

PRINCIPAL

(Seal)