



## ETHNOVETERINARY MEDICINAL PLANTS USED TO TREAT BONE FRACTURE FROM RAYALASEEMA REGION ANDHRA PRADESH, INDIA

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### ABSTRACT

The paper deals with ethnoveterinary medicinal plants used to treat bone fracture to the animals. A total 24 plant species belonging to 24 genera and 20 families have been recorded from the Rayalaseema region of the Andhra Pradesh. Formulations and dosage of use were also given in the paper. Due to over exploitation of the medicinal plants in this region plants may undergo rare and endangered. So it is suggest that *ex-situ* and *in-situ* conservation is needed to overcome the said problem.

**Keywords:** Ethnoveterinary medicinal plants, Bone fracture, Rayalaseema region.

### INTRODUCTION

Ethnoveterinary medicine is a broad field encompassing people's beliefs, skills, knowledge and practices related to veterinary health care [1]. Medicinal plants traditionally used in the treatment of animal diseases play a crucial role in local health modalities. Specifically, phytotherapeutics often represent the primary form of therapy in rural veterinary care as allopathic modalities remain inaccessible, especially in the developing world [2]. However, traditional ethnoveterinary knowledge is still mainly orally transmitted from generation to generation (i.e., in the form of traditional remedies, poems, drawings stories, folk myths, proverbs and songs). In spite of enormous progress in modern medical system, about 80% of the world population still depends on traditional systems of medicine for primary health care. Due to the nature of oral transmission, this form of local knowledge remains fragile and threatened, and presents an urgent need for being recorded and documented. The present work is an effort to document and analyze the traditional knowledge regarding the practice and use of plants in treatment of bone fracture.

### Study area

Rayalaseema is a land-locked region with an area of 69,043Km<sup>2</sup> accounting for 25% of the total geographical area of Andhra Pradesh. The region by its location extends approximately from 12° 3' N to 16° 15' North Latitude and 76° 55' E to 79° 55' East Longitude. Geographically the Rayalaseema region forms the south

and eastern Indian peninsular. It includes within its fold the districts of Anantapur, Chittoor, Kadapa and Kurnool. It is bounded on the south by the state of TamilNadu and Karnataka, on the west by Karnataka state, on the north by Telangana region and on the east by coastal region of Andhra Pradesh. The Rayalaseema region has no coast line and is accessible only by land. The region lies mostly at an altitude of about 300 to 700 meters above mean sea level.

### MATERIAL AND METHODS

The methodology and mode of approach for this study is adopted from the classical works of Jain [3-5], Chadwick and Marsh [6], Hemadri [7], Martin [8]. Emphasis was given mainly to intensive field work in the selected tribal pockets. The present study was undertaken during the period 2010-2014. It is the outcome of intensive field trips were made in the 88 interior tribal pockets of the study areas. Four types of informants were chosen by selected sampling and random sampling methods, they are

- ❖ The Vaidyas and Medicine men
- ❖ Village Headman's, Priests, prominent persons, their wives and other women, those who are aware in the concerned.
- ❖ Man and women in working in the fields and Shandies (santha's) and other common places with fifty years old.
- ❖ Tribals, those who are cutting roots, tubers, herbs etc., in the forest.

### Identification of specimens

After completing the plant collection Each plant was critically studied and identified using the 'Flora of British India' by Hooker [9], 'Flora of Presidency of Madras' by Gamble, [10], 'Flora of Andhra Pradesh' by Pullaiah and Chennaiah [11] and with the available authenticated literature. The uses reported by the tribes were compared and thoroughly screened with the important works such as Gamble, Hooker, Chopra *et al* [12]. The Wealth of India, (1948-1976), Agarwal, [13], Jain and other recent works, so as to educate and bring new plants on to the agenda of Ethno-Veterinary Practices (EVPs).

