ISSN: 2322 - 0902 (P)
ISSN: 2322 - 0910 (O)

International Journal of Ayurveda and Pharma Research

Research Article

ETHNOMEDICINAL PLANTS USED BY TRIBES OF CHITTOOR DISTRICT OF ANDHRA PRADESH TO CURE MUSCULAR PAIN AND INFLAMMATION

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ABSTRACT

An ethnobotanical survey was carried out to collect the first-hand information on medicinal plants used by the inhabited and traditionally rich tribal communities (Chenchus, Yanadis and Nakkalas) in Chittoor district of Andhra Pradesh (AP) for the treatment of muscular pain and inflammation. The information was gathered by an integrated approach of botanical collections, group discussions and questionnaire. The survey revealed thirty forty (34) ethno-medicinal plants belonging to twenty one (21) angiospermic families specifically used for the preparation of medicinal remedies. The tribal claims on the medicinal plants are listed with Latin name, family, local name, part used, method of preparation, dose and its use in pain and inflammation conditions. The habit of frequently used plant were recorded includes tree species (44 %) followed by herbs (35 %) climbers (12 %), under shrubs (6 %) and shrub (3%). Most frequently utilized plant parts were leaves, followed by root, latex, whole plant, bark, fruits, rhizome and seeds. In this particular study the most dominant family was found to be Euphorbiaceae. The result clearly indicates that people living around Chittoor forest area hold valuable traditional knowledge of the use of medicinal plants for their primary health care need related to muscular injury and inflammation. These plant resources are important component in their local livelihood and to control overexploitation of these resources sustainable management approach and proper conservation strategy for the area is also highly recommended by bringing the involvement of local communities and forest department. More in-depth investigations on these claims through phytochemical and pharmacological parameters are required to explore their activities to deal with the conditions of pain and inflammation.

KEYWORDS: Traditional Knowledge, Chittoor, Muscular injury, Pain, Inflammation, Tribes.

INTRODUCTION

India is a treasure of traditionally well-practiced knowledge of medicinal plants since time immemorial. The majority of the country population still depends upon local knowledge systems to meet their day-to-day health needs. The folk knowledge system of medicine is of great significance as the 65 percent of the total population has access to only local medicinal plant [1], and nearly seventy (70) percent of the population lives in the villages, wherein they are struggling to access and afford the modern allopathic medicines [2]. Folk knowledge of using the medicinal plants ranks at the top in terms of the total number of users, the number of medicinal plants used and number of practitioners, but at some places the information on ethno-medicines has not been documented properly.

The major populations of the tribal and rural people, who are residing in completely remote areas are dependent on forest products for their daily needs and are prone to many health and accidental hazards during their traverse long journey in the forest. They often face painful swelling and injuries. Pain is an unpleasant sensation that can limit a person's capabilities and abilities to follow a daily routine. It often acts as an early warning signal to alert us that something is not right with the body. Pain can range from mild, localized discomfort to agony. Body pain is a common occurrence and can sometimes affect our everyday routines. It can be acute and short-lived, or become a chronic long-term problem. Some of the most common causes of injury at work are trips, slips and falls, manual handling and lifting accidents. The most frequent types of injury at

work are sprains and strains, back, head and neck injuries and repetitive strain injuries. Inflammation is–very generally speaking – the body's immune system's response to stimulus. There is a loss of function, for example, when the inflamed limb can no longer be moved properly. There are five signs, or symptoms, that may indicate an acute inflammation: redness, heat, swelling, pain and finding it hard to move the affected area of our body normally. Some inflammation may be minor, affecting only a small area and will heal on its own, but it can also be widespread, painful and require immediate treatment. [3]

In the light of the above, a compilation of ethnobotanical studies carried out in the Chittoor district of Andhra Pradesh (AP), with a special focus on the knowledge of tribes on native species of medicinal plants that are potentially useful for the treatment of painful conditions and inflammation due to injury.

MATERIALS AND METHODS

Study Area

Chittoor is a part of Rayalaseema region of Andhra Pradesh. The district occupies an area of 15,359 square kilometers (5,930 sq m). Chittoor district lies extreme south of the Andhra Pradesh state approximately between 12°37′-14°8′ north latitudes and 78°3′-79°55′ east longitudes. Thirty (30) percent of the total land area is covered by forests in the district. The soils in the district constitute red loamy 57%, red sandy 34% and the remaining 9% is covered by black clay black loamy, black sandy and red clay.

