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Studies on utilization patterns of *Terminalia chebula* Retz. in Sirsi forest division of Uttara Kannada district of Western Ghat region, Karnataka, India

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Abstract

Terminalia chebula Retz. commonly known as Harar (Hindi) and Analekai/Alale(Kannada) having a trading name of 'Chebulic myrobalan' belongs to the family Combretaceae and is indigenous to India and Southeast Asia. This is a medium to large deciduous tree, younger stems glabrescent and woody growing up to 30 m tall, with a trunk up to 1m in diameter. *T. chebula* occurs scatteredly in Teak forests, and deciduous forest and extends into forests of comparatively dry types. Harar has been traditionally used in the Indian system of medicine Ayurveda. It is routinely used as a household remedy throughout the subcontinent for treating various illnesses. It is also used in many of the standard preparations such as 'Triphala' and 'Chyawanprash' which is used as a food supplement. Myrobalans are also used in the preparation of ink and in dye as a mordant for the basic aniline dyes and the fruit is extensively used for tanning. However studies on utilization patterns of this species were rarely documented. Keeping in view the socio-economic importance of this species, the present study was conducted to document the utilization patterns of *Terminalia chebula* Retz. tree by local people in the villages of Sirsi Forest division using a participatory discussion method through a questionnaire survey. The survey was conducted in 22 different villages of Sirsi Forest division which is located in the Uttara Kannada district of Karnataka. A total of 85 families were surveyed from these villages. The present study documented fifteen different using patterns of *Terminalia chebula* tree used by local people of this region. This study also documented the seven different medicinal usages of this tree from this region which was used by the local people to treat various human and animal ailments. Fruit (100%) was the most frequently used part of this tree followed by fuelwood (42.35%) and leaves (9.41%) for manuring.

Keywords: *Terminalia chebula*, utilization, indigenous knowledge, myrobalan, fruit, fuelwood

Introduction

The World Health Organization reported that 80% of the world population relies chiefly on traditional medicines involving the use of plant extracts or their active constituents (Anon, 1993) [1]. It has been estimated that in developed countries such as the United States of America, plant drugs constitute as much as 25 percent of the total drugs, while in fast-developing countries such as China and India, the contribution is as much as 80 percent. Thus, the economic importance of medicinal plants is much more in countries like India than in the rest of the world. In the last few decades, herbal medicine has become popularized in both developed and developing countries (Naik *et al.* 2004) [14]. This is because herbal medicines are cheap and have a natural origin with higher safety margins and lesser or no side effects (Ayyanar and Ignacimuthu, 2011) [3]. In different sections of the country, practitioners of the various Indian systems of medicine (ISM), including Ayurveda, Unani, Siddha, and the homoeopathic systems, have attempted to use and continue to use locally grown plants (Hussain *et al.* 2005) [9]. In most developed countries, over 25 percent of new prescriptions are currently filled with one or more plant-based medications. In comparison to synthetics and antibiotics, plant-based formulations have been shown to be more biologically compatible with the human body. They are also less toxic and have fewer adverse effects when used over an extended period of time. As a result, interest in and demand for plant-based goods, pharmacological intermediaries, and natural fragrance compounds are booming.

Traditional healing system around the world that utilizes herbal remedies are an important resource for the discovery of modern drugs (KoeHN and Carter, 2005) [12].

In India, the *Terminalia chebula* tree is distributed throughout the greater part except for the arid zone (Troup, 1921) [15]. It is found in the sub-Himalayan tract from the Ravi eastward to West Bengal and Assam, ascending up to an altitude of 1,600 m. Harar has been traditionally used in the Indian system of medicine: Ayurveda. It is an important herbal drug in Ayurvedic pharmacopoeia and is called the “King of Medicines” (Khan and Jain, 2009) [11] because of its multi-therapeutic value. Traditionally, *T. chebula* has been used to treat kidney and urinary disorders, nervous disorders, colic pain, chronic cough, sore throat, asthma, etc. It is also used as a laxative, antitussive, diuretic, digestive, antidiabetic, and as cardiogenic remedy (Chander and Chauhan, 2014) [7]. Harar is also useful in blood pressure, carious teeth, cough, dysentery, diarrhoea, piles, vaginal discharge, ulcers, vomiting, and worms and has been held in high esteem in Hindu medicines. The fruit is rich in tannin and its content varies with geographical distribution. The fruit pulp of *Terminalia chebula* is used in many of the standard preparations such as ‘Triphala’ and ‘Chaywanprash’ which are used as a food supplement. In some states of India and Gulf countries, fruit jam is used as a food supplement. Apart from medicinal and clinical uses, myrobalans are also used in the preparation of ink and in dye as a mordant for the basic aniline dyes and the fruit is extensively used for tanning. The wood is used for building purposes, agricultural implements, Plywood and in the matchbox industry. *Embllica officinalis*, *Terminalia bellarica* and fruits of the Hirda plant are used together as Triphala in traditional medicine. Triphala is used well for a number of illnesses, including acid reflux, constipation, and even eye problems. Toxins and other unwanted accumulations are removed from the body using fruit extract to enhance digestion and assimilation. Black myrobalan is a sweet, astringent, warming herb with an unpleasant taste. The fruits are used internally in the treatment of constipation, digestive and nervous complications, diarrhoea, dysentery, intestinal worms, haemorrhoids, rectal prolapse, abnormal uterine bleeding and

inflammation, vaginal discharge, involuntary ejaculation, coughs and asthma (Bown, 1995) [6]. Externally, it is used to treat ulcers, wounds, mouth inflammation and gum diseases. The fruit is harvested when ripe and sun-dried for later use.

Materials and Methods

Uttara Kannada district is one of the richest biodiversity parts of Karnataka and is also known for its richest treasure of medicinal plants. The total geographical area of this region accounts for 10,291 km² and of which 7,807 km² is under forest cover. Uttara Kannada is the only district in Karnataka, which has a forested area of about 80 percent and falls in the region of the Western Ghats (Bhat *et al.* 2014) [5]. The Sirsi forest division falls in Sirsi and Siddapur talukas with a small portion of Mundagod Taluk. The total forest area of the division is 171828.19 ha. The forest area accounts for 77.96% of the total geographical area of the division. As we move towards ghats, forest types largely vary from scrub type - unwooded - moist deciduous, semi-evergreen, evergreen and wet evergreen forests. 70-80% of natural forest is concentrated in the crest of the Western Ghats falling in this division. Varying climatic conditions add to the vertical diversity of forests in the division from scrub type in the plains to wet evergreen in the ghats. The forest surrounds the towns of Sirsi and Siddapur, more or less in a compact extensive belt towards the west and in scattered bits separated by cultivations, Bettas (protected forests) and minor forests towards the east. The study area approximately lies between 14° 12' and 14° 51' northern latitudes and 74° 34' and 75° 4' 1' eastern longitude (Fig 1).

The present study was conducted to document indigenous knowledge of *Terminalia chebula* tree by local people of Sirsi Forest Division by participatory discussion method through a questionnaire survey. The survey was conducted in 22 different villages of the Sirsi Forest division (which comprises five Forest Ranges (*i.e.* Sirsi, Hulekal, Banavasi, Siddapur, and Janmane) nearby the natural populations of *Terminalia chebula*. A total of 85 families were surveyed from these villages. Families were selected randomly in the study area to know its using patterns by local people.

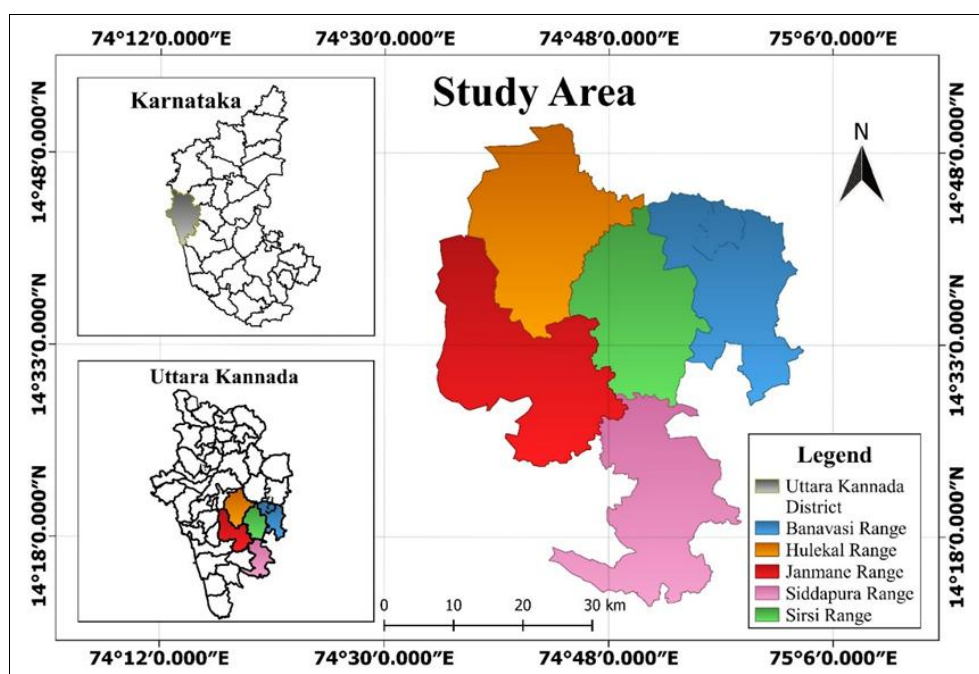


Fig 1: Location of the study area

Results and Discussion

Uttara Kannada district is one of the affluent biodiversity parts of Karnataka and is also known for its richest treasure of medicinal plants. These traditional forest dwellers have extensive knowledge regarding plants and various other resources that are prevalent in their surroundings. Proper documentation of ethno-medicinal knowledge is a prime requirement to preserve ancient knowledge. In this study, a total of 85 families from 22 different villages of the Sirsi forest division were surveyed and different using patterns of *Terminalia chebula* were documented which are used for various purposes by the local people in their day to day life.

The present study also documented the seven different medicinal usages of *Terminalia chebula* tree from the study area (Table 1). The various medicinal usages which are documented from the study are in descending order of Treatment of septicemia of limb (43.52%), which is a common illness among farmers who are working in moist agricultural land. Followed by treating dry cough (14.11%), cure skin wrinkles (4.70%), and controlling

dysentery (3.52%). Other medicinal usages like treating pimples, stomach pain relief, and treating Asthma each have documented percentage usages of 1.17%. For treating septicemia of the legs, whole fresh fruit is rubbed on a hard surface and the pulp extract is applied to the infected parts. This remedy method is followed by all respondents in the study area. For treating dry cough, stomach pain relief, and treating asthma, fresh fruit pulp is sun-dried and made into a powder and consumed orally with milk or water until cured. Fruit was most common among the tree part, which is used by locals to cure various ailments as a household remedy. A similar documentation was made by Joshi *et al.* (2020) ^[10], in which the author documented 5 different medicinal usages of *Terminalia chebula* for the treatment of human ailments such as loss of appetite, blood pressure, cough and cold, fever, and stomach ache. Another similar documentation was made by Dinesh *et al.* (2017) ^[8], where they documented 5 various medicinal usages of this tree for treating human ailments like Cough, asthma, toothache, eye infection, hiccup and 2 kinds of livestock ailments.

Table 1: Different medicinal usages of the *Terminalia chebula* tree documented in the study areas of Sirsi Forest division

Sl. No.	Medicinal Usages	Plant part used	No. of Families used	Per cent Usages
1	Treatment of septicemia of the legs	Whole fruit	37	43.52
2	Treating Dry Cough	Fruit pulp	12	14.11
3	Cure Skin Wrinkles	Fruit pulp	4	4.70
6	Controlling Dysentery	Dried fruit Pulp powder	3	3.52
4	Treating Toothache	Fruit pulp	1	1.17
5	Stomach pain relief	Dried fruit Pulp powder	1	1.17
7	Treating Asthma	Dried fruit Pulp powder	1	1.17

N = 85

This study documented the fifteen different using patterns of *Terminalia chebula* tree by local people of this region as shown in Table 2. Among the different usages, medicinal usage was highest (69.41%), followed by firewood (42.35%) where local people depending on woods and branches for the cooking purpose, treating foot and mouth diseases of cattle (30.58%) where the fruit pulp juice is extracted and mixed with water and cattle with foot and mouse diseases are made to stand in that

water which eventually cures this diseases. Land smearing (29.41%) in which Black dye extracted from the fruit is mixed with cow dung and applied to house premises. Followed by Triphala churna making by mixing the dried fruit of *Terminalia chebula* along with the *Phyllanthus emblica* (Amla/Indian gooseberry) and *Terminalia bellarica* (Bahera). Other uses documented are Black dye extraction (10.58%), and preparation of manures (9.41%), by the leaves of these trees.

Table 2: Different utilization patterns of the *Terminalia chebula* tree documented in the villages of Sirsi Forest Division

Sl. No.	Different purposes of usage	Parts used	No. of Families used	Per cent Usages
1	Medicinal Uses	Fruit	59	69.41
2	Fuelwood	Wood and branches	36	42.35
3	Foot and mouth diseases of cattle	Fruit	26	30.58
4	Land Smearing(Black dye + cow dung)	Fruit	25	29.41
5	Triphala churna making	Fruit	9	10.58
6	Black dye extraction	Fruit	9	10.58
7	Manuring	Leaves	8	9.41
8	Insect repellent(in areca nut)	Fruit	4	4.70
9	Areca nut fungal diseases	Fruit	4	4.70
10	Fishing	Fruit	2	2.35
11	House painting	Fruit	1	1.17
12	Hair dying	Fruit	1	1.17
13	Colouring of Black Pepper	Fruit	1	1.17
14	Colouring of Footwear	Fruit	1	1.17
15	Paddy fungal diseases control	Fruit	1	1.17

N = 85

The fruit pulp extracts is mixed with other fungicides and sprayed to the areca nut trees for effective control of the fungal infection (4.70%), and the *Terminalia chebula* fruit extracts is sprayed around the areca nut trees which acts as insects repellent (4.70%). And other using patterns documented in this study are Fishing (2.35%) by using fruit pulp, Traditional house painting,

hair dying, the colouring of black pepper, the colouring of footwear, and fungal diseases controlling in paddy, each with using percent of 1.17%. However, in recent years the use of these tree by locals decreased due to the decline in the population of *Terminalia chebula* and lower regeneration.

The results are found similar in accordance with the study

conducted by Miah *et al.* (2006) ^[13] on using patterns of the Triphala trees. Study documented 8 different using patterns of trees like fodder, fruits, fuel, life fence, medicine, religious, shade and timber. A similar documentation was made by Arya and Sunny (2016) ^[2]. They documented 9 different using patterns of *Terminalia chebula* like medicine, edible food, fodder, fuel, timber, dye, handicrafts, religious, and ornament.

The study documented that the maximum parts used by local people of this tree was fruit which is used (100%), followed by woods and branches (42.35%) which is mainly used for fuel purpose in villages, and leaves (9.41%) which is used for the manuring purpose, and no use of bark and roots have revealed by the respondents from the study area (Table 3). The results are in line with the study conducted by Miah *et al.* (2006) ^[13] on using patterns of the Triphala trees. Study documented the fruits (100%) used by all villagers, followed by wood for fuel (78%) and a shade (76%) and less important is documented for religious and fodder purposes.

Table 3: Percent parts of *Terminalia chebula* tree used by local people in Sirsi Forest Division

Sl. No.	Parts used	Total no. of respondent used	Percent utilization
1	Fruits	85	100
2	Woods and branches	36	42.35
3	Leaves	8	9.41

N = 85

Extensive fruit collection by locals and seeds enclosed in a hard endocarp which requires a longer time for germination are the reasons for the poor natural regeneration of Harar (Bag *et al.* 2013) ^[4]. Usually, this tree yields seeds of 30 to 40 kg/year/tree. And locals collect these seeds for household use. Around 7 to 8 kg/year of these fruits are collected by local healers/traditional practitioners for medicinal usage. The villagers sell fruits of this tree to the local buyers.

Conclusion

Herbal medicines of *Terminalia chebula* are cheap and have a natural origin with higher safety margins and lesser or no side effects and are easily accessed by local people. Local communities of Sirsi Forest division have extensive knowledge of plants and other resources prevalent in their surroundings. Based on the presence of enriched indigenous medicinal knowledge, local communities use it for a variety of purposes. In this study, a total of 85 families from 22 different villages of Sirsi Forest Division were surveyed and 15 different using patterns of *Terminalia chebula* were documented, which are used for a variety of purposes by the local people of this region. Intensive and uncontrolled exploitation of its fruits, combined with the low rate of natural regeneration, has led to the drastic decline in its number in natural habitats. There is a need to conserve the species from anthropogenic factors to conserve its population in the wild.

There is scope to promote this species among the farmers to grow in their fields by artificial regeneration. Absence of natural regeneration of Harar in its natural population confirms the urgency of propagation of the species with the help of artificial techniques and minimizes destructive harvesting methods.

Proper documentation of ethnomedicinal knowledge is a prime requirement to preserve ancient knowledge. An extensive study is required to assess threat parameters of this species in natural habitats. Phyto-constituents analysis of the fruit is needed to know its medicinal properties to treat human ailments. Implementation of conservation measures is essential for

Terminalia chebula to increase the diversity of species. There is a need to study the viability of *Terminalia chebula* seeds at the nursery level to produce quality planting material for mass multiplication.

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