

Research Article

A PRELIMINARY REPORT ON THE INDIGENOUS KNOWLEDGE ON ANIMAL HEALTH CARE PRACTICES IN BARGARH DISTRICT OF ODISHA, INDIA

Alok Ranjan Sahu^{1*} and Maninee Sahu²

¹Department of Botany, Saraswati +3 Science (Degree) College, Near Petrol Pump, Kesinga Road, Bhawanipatna, Odisha-766002, INDIA

²Department of Physics, Ghess College, Ghess, Odisha-768034, INDIA

*Corresponding author's E-mail: alok.btgene@gmail.com

KEY WORDS:

Ethno veterinary, livestock, medicinal plant, traditional medicine

ARTICLE INFO

Received on:

19.05.2017

Revised on:

02.08.2017

Accepted on:

04.08.2017

ABSTRACT

The objective of the present work was to register and document the traditional knowledge of plant resources used in ethnoveterinary practices in Bargarh district of Odisha, India. Survey was carried out in the interior of the district, to explore the therapeutic uses of plants by local inhabitants. Information was gathered from traditional healers, elderly people and farmers by using participant observation, open-ended conversations and semi-structured questionnaires. The investigation was conducted during 2015 to 2017 in order to generate ethno veterinary data. Domestication of animals brings cash income to the rural families, bringing protection against the social depressions in addition to providing milk products like rabidi, chena, paneer, ghee, etc. of high nutritional value. In present study we have discussed the Ethnobotanical uses of 50 plants belonging to 33 families have been documented in the present study for their interesting therapeutic properties for various veterinary ailments such as diarrhoea, injury, fever, digestive disorders and maternity complications etc. The family Fabaceae had the largest number of reported species. Leaves were more commonly utilized for the preparation of ethnoveterinary medicine than other plant parts. Documentation of traditional knowledge related ethnoveterinary information and identification of potential species for prioritization of conservation through sustainable management is essential for the benefit of future generations. The present study contributed to the construction of an inventory of ethnoveterinary plants, which might provides a better database for future scientific validation studies.

INTRODUCTION

India is a huge storage area of medicinal plants that are used in traditional medical treatments. The various indigenous systems such as Siddha, Ayurveda, Unani and Allopathy use several plant species to treat different ailments. It is a well-established fact that plants play an essential role to treat various disease and disorders of common people. Medicinal plants are the valuable gift of our mother nature for natural healthcare. A huge number of modern drugs have been isolated from natural sources mostly from the plant world. The plant based traditional medicine systems persist to play a vital role in health care, with about 80% of the world's farmers and animal growers relying mainly on traditional medicines for treating routine maladies for their livestock (Sahu *et al.*, 2016; Sahu and Sahu, 2017). The science that completely deals with treating their livestock and other domestic animals with traditional medicine is known as 'ethnoveterinary medicine'. Mc Corkle (1986) coined the term *Ethno-Veterinary*. Though, there is no authentic evidence of when and how

plants came into usage for curing the domestic animals, the rural people seems to be aware of it through generations. It has been reported that many rural peoples use local herbal medicines for treatment of their domestic animals and the role of ethnoveterinary medicine in livestock development is beyond dispute (Misha and Patro, 2010; Mallik *et al.*, 2012; Galav *et al.*, 2013; Yadav *et al.*, 2014; Sahu *et al.*, 2016). Odisha being an agricultural state with predominance of rural population and hence animals, particularly cattle, play an important role in economy and social welfare. Farmers of Odisha have to treat their domestic animals with traditional medicines in spite of the availability of a large number of veterinary dispensaries and veterinary hospitals, primarily because of high cost of allopathic medicines and their associated side effects, cultural preferences and unavailability of required medicines in veterinary dispensaries and hospitals. So far some authors (Misha and Patro, 2010; Mallik *et al.*, 2012) reported the ethnoveterinary practices and gathered information in the field of ethnoveterinary medicine has