The important rivers in the district are Ponnai and Swarnamukhi rivers which originate in eastern ghats. The summer temperature touches 46° C in the eastern parts whereas in the western parts it ranges around 36° to 38° C. Similarly the winter temperatures of the western parts are relatively low ranging around 12° C to 14° C and in eastern parts it is 16°C to 18°C. Chittoor district receives an annual rainfall of 918.1 mm [4].

Ethnobotanmical Survey

Ethnobotanical survey was conducted in 2012 in fourteen villages namely; Bangarupalemu, Gudimallam, Karveti Nagar, Kuppam, Madanapalle, Mamandur forest, Nagari, Nimmanapalli, Pakala, Palamaner, Pileru, Puttur, Rangampeta and Talkona of Chittoor district were selected for the study (Figs. 1-3). Beside the rural people, the study area was the inhabitants of different tribal groups like Chenchus, Yanadis and Nakkalas. The claims were obtained through interview based on questionnaires and conversations in the local Telugu language (Fig 6A, 6B) with nearly 120 informants between the age groups of 40-70 years.

The questionnaire allowed responses on the local names of the plant, useful plant parts, method of preparation (i.e. paste, powder and juice), mode of the administration, dosage, form of usage (either fresh or dried) and whether the plants used either singly or in combination of other plants, minerals and salts. All the plants were taxonomically identified with the help of flora; "The Flora of Presidency of Madras" by Gamble[5] and other related work [6-16]. The process of collection of voucher specimens, preservation, herbaria and technique for the collection of ethno medicinal information was followed as per Jain and Rao. [17]

RESULTS AND DISCUSSION

The potentiality of ethno-botanical knowledge acts as an essential resource for developing new kinds of pharmaceuticals and other medicinally important products. The knowledge is not only useful for the conservation of age-old traditional culture practices as well as biodiversity, but also play a major role in development of new drugs [16]. The present study brought the traditional knowledge to public domain and discussed in detail the age old therapeutic methods employed by the tribal people used for the treatment of muscular injury and associated pain. Developing novel, effective and safe anti-inflammatory agents has remained a major thrust area in the main stream of system 'finding alternatives to Non Steroidal Anti-inflammatory drugs (NSAID's) for the treatment [18]. The study revealed thirty four (34) folk-medicinal claims on the treatment of pain related to muscular injury and inflammation, comprising thirty four (34) plant species belonging to thirty (30) angiospermic genera of twenty one (21) families (Table 1). The habit of frequently used plant were recorded on tree species (44 %) followed by herbs (35 %) climbers (12 %), under shrubs (6 %) and (3%) shrub (Fig.4). The collected data showed maximum number of the plants from the family Euphorbiaceae followed by Loganiaceae, Anacardiaceae, Apocynaceae, Caesalpiniaceae, Convolvulaceae and so on (Fig.5). While frequently used plant parts were leaves followed by root, latex, whole plant, bark, fruits, rhizome and seeds. (Fig.7)

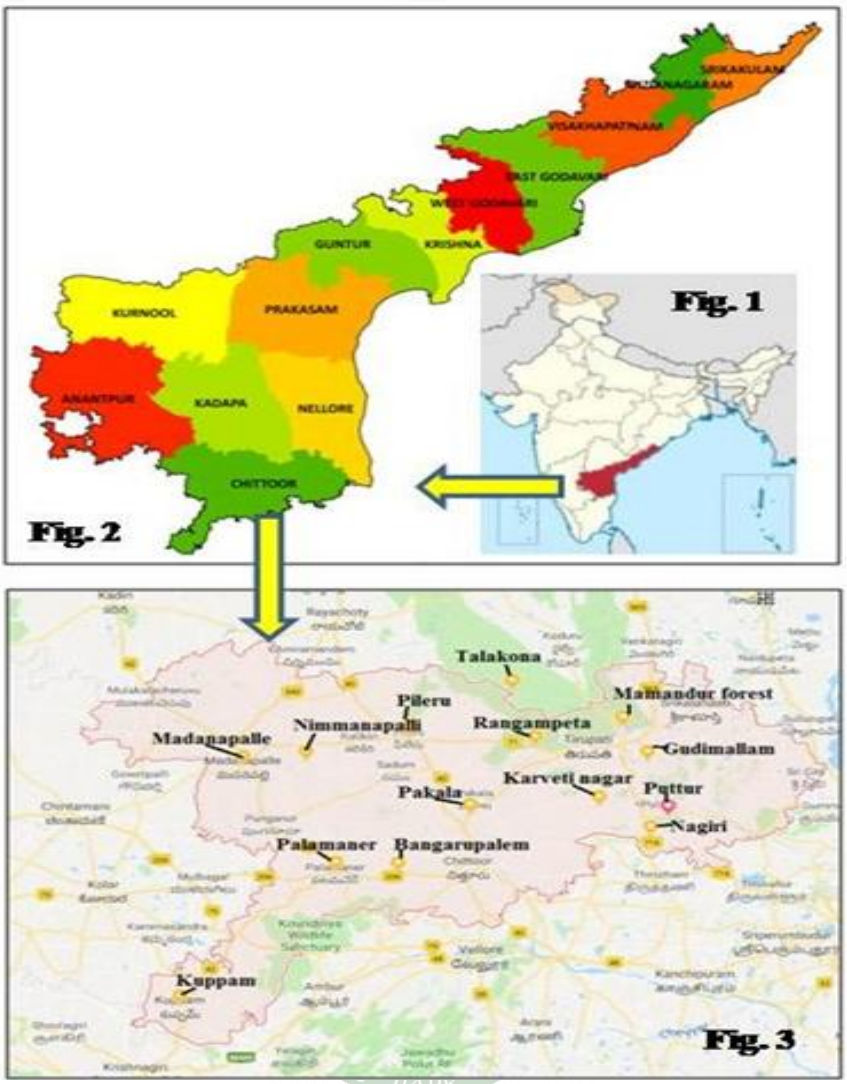
Majority of the recipes were prepared from the tree species with maximum utilization is of leaves (Fig.7). The findings corroborated with an earlier report by Baruah et al.[19]. Although, the data obtained during the study has also been compared and correlated with recent and past available literature[16-29]. It has been found that most of the new folk-medicinal claims are duly reported in the

present study either remained undocumented or their mode of administration, combination of ingredients and parts used are hitherto different from earlier work.

Table 1: Enumeration Folk Medicinal Species

S.No.	Botanical Name /Habit /Family/ Local Name	Part(s) Used	Tribal Claim
1.	*Alpinia galanga* (L.) Willd./ Herb/ Zingiberaceae / Dumparashtramu	Rhizome	Rhizome is made into a paste and mixed with a little amount of $CaCO_3$. External Application of the paste on the affected area gives immediate relief from the painful swellings due to injury.
2.	*Alseodaphne semecarpifolia* Nees/ Tree/ Lauraceae / Naramamidi	Bark (Fig. 6A)	The bark is grounded into the paste and the affected area wrapped with a cotton cloth (bandage).
3.	*Alstonia scholaris* (L.) R.Br./ Tree/ Apocynaceae/ Eduaakulaponna (Fig 9A-B)	Latex (milky sap)	The tree bark is peeled off and latex exudes (milky sap) applied externally.
4.	*Argyreia nervosa* (Burm. f.) Bojer/ Climber/Convolvulaceae / Smudrapala	Leaves and root	The roots are grounded into a paste, mixed with little amount of turmeric powder and applied externally. The affected area tied with one leaf of *A. nervosa* with the help of a cotton bandage.
5.	*Calotropis gigantea* (L.) R.Br./ Shrub/Asclepiadaceae / Tellajilledu	Latex and leaves	Latex produced by peeling the epidermal layers of the stem applied externally along with one leaf of *C. gigantea* followed by bandage with cotton cloth is found to be effective in pain.
6.	*Cardiospermum canescens* Wall./ Climber/ Sapindaceae/ Peddabusada	Root	External application of the paste made up of pounded root mixed with CaCO3 is effective in curing pain and inflammation.
7.	*Cardiospermum halicacabum* L./ Climber/Sapindaceae/ Chinnabusada	Whole plant	External application of the paste made from the whole plant is effective.
8.	*Carica papaya* L./Tree/ Caricaceae / Boppaya	Leaf	External application of the paste made from a pinch of $CaCO_3$, Camphor and water is applied, followed by wrapping bandage with few *C. papaya* leaves is effective in curing painful muscular injury.
9.	*Cassia occidentalis* L./ Under shrub/ Caesalpiniaceae / Kasinda	Leaf	Leaf juice is applied externally to the affected area.
10.	*Commiphora caudata* (Wight & Arn.) Engl./ Tree/ Burseraceae / Kondamamidi	Bark (Fig. 8A)	Bark is grounded into a paste and applied externally for pain.
11.	*Croton bonplandianum* Baill./ Herb/ Euphorbiaceae/ Galivanamokka	Whole plant	Whole plant is grounded into a paste and applied externally.
12.	*Curcuma amada* Roxb./ Herb/ Zingiberaceae / Mamidipasupu	Rhizome	External application of the paste made up from the rhizome along with a little amount of CaCO3 give immediate relief from painful swellings.
13.	*Cyperus rotundus* L. Herb/ Cyperaceae/ Tunga	Tuberous root (Fig.8B)	Tuberous roots are grounded into paste and applied externally on affected area.
14.	*Datura metel* L./ Under shrub/ Solanaceae/ Nallaummetta	Leaf (Fig. 10A)	Leaf juice is applied externally to the affected area.
15.	*Delonix elata* (L.) Gamble/ Tree/ Caesalpiniaceae / Chinnakesaramu	Leaf	Leaf juice is applied externally to the affected area.
16.	*Entada pursaetha* DC. / Woody Liana or Climber/ Mimosaceae /	Seed	The seed is rubbed on the stone by using lime water to get a paste, which is applied externally

	Gilateega		to the injury area.
17.	*Euphorbia antiquorum* L./ Tree/ Euphorbiaceae / Bommajamudu	Latex	The stem latex is applied externally on the affected area.
18.	*Euphorbia tirucalli* L./ Tree/ Euphorbiaceae/ Pullajamudu	Latex	The stem latex is mixed with camphor powder and applied externally to the affected area.
19.	*Ficus racemosa* L./ Tree/ Moraceae/ Atti	Bark and Latex (Fig.8C)	The bark is peeled off to produce latex and is mixed with turmeric powder to apply externally for the inflammation.
20.	*Ipomoea aquatica* Forssk. Procumbent Aquatic Herb/ Convolvulaceae / Tutiaaku	Whole plant (Fig.10B)	At the time of uncontrolled swellings, curry is made from the whole plant by using the sesame oil and consumed for three consecutive days to control inflammation.
21.	*Lepidium didymum* L./ Herb/ Brassicaceae/ Verrikotimeera	Whole plant	The whole plant is squeezed to produce juice and applied externally onto the painful area.
22.	*Mimosa pudica* L./ Herb/ Mimosaceae/ Attipatti	Root	External application of oil made from by mixing the grounded roots (5 Kg) sesame oil (10 liters) and goat milk (3 lt), followed by boiling the whole mixture until it becomes black. The squeezed oil from the mixture is applied.
23.	*Moringa oleifera* Lam./ Tree/ Moringaceae / Munaga	Root	Root is grounded into the paste and applied externally.
24.	*Plectranthus amboinicus* (Lour.) Spreng./ Herb/ Lamiaceae / Vaamuaaku	Leaf	Few heat exposed leaves (3-4) wrapped with a cotton cloth on the affected area.
25.	*Plumbago zeylanica* L./ Herb/ Plumbaginaceae/ Chitramulamu	Leaf and root	External application of paste made up of the grounded roots and leaves is used to treat the initial painful swelling.
26.	*Ricinus communis* L./ Tree/ Euphorbiaceae / Aamudamu	Leaf	External application of the leaf paste bandaged with cotton cloth
27.	*Semecarpus anacardium* L.f./ Tree/ Anacardiaceae/ Nallajeedi	Fruit	Fruits are grounded into paste and mixed with lime water to apply externally on the affected area.
28.	*Sida acuta* Burm.f./ Herb/ Malvaceae/ Chittimuttemu	Leaf	External application of the grounded leaf paste for the pain and swelling
29.	*Sida cordifolia* L. / Herb/ Malvaceae/ Chirubenda	Root	Roots are grounded into the paste and then boiled in sesame oil till it turned black, followed by squeezing with cloth. The final liquid applied on the affected area to treat muscular injury.
30.	*Sida retusa* (L.) Mast. / Herb/ Malvaceae/ Chittimutti	Root	Roots are grounded into paste by mixing camphor powder, applied externally to treat the swelling.
31.	*Spondias pinnata* (L. f.) Kurz/ Tree/ Anacardiaceae/ Adavimamidi	Fruits	Fruits are grounded into paste and applied externally.
32.	*Strychnos nux-vomica* L./ Tree/ Loganiaceae/ Mushti	Root	Powdered root is made into a paste by adding lime water and turmeric powder and is used to treat painful inflammation.
33.	*Vitex negundo* L. var. *purpurascens* Sivarajan & Moldenke / Tree / Verbenaceae/ Vavili	Leaves	Leaves are grounded into a paste and applied externally on the swelling area.
34.	*Wrightia arborea* (Dennst.) Mabb. / Tree/ Apocynaceae/ Potlapala	Latex and leaf	A paste of stem latex mixed with grounded leaf applied externally on the swelling area with the help of cotton bandage to remove inflammation and pain.



Figs. 1-3 Chittoor district map with studied areas

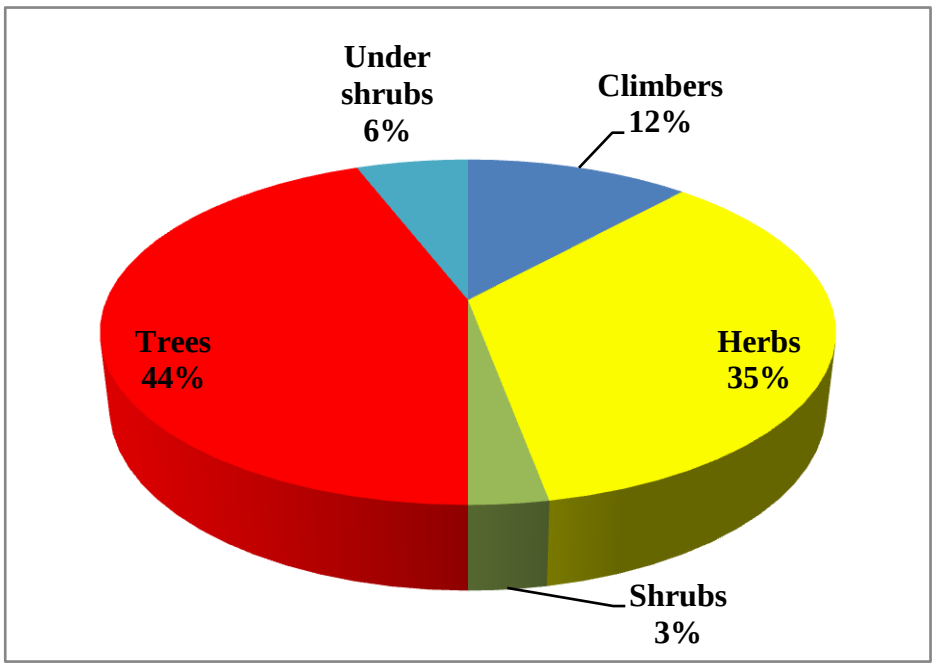


Fig. 4 Habit (%) of the Folk-medicines under studied area

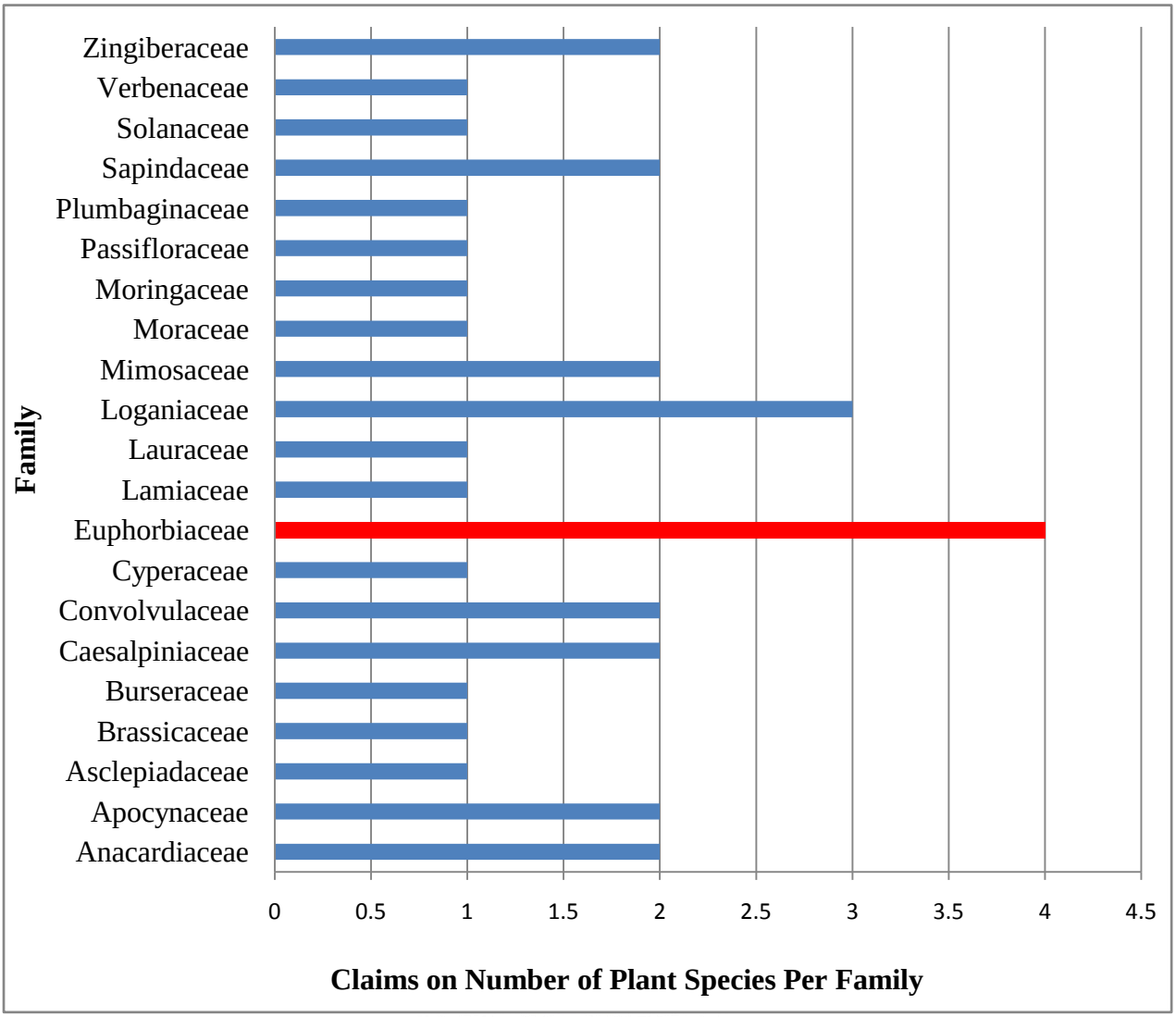


Fig. 5 Claims on Number of Plant Species (Family Wise)

Fig. 6A. Collection of Bark from the tree of *Alseodaphne semecarpifolia*
6B. Interaction with Chenchu Tribe

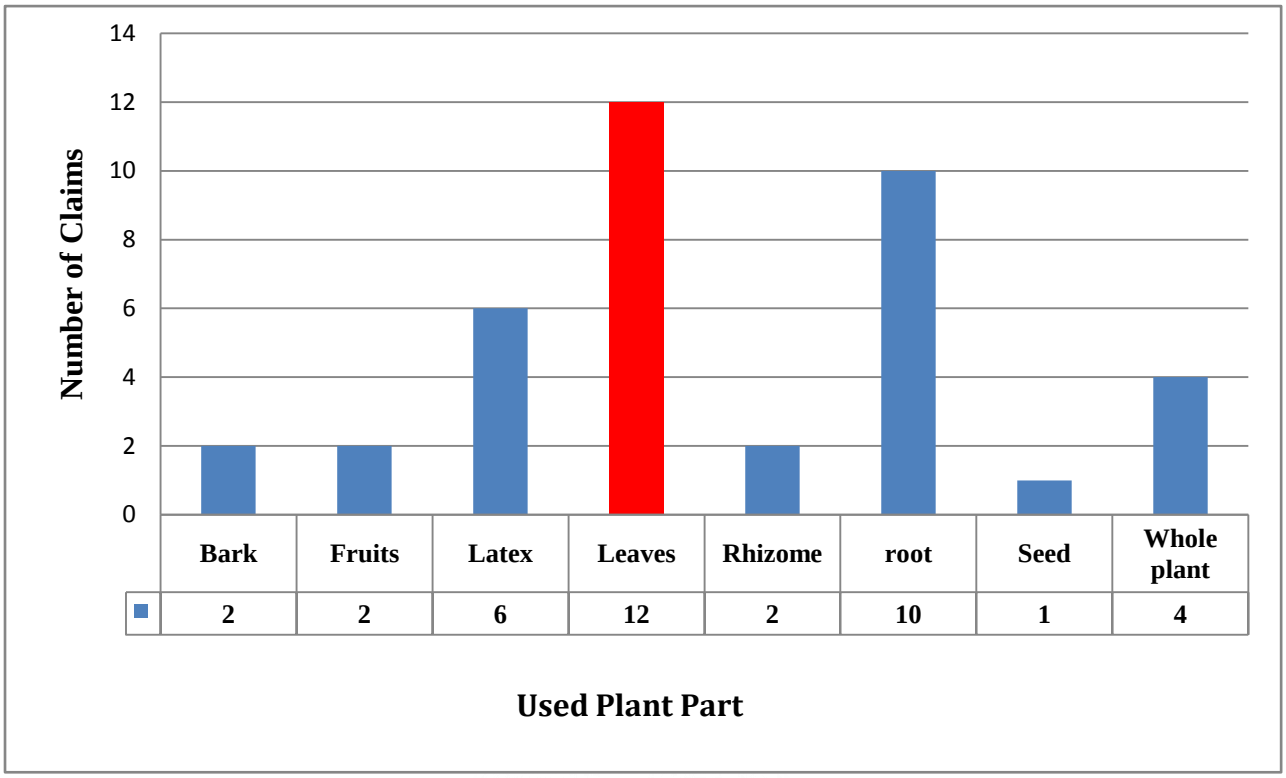


Fig. 7 Folk-medicinal Claims and Use (Frequency) of Plant or Part

Fig. 8A. *Commiphora caudata*, 8B. Tuberous roots of *Cyperus rotundus*, 8C. *Ficus racemosa* bark with latex

Fig. 9 *Alstonia scholaris* A. Bark; B. Flower

Fig. 10A. *Datura metel* **10B. *Ipomoea aquatica***

CONCLUSION

The findings of the study envisage that the tribal communities and rural people living in remote forest areas of Chittoor district are still depend upon the medicinal plants for their primary healthcare. The traditional knowledge on ethno-medicinal plants present in the area has great potentiality to cure different types of muscular pain and inflammations. Further validation of these claims by the advanced pharmacological and clinical studies may give some leads in the management of swellings and muscular injury in more natural way.

ACKNOWLEDGEMENTS

MK Husain is thankful to Central Council for Research in Unani Medicine (CCRUM), Ministry of AYUSH, Government of India for the Young Scientist Award. The authors are thankful to the Director-General, CCRUM, New Delhi for all necessary supports.

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Cite this article as:
Penchala Goli Pratap, Mohd Kashif Husain, G. Sudarsanam, Mokhtar Alam, Shahidul Khair, Munawwar Hussain Kazmi. Ethnomedicinal Plants Used by Tribes of Chittoor District of Andhra Pradesh to Cure Muscular Pain and Inflammation. International Journal of Ayurveda and Pharma Research. 2018;6(3):8-16.

Conflict of interest: None Declared

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