### RESULTS AND DISCUSSION

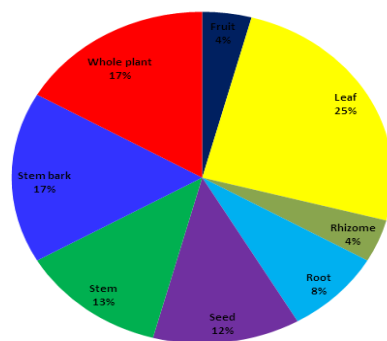
In all, 24 plant species belonging to 24 genera and 20 families (Rutaceae, Annonaceae, Poaceae, Caesalpinaceae, Rubiaceae, Cassythaceae, Vitaceae, Zinziberaceae, Cuscutaceae, Dilleniaceae, Tiliaceae, Malveceae, Anacardiaceae, Rutaceae, Euphorbiaceae, Plumbaginaceae, Solanaceae, Sterculiaceae, Boraginaceae, Fabaceae and Rhamnaceae. have been documented in the present study (Tables 1). Majority of plants used were collected from wild indicating the species diversity and abundance in the study area. This also indicates the need for conservation measures, especially for those plants with high use value. The leaves (25%) was most commonly used plant part to prepare the medicine, followed by stem bark and whole plant (17%), stem(13%) and seeds (12%), Root (8.%) and fruit and rhizome (4 %) (Fig.-1). However, in few preparations it was observed that more than one part

of the plant was used for medicinal preparation. Formulations prepared from 24 plant species, only six formulations contained two herbal ingredients, while the rest were single herb preparations (Table 1). All the preparations were applied externally as paste or poultice as a plaster. Application of the prepared drug depends on the portion of fracture, severity and physical appearance of an individual. The broken bones were set together to right position and were supported by bamboo sticks and tied with rope. The plant *Cissus quadrangularis* has been well studied in this regard and its bone fracture healing ability was established [14-16] Chopra et al, Deka et al [17]. Present study was planned in this context to document the existing EVPs in the Rayalaseema region area of India. Questionnaire and oral interviews were the tools used for the present study. Field visits and focused group discussions were used as the tools. The information was collected using pre-designed questionnaires and open-ended interviews. Focused group discussions were arranged to verify the information provided by the key respondents to reach more accurate results [18-20]. Ethno-veterinary Medicine is used for the maintenance of good animal health in developing countries [21]. Collection of rich data on existing EVPs used for livestock and pet animals in the Rayalaseema indicates that livestock and pet animal owners use the traditional system of veterinary medicine for primary health care same as stated by Reddy *et al* [22]. Plants constitute major part of EVM so most of the remedies reported in the present study are based on plants.

**Table 1. Ethno veterinary medicinal Plants used for Bone fracture**

S.No	Name of the species	Part used	Family	Local name	Dosage and mode of preparation
1	<i>Aegle marmelos</i> (L.) Correa	Leaves	Rutaceae	Maredu	Leaves are crushed with butter, applied over fractured area and bound to cure.
2	<i>Annona reticulata</i> L.	Fruit	Annonaceae	Ramaphalam	Unripened fruit paste is applied on the body of cattle daily once for 2days
3	<i>Bambusa arundinacea</i> (Retz.) Willd.	Stem	Poaceae	Veduru	Stick is tied on the bones for fifteen days to cure fractured area
4	<i>Bauhinia vahlli</i> Wight & Arn.	Stem bark	Caesalpinaceae	Addaku	Stem bark with that <i>Polyalthia longifolia</i> are taken in equal quantities and ground with alum is applied on the bone fractured areas and bandaged with the help of cotton cloth
5	<i>Canthium parviflorum</i> Lam.	Leaves	Rubiaceae	Chinna Balusu	Leaves boiled in goat milk are applied over fractured area and bound over it
6	<i>Cassytha filiformis</i> L.	Whole plant	Cassythaceae	Seethamma savaralu	Whole plant is pounded in human urine and banded over the affected part
7	<i>Cissus quadrangularis</i> L.	Stem	Vitaceae	Nalleru	About 75g of stem paste, 25g of rhizome paste of ginger and 20g of lime are mixed together. This paste is

					applied on broken part of the body as plaster and allowed to stay for 12-15 days as curative
8	<i>Curcuma longa</i> L.	Rhizome	Zinziberaceae	Pasupu	Fresh rhizome is ground, mixed in half litre lukewarm milk and given orally to the animal
9	<i>Cuscuta reflexa</i> Roxb.	Whole plant	Cuscutaceae	Seethamma savaram	Whole plant is given orally twice for week
10	<i>Dendrocalamus strictus</i> Roxb.	Stem	Poaceae	Konda veduru	Infusion of tender stem is given once in a day for three days for early cure
11	<i>Dillenia pentagyna</i> Roxb.	Whole plant	Dilleniaceae	Revadi chettu	Leaf paste is applied over the fractured area for 8-12 days to cure
12	<i>Grewia hirsuta</i> Vahl.	Root	Tiliaceae	Tadiki	Root paste is applied as a plaster
13	<i>Jatropha gossypifolia</i> Linn.	Root	Malveceae	Seema nepalam	Root paste is plastered over fractured bones
14	<i>Mangifera indica</i> L.	Stem bark	Anacardiaceae	Mamidi	Stem bark is separated by using a sharp stone and is crushed and mixed with rice gruel or water. This is given twice daily for healing fracture
15	<i>Murraya paniculata</i> (Linn.)Jack.	Leaves	Rutaceae	Kondakarivepa	Leaf paste is used as plastered over fractured bones
16	<i>Phyllanthus emblica</i> L.	Leaves	Euphorbiaceae	Usiri	stem galls ground with leaves of <i>Vanda tassellata</i> and the paste plastered over the parts
17	<i>Plumbago zeylanica</i> L.	Leaves	Plumbaginaceae	Agnimatha	Leaves and roots are ground with <i>Phaseolus mungo</i> seeds and made into paste, this is applied locally as a plaster for 3-5 consecutive days to aid fracture setting
18	<i>Solanum surattense</i> Burm.F.	Whole plant	Solanaceae	Nelavakudu	Whole plant ground with <i>Sesamum</i> oil and the paste plastered on effected parts of cattle
19	<i>Sterculia urens</i> Roxb.	Stem bark	Sterculiaceae	Kovela chettu	Highly viscous bark extract mixed with one egg. and 10 g asfoetida powder are mixed well; uniform paste is applied
20	<i>Tamarindus indica</i> L.	Seeds	Caesalpiniaceae	Chinta chettu	Seeds are pounded with those of <i>Phaseolus mungo</i> and a pinch of lime and the paste is used as a plaster
21	<i>Trichodesma indicum</i> L. R.Br.	Leaves	Boraginaceae	Guvvagutti	Leaves are grind with sesame seed oil and banded over the affected (fracture) part.
22	<i>Vigna mungo</i> (L.) Hepp.	Seeds	Fabaceae	Minumulu	Paste prepared from the seeds is applied around the affected parts of the fractured area and bandaged
23	<i>Vigna radiata</i> (L.) R. Wilcz	Seeds	Fabaceae	Pesalu	Seed paste is applied externally on bone fracture
24	<i>Zizphus oenoplia</i> (L.) Mill.	Stem bark	Rhamnaceae	Parima	Stem bark paste mixed with a pinch of turmeric powder is applied on the affected area daily twice for 3d.

**Figure 1. Part wise analysis of EVMP**

## CONCLUSION

Ethnoveterinary medicine provides the major source for the treatment of diseases in livestock throughout the world even today. Humans have used herbal remedies for curing different diseases of their domesticated animals since the beginning of civilization. People of the study area effectively used 183 plants in their different forms. Very common diseases of the animals were treated with perfection and care by the participation of people. This folk knowledge of the area documented will help provide information for curing the veterinary diseases of other areas in future. And also there is an urgent need for

biochemical analysis and pharmaceutical investigations of plant species used by the people of this region to formulate and standardize the medicine for sustainable uses, progress and development. The species may undergo to rare, endangered and threatened condition in this area due to over exploitation. So it is suggest that *ex-situ* and *in-situ* conservation is needed to overcome the said problem.

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## REFERENCES

1. Mc Corkle CM. An Introduction to ethnoveterinary research and development. *Journal of Ethnobiology*. 6, 1986, 129-149.
2. Katerere DR and D Luseba. *Ethnoveterinary botanical medicine. Herbal medicines for animal health*. Boca Raton, CRC Press, 2010.
3. Jain SK. Observations on Ethnobotany of the tribal of Central India. In, Jain, S.K. (ed.), *Glimpses of Indian Ethnobotany*. (Oxford & IBH, New Delhi). 1981, 193–198.
4. Jain SK. *A Manual of Ethnobotany*. Scientific Publishers, Jodhpur, 1987.
5. Jain, S K and S Shrivastava. *Dictionary of Ethno-veterinary plants of India*, Deep Publications, New Delhi, 199, 1999.
6. Chadwick DJ and J Marsh (ed.). *Ethnobotany and the search for new Drugs*. John Wiley & Sons, Chichester, U.K, 1994.
7. Hemadri K. *Shastravettalanum Akashistunna Girijana Vaidyam (Tribal Pharmacopoeia)*, Tribal Cultural Research and Training Institute, Hyderabad, 1994.
8. Martin G, *Ethnobotany - A method manual*. Chapman & Hall, London, 1995.
9. Hooker JD *et al. Flora of British India*. 7 Vols. London, 1872-1897.
10. Gamble JS, CEC. Fischer. *Flora of the Presidency of Madras* (Adlard & Sons Ltd, London), 1915-1930, Reprinted edition (Botanical Survey of India, Calcutta), Vols. 1–3, 1957.
11. Pullaiah T. *Flora of Andhra Pradesh*. Scientific Publishers, Jodpur, India. 3, 1997, 922-1349.
12. Chopra SS, Patel MR, Awadhiya RP. Studies of *Cissus quadrangularis* in experimental fracture repair, a histopathological study. *Indian Journal of Medical Research*. 64, 1976, 1365–1368.
13. Agarval VS. *Economic plants of India*. Kailash Prakasham, Calcutta, 1986.
14. Udupa KN, Prasad GC. *Cissus quadrangularis* in healing of fractures, a clinical study. *Journal Medical Association*. 38, 1962, 590–593.
15. Udupa KN, Prasad GC. Biomechanical and calcium-45 studies on the effect of *Cissus quadrangularis* in fracture repair. *Indian Journal Medical Research*. 52, 1964a, 480–487.
16. Udupa KN, Prasad GC, Further studies on the effect of *Cissus quadrangularis* in accelerating fracture healing. *Indian Journal Medical Research*. 52, 1964b, 26–35.
17. Deka DK, Lahon LC, Saikia J, Mukit A. Effect of *Cissus quadrangularis* in accelerating healing process of experimentally fractured radius–ulna of dog, a preliminary study. *Indian Journal of Pharmacology*, 26, 1994, 44–45.
18. Murty PP and GM Narasimha Rao. Ethnoveterinary medicinal practices in tribal regions of Andhra Pradesh. *Bangladesh J Plant Taxon*. 19(1), 2012, 7-16.
19. Goud PSP and T Pullaiah. Folk veterinary medicine of Kurnool district, Andhra Pradesh. *J Ethnobot*, 8, 1996, 71-74.
20. Reddy KN, Venkata Raju RR. *Journal of Econ Tax Bot*. 23(2), 1999, 347–357.
21. Kudi CA. Ethnoveterinary, complementary and low cost treatment and management of working animal. In *The Challenge of Improving the Transport Animal Welfare in the World, Ways Forward*. Workshop Held by World Association for Transport Animal Welfare and Studies (TAWs), Silsoe Research Institute, UK, 2003.
22. Reddy KN, Subbaraju GV, Reddy CS. *Indian J Tradit Knowledge*. 5(3), 2006, 368–372.