been focusing on the folk knowledge for Odisha in general, and Bargarh district in particular (Sahu *et al.*, 2016). People of this district generally depend upon agriculture and animal husbandry. The tribal usually domesticate buffalo and ox for ploughing, cow for milk and goat for milk purposes. They also rear poultry for their own use, as well as for sale in the market to earn their livelihood. Though they are not very much aware of the health care of domestic animals with modern allopathic medicines because of the remoteness of the area, they treat these animals with traditional herbal medicines. Even the people in urban areas also treat their domestic animals with the herbal medicines, which are safe to use without any side effect (Sahu *et al.*, 2016). Further, proper research in ethnoveterinary medicine will no doubt help to confirm the claims made by ethno-veterinarians with respect to the efficacy of ethnoveterinary treatments by ethno-veterinarians. Hence, there is need to standardize ethnoveterinary medicines to fully integrate it into traditional medicine. Many countries have documented ethnoveterinary practices with special emphasis on use of medicinal plants and some countries have already developed databases on botanical resources and using them in their research studies and development. Basing upon these backgrounds, the present study was conducted in different Blocks of Bargarh district to identify, collect and document the ethnoveterinary medicinal plants used by people of this area and their utilization for primary

health care of animals in treatments of different ailments.

MATERIALS AND METHODS

Study area

The current study was carried out in Bargarh district of Odisha, India (Fig. 1.). The Bargarh district is situated in western zone of the Odisha at 20° 43' - 20° 41' N and 82° 39' - 83° 58' E with an area of 5837 Sq km (Sahu *et al.*, 2010; Sahu *et al.*, 2013; Sahu *et al.*, 2016, Sahu and Sahu, 2017). Bargarh is the 12th district in terms of size and 13th in terms of population. Bargarh is the 17th urbanized district in state having only 10.13% of its population live in urban areas as against 16.69% of state's population living in urban areas. Bargarh district is bounded on the north by the state of Chhatisgarh and on the east by the district of Nawapara. The physiography of the Bargarh district gives a perfect platform for the tribal in sustaining their ethno cultural identity. The soil is red, red black and alluvium type. The district enjoys a tropical monsoon. The forests are dry deciduous and moist type. The district is inhabited by tribes like *Sahara, Binjhal, Kondh, Gond, Munda, Kuli, Oran, Kisan, Mirdha, Kharia* and *Parja*. Out of these, *Sahara, Binjhal, Kondh* and *Gond* are the predominant tribes (Sahu *et al.*, 2010; Sahu *et al.*, 2013; Sahu *et al.*, 2016). Even though modern system of medicine has influenced the people, still these people not only earn their livelihood from the forest but also go on forest for medicines for the treatment of different diseases.

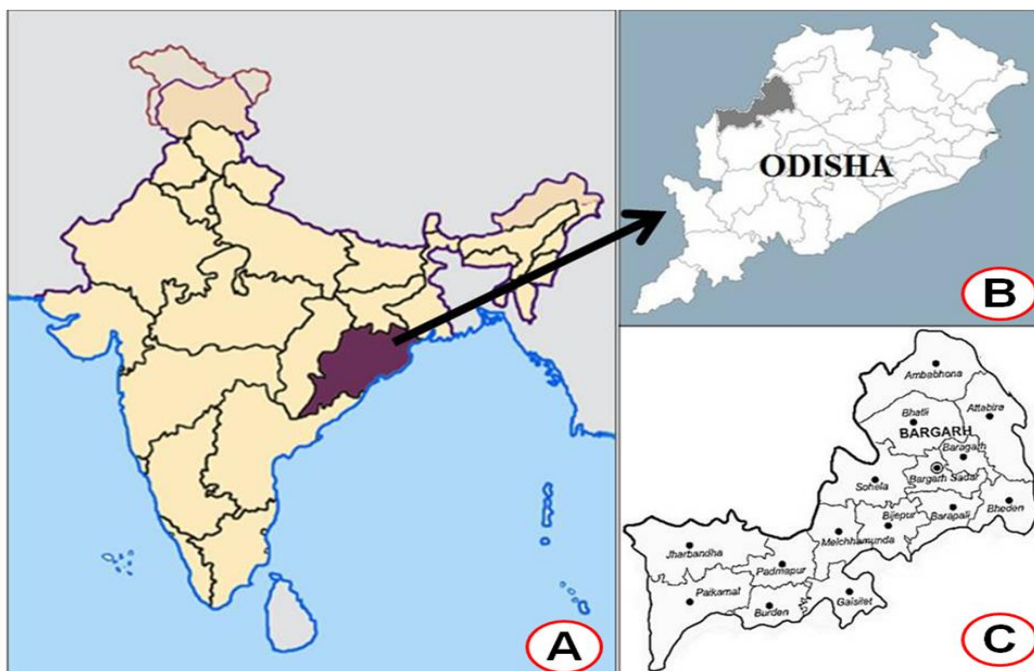


Fig. 1. Location of the Odisha state in the eastern region of India (A), map of the Odisha state (B), and area showing different blocks of Bargarh district (C).

Data Collection

The rural peoples are dependent on forest and natural vegetation for their daily requirements. Therefore present research was focused in different villages nearby forest areas of Bargarh district of Odisha. Data collection on the study area was carried out during 2015 to 2017, following established and standard procedures (Sahu *et al.*, 2010, Sahu *et al.*, 2013; Sahu *et al.*, 2016). The study area was visited frequently and close interaction were made with the senior tribal people practicing herbal medicines. During field work, interviews were conducted with local knowledgeable villagers, the herbal healer called 'Vaidyas', 'Kabiraj' (local physicians in Indian System of Medicine), old woman and medicinal plant vendors. Plant specimens were collected and identified with local flora (Saxena and Brahmam, 1996). Some of the elderly people practicing such medicines did not easily reveal the truth directly, so indirect methods adopted to extract directly or indirectly. Moreover common tribal people were also contacted to know about their common ailments and healing methods. All information thus collected were scrutinized and compiled in a tabular form.

RESULTS

In the present study ethnoveterinary uses of 50 medicinal plant species belong to 48 genus and 33 families are documented. The genus *Ficus* (includes *Ficus racemosa* L. and *Ficus religiosa* L.) and *Terminalia* (includes *Terminalia arjuna* (Roxb. ex DC.) and *Terminalia chebula* Retz.) have two species in each, respectively. The routine maladies of livestock viz. diarrhoea, injury, fever, digestive disorders and maternity complications etc. are treated with these medicinal plants. Detailed information pertaining to these medicinal plants used in ethnoveterinary medicine viz. their botanical name, vernacular names, name of the family, part used, mode of preparation, administration, doses and duration for each plant is given below (Table 1.). Few photograph of plant parts that were used for ethnoveterinary purpose by the natives of Bargarh district was shown in Fig. 2. Among plant parts, leaf (38%) is more commonly used, followed by seed (20%), fruit (12%), whole plant (10%), bark (8%), rhizome (4%) and 2% each of bulb, root, seed oil and latex respectively (Fig. 3).

Table 1. Plant species used for Animal Health Care Practices in Bargarh District of Odisha, India

Botanical name, Family & Local Name	Parts used	Dosage and mode of application
<i>Abrus precatorius</i> L. (Fabaceae), 'Kaincha'	Leaf, seed	About 5-10g powdered seed with water is given to cure cardiac problems. Further leaf paste is applied on gall neck and breast swellings.
<i>Acacia nilotica</i> (L.) Del. (Mimosaceae), 'Ghuhuria'	Pod, Twigs	Tender pods are given every morning and evening to enhancing the lactation. Further about 500g tender twigs are given as feedstuff for two to three days to buffaloes for curing diarrhoea.
<i>Achyranthes aspera</i> L. (Amaranthaceae), 'Latkana'	Leaf	Leaves pounded into a paste is applied on genital part and allowed to inhale the same for easy delivery and retained placenta
<i>Aegle marmelos</i> Correa ex Roxb. (Rutaceae), 'Bel'	Fruit	Paste of 500g unripe fruit mixed with 50g dried ginger fed orally once a day, for two to three days to treat dysentery and diarrhoea.
<i>Allium sativum</i> L. (Liliaceae), 'Lesun'	Bulb	➤ About 100 g bulb fried with 100 ml of mustard oil. After cooling it is massaged on neck of cattle for treatment of cold and cough, swollen throat and haemorrhagic septicaemias. ➤ Decoction prepared by boiling 20g bulbs with 20g of fruits of <i>Piper longum</i> and 20g leaves of <i>Ocimum sanctum</i>, with 2000ml water until it becomes 500 ml. After cooling it is given twice a day for three days for cure of haemorrhagic, cough cold, swollen throat.
<i>Andrographis paniculata</i> Nees. (Acanthaceae), 'Bhuinlim'	Leaf	About 100 g of leaf, 100 g fruits of <i>Coriandrum sativum</i> and 10g of <i>Piper nigrum</i> together pounded with water, and the filtrate is given orally to cattle thrice a day as a cure for fever.
<i>Anona squamosa</i> L. (Annonaceae), 'Sitabahal'	Leaf	Leaf paste is topically applied on wounds for healing.
<i>Asparagus recemosus</i> Wild. (Liliaceae), 'Satabari'	Root	About 5-10g of root, 8-10 tender leaves of lemon grass, rice curd, and black salt are crushed and given to cure fever.
<i>Azadirachta indica</i> Juss. (Meliaceae), 'Lim'	Leaf	About 100g leaves given as feed stuff twice daily to treat urinary problem in cattle.

<i>Bambusa arundinacea</i> (Retz.) Willd. (Poaceae), 'Baunsa'	Leaf	Tender leaf is fed daily to cattle for better lactation.
<i>Boerhaavia diffusa</i> L. (Nyctaginaceae), 'Gadaha purnui'	Whole plant	About 1500g whole plant is fed twice a day for removal of retained placenta in cows and buffaloes.
<i>Calotropis procera</i> (Aiton) Dryand. (Asclepiadaceae), 'Arakh'	Leaf	About 250g green leaves are given as feedstuff daily to kill the intestinal worm in sheep.
<i>Cassia fistula</i> L. (Caesalpiniaceae), 'Sunari'	Fruit	Ghee obtained from cow milk is applied on fruit and warmed up in flame and there after it is applied frequently on cold affected swollen throat of cattle for cure.
<i>Cartharanthus roseus</i> (L.) G. Don. (Apocynaceae), 'Baramasi'	Whole plant	Whole plant extract is applied topically to cure wounds.
<i>Cicer arietinum</i> L. (Fabaceae), 'Chana'	Seed	Soaked seeds are given as feedstuff to increase the milk quantity in case of mulching cattle.
<i>Cleistanthus collinus</i> (Roxb.) Benth. & Hk. (Euphorbiaceae), 'Karla'	Leaf	Leaves are crushed and spread on floor of cattle shed to cure foot diseases locally called Khura.
<i>Clitoria ternatea</i> L. (Fabaceae), 'Aparajita'	Leaf	Leaf extract along with salt is applied over eye to cure eye swelling.
<i>Coriandrum sativum</i> L. (Apiaceae), 'Dhania'	Leaf	About 10g each of leaf of the plant, seeds of <i>Trachispemum ammi</i> (Juani) are crushed to paste and given with salt twice daily to cure dyspepsia.
<i>Curcuma longa</i> L. (Zingiberaceae), 'Haldi'	Rhizome	About 15-20 g rhizome mixed with 100 mango pickle is given twice a day for two days to treat general gastric problems.
<i>Cuscuta reflexa</i> Roxb. (Convolvulaceae), 'Nirmuli'	Whole plant	Decoction of the <i>Cuscuta</i> is applied on the infected site bitten by the poisonous worm to relieve the pain in domestic animals.
<i>Dalbergia sisso</i> Roxb. (Fabaceae), 'Sisu'	Whole plant	Leaf paste of the plant mixed with water is given to animal to cure blisters and leg sore.
<i>Ficus racemosa</i> L. (Moraceae), 'Dumer'	Latex	The fresh latex is applied on wounds of cattle as a cure.
<i>Ficus religiosa</i> L. (Moraceae), 'Pipal'	Bark	About 500 g fresh barks are boiled in 2000ml water for one hour and decoction is given orally for removal of retained placenta in buffaloes.
<i>Foeniculum vulgare</i> Mill. (Apiaceae), 'Panmuhuri'	Seed	Equal amount of fried and normal seeds are crushed and 100g powder is given twice a day for two to three days to treat diarrhoea.
<i>Gossypium herbaceum</i> L. (Malvaceae), 'Kapa'	Leaf	The leaf juice is given orally as a cure for suppuration of waist after delivery.
<i>Helianthus annuus</i> L. (Asteraceae), 'Suryamukhi'	Seed	About 50 ml seed oil is given daily during pregnancy to cattle for smooth delivery.
<i>Hibiscus cannabinus</i> L. (Malvaceae), 'Kanria'	Seed	Seeds fed to lactating cows to enhance lactation.
<i>Ipomea aquatica</i> Forssk. (Convolvulaceae), 'Kalamasaga'	Leaf	Leaves are given once daily for two weeks against blood urine.
<i>Justicia adhatoda</i> L. (Acanthaceae), 'Basang'	Leaf	➤ About 250g of leaf paste mixed with 250g curd, 100g of resin powder obtained from <i>Shorea robusta</i> and given to cows for easy delivery. ➤ Again, 500ml juice obtained from pounded leaves boiled with 2g of <i>Piper nigrum</i> and 1000 ml of water. This decoction after cooling is given orally to cattle twice a day for bronchial problem.

		➤ Further 500 ml of leaf juice mixed with 20g of fruit powder of <i>Piper longum</i> is prescribed twice a day for severe cough.
<i>Lawsonia inermis</i> L. (Lythraceae), 'Benjati'	Bark	Decoction prepared by boiling 250 g bark with 2000 ml water is prescribed for constipation in Luke warm condition with rock salt in 50 ml dose twice daily.
<i>Madhuca indica</i> J. F. Gmel. (Sapotaceae), 'Mahul'	Seed	Cake obtained after oil extraction from seeds is applied on chronic wounds to expel worms.
<i>Mangifera indica</i> L. (Anacardiaceae), 'Amba'	Fruit	About 10 ml juice of ripe mango mixed with 10 ml extract of <i>Centella asiatica</i> is given for constipation.
<i>Mimusops elengi</i> L. (Sapotaceae), 'Baul'	Leaf , Fruit	➤ About 100 g of leaves pounded and squeezed juice is given orally twice a day to cows to cure suppuration of waist after delivery. ➤ Further 100 g of fruits pounded to a fine paste. It is mixed with 500 ml water and given orally twice a day as a cure for urinary problems.
<i>Morinda citrifolia</i> L. (Rubiaceae), 'Achhu'	Bark	Stem bark decoction is prescribed for the treatment of intestinal disease of domestic animals.
<i>Musa paradisiaca</i> L. (Musaceae), 'Kadel'	Fruit	Ripened banana is given as feedstuff to cows and buffaloes to treat mastitis.
<i>Nyctanthes arbor-tristis</i> L. (Oleaceae), 'Gangasiuli'	Leaf	About 500 ml of extracted leaf juice boiled with 20 g fruit of <i>Piper nigrum</i> and 1000 ml water until it becomes 500 ml. After cooling it is given orally to cure fever, for three days.
<i>Piper nigrum</i> L. (Piperaceae), 'Gol mircha'	Seed	Fine powder of piper is mixed with butter and pasted to the site bitten by poisonous worms in cattle.
<i>Portulaca oleracea</i> L. (Portulacaceae), 'Nuni sag'	Whole plant	Whole plant is given as feedstuff to prevent excessive bleeding to buffaloes during and after delivery.
<i>Psidium guajava</i> L. (Myrtaceae), 'Maya'	Leaf	About 20 gm tender leaves of the plant, <i>Syzigium cumini</i> and <i>Mangifera indica</i> are pounded together, and the Juice is given orally to cattle for the treatment of dysentery.
<i>Raphanus sativus</i> L. (Brassicaceae), 'Mula'	Leaf	Daily about 1 kg plant is given as fodder to cow daily for one week to maintain pregnancy just after fertilization for one week.
<i>Ricinus communis</i> L. (Euphorbiaceae), 'Jada'	Seed	About 50 ml seed oil is drenched twice for two to three days for general gastric problems (to clean the stomach).
<i>Rosa indica</i> L. (Rosaceae), 'Gulab'	Flower	Rose petals and commercially available product 'Gulkand' is fed to increase the milk quantity especially lactating cows and buffaloes.
<i>Syzygium aromaticum</i> L. (Myrtaceae), 'Labang'	Seed oil	Seed oil is applied over nipples to treat mastitis.
<i>Tagetes erecta</i> L. (Asteraceae), 'Ganja'	Leaf	Slightly warm mixture of leaf extract and mustard oil is poured into the ears of the domestic animal to cure earache.
<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn. (Combretaceae), 'Kau'	Bark	Paste of fresh bark is given orally for removal of retained placenta in cows and buffaloes.
<i>Terminalia chebula</i> Retz. (Combretaceae), 'Harda'	Fruit	About 20g fruits mixed with 200g methi are boiled in 2.5 litre water for half an hour and allowed to cool. 50 ml cooled decoction is given orally for two to three days for better digestion.
<i>Triticum aestivum</i> L. (Poaceae), 'Gaham'	Seed	300g seed are crushed and mixed with 20g tea leaves and 100g Ashwagandha, the mixture is given to cow to treat cold for two days to treat cold.
<i>Vigna mungo</i> (L.) Hepper. (Fabaceae), 'Mug'	Seed	Seeds of the plant, rhizome of <i>Zingiber officinale</i> and leaf of <i>Bambusa arundinacea</i> are together fed to the cow three times daily to cure liquid purging.
<i>Vitex negundo</i> L.	Leaf	Leaf paste (5-10g) of the plant is given along with cow ghee and

(Verbenaceae), 'Nirguni'		honey to cure cough in cattle.
<i>Zingiber officinale</i> Rosc. (Zingiberaceae), 'Ada'	Rhizome	100g ginger are mixed with 100g seeds of <i>Piper nigrum</i> and given once or twice daily to the cattle to treat cough or throat problem.

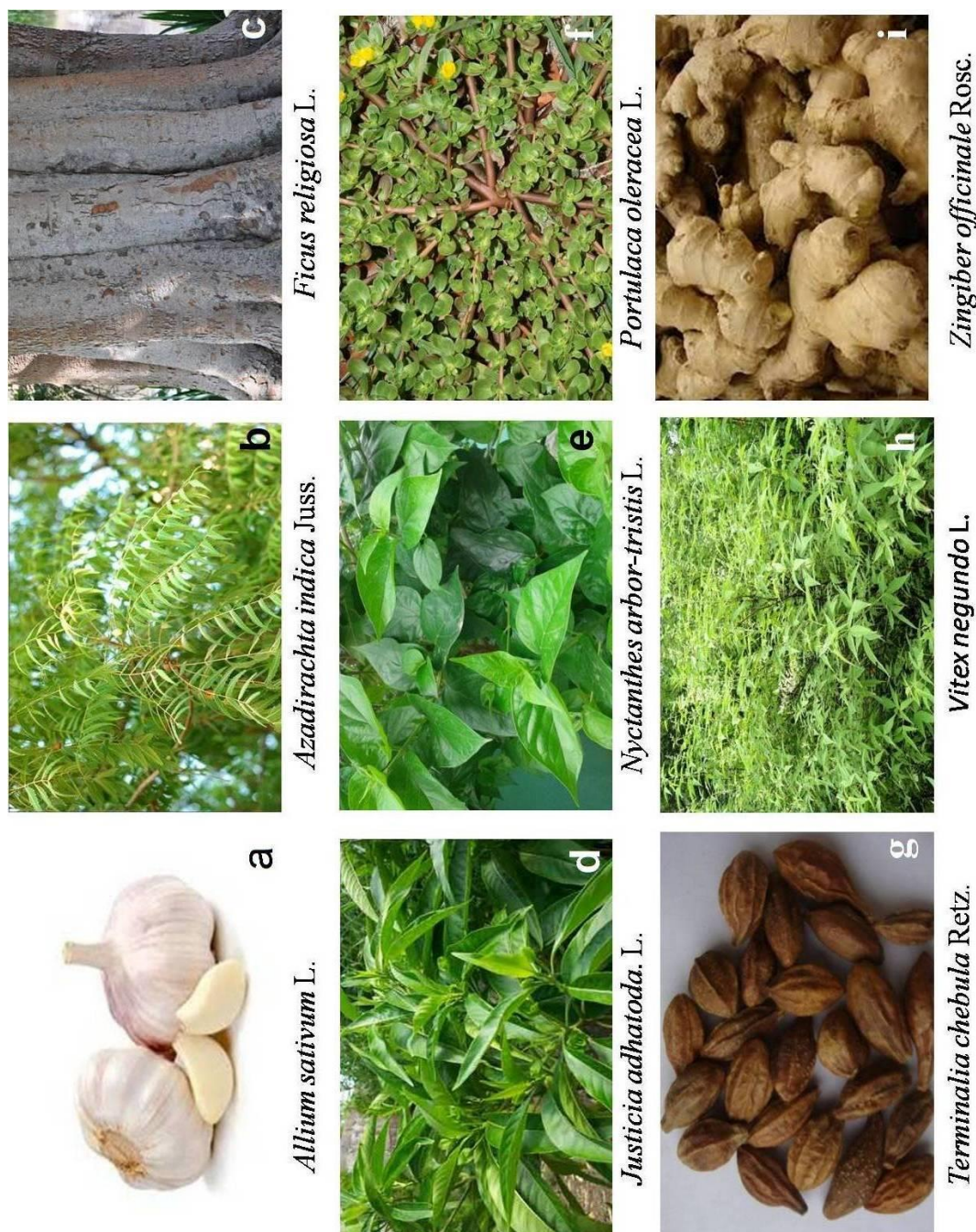


Fig. 2. Few plant parts used for animal health care practices in Bargarh District of Odisha, India: Bulbs of *Allium sativum* L. (a), Leaves of *Azadirachta indica* Juss. (b), Stem bark of *Ficus religiosa* L. (c), Leaves of *Justicia adhatoda* L. (d), Leaves of *Nyctanthes arbor-tristis* L. (e), Whole plant of *Portulaca oleracea* L. (f), Fruits of *Terminalia chebula* Retz. (g), Leaves of *Vitex negundo* L. (h) and Rhizome of *Zingiber officinale* Rosc. (i).

DISCUSSION

Native people throughout the world in different geographical regions utilize medicinal plants growing in their surrounding localities for treating different human ailments and their domestic animals. Ethnoveterinary is a holistic inter-disciplinary study of indigenous knowledge and associated skills, practices, beliefs and social structures pertaining to the healthcare husbandry income producing animals, has emerged as a fertile field for generation and transfer appropriate and sustainable veterinary alternatives to the stock raisers. Prolonged use of synthetic drugs commonly used in conventional system of medicine, their associated side effects as well as the uncertainty concerning their safety has paved a way towards an era of alternative system of medicine i.e. herbal medicine based on traditional knowledge. Some of the oldest known medicinal systems of the world such as Ayurveda of Indus civilization, Arabian medicine, Chinese and Tibetan medicine and Kempo of

Japanese are all based on plants. The market for herbal drugs has grown at impressive rate and people rely on herbal drugs is rising not only in developing countries but in developed nations too. In this context WHO cites as strategic goals the rediscovery of traditional medicine and its rational use, in part because of its lower cost and higher acceptability (WHO, 2002-05).

The present paper enlisted 50 plant species belongs to 33 families. Out of which most of them were collected from the wild except few of which are cultivated species. Plants like *Abrus precatorius* L., *Acacia nilotica* (L.) Del., *Allium sativum* L., *Justicia adhatoda* L., *Mimusops elengi* L. etc., were used for treatment of more than one diseases. The present report on the use of plants for ethnoveterinary medicinal purposes draws support from earlier studies in different parts of the Odisha (Misha and Patro, 2010; Mallik *et al.*, 2012 and Sahu *et al.*, 2016) and other state of India (Galav *et al.*, 2013; Yadav *et al.*, 2014).

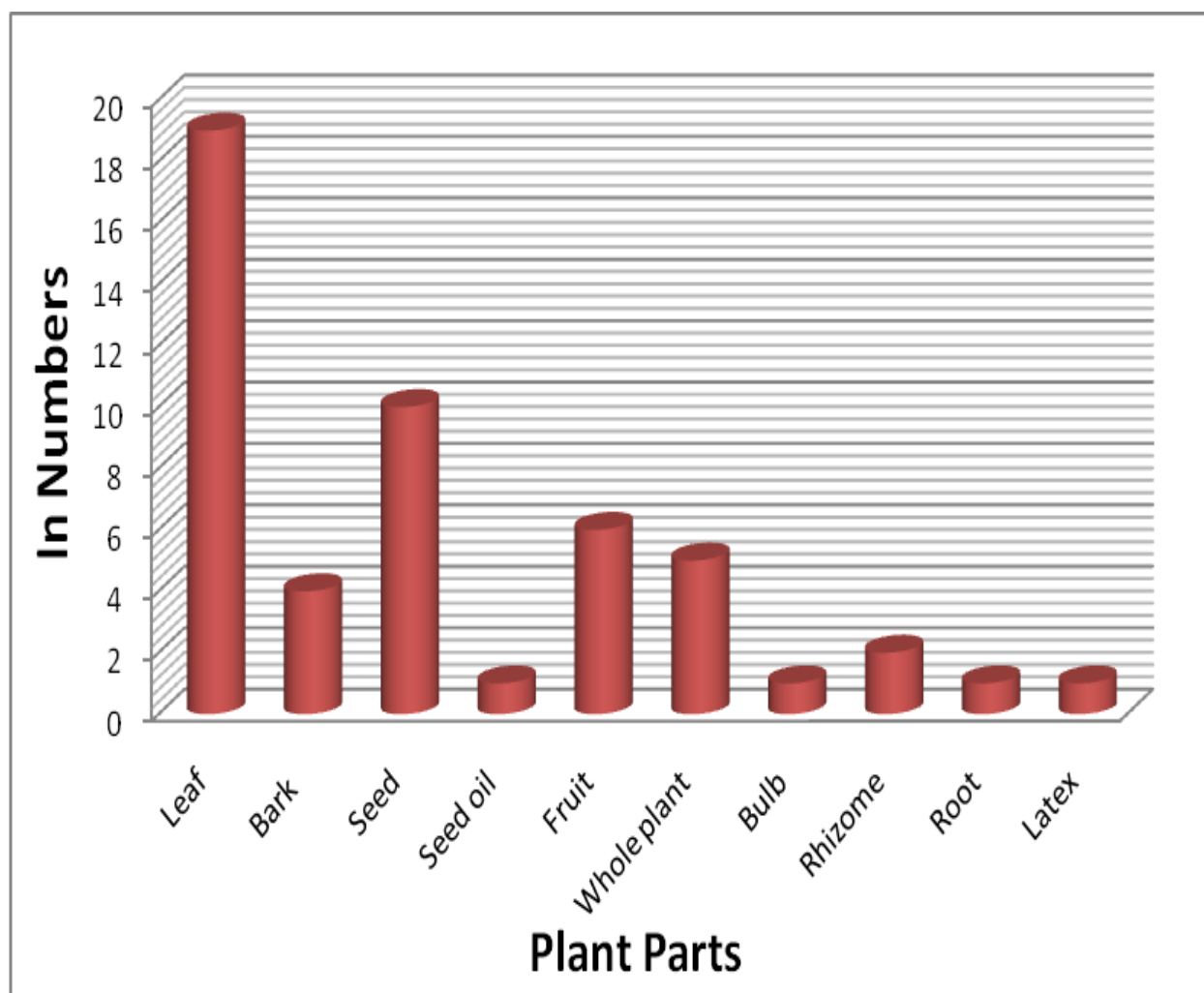


Fig. 3. Plant parts used for Animal Health Care Practices in Bargarh District of Odisha, India

The domestic animals and cattle play an important role in day to day life of the tribals and rural people. The cattle provide milk, leather, manure, fuel and many other things useful to the people while goat and sheep provide meat. Furthermore, ox and buffalo are used to ploughing the crop fields. Hence health of domestic animal is more essential for the tribal people. The present investigation has brought to light some popular and frequently used medicinal plants available in the localities for treatment of indigestion, ear infection, sores, dysentery, cough, infection in between toes to name a few. A concise list of wild plant resources of the district and their utilization will provide basic data for further studies aimed at conservation, traditional medicine practice and economic welfare of the rural and tribal population of Bargarh district.

Acknowledgement

The authors are especially thankful to the tribal and local health healers of Bargarh district for their cooperation and voluntarily shared a wealth of their accumulated knowledge regarding the ethnomedicinal practices of their communities and for their hospitality. The author (ARS) especially thankful to the Principal, the Chairman, and the Director of Director of Saraswati +3 Science (Degree) College, Bhawanipatna for providing necessary facilities, moral supports, and encouragement. Above all, we are grateful to our parents and family members to whom we owe all that we have become today for it is by their blessings, from both heaven and earth that insulates us from all odds and helps us to grow.

References

- Devi, K., G.D. Karthikai, G. Thirumaran, R. Arumugam and P. Anantharaman. 2009.** Antibacterial activity of selected medicinal plants from Parangipettai coastal regions, India. *World App Sci. J.*, 7(9): 1212-1215.
- Galav, P., A. Jain and S.S. Katewa. 2013.** Ethnoveterinary medicines used by tribals of Tadgarh Raoli Wildlife Sanctuary, Rajasthan, India. *Indian Journal of Traditional Knowledge*, 12(1): 56-61.

- Mallik, B.K., T. Panda and R.N. Padhy. 2012.** Ethnoveterinary practices of aborigine tribes in Odisha, India. *Asian Pacific Journal of Tropical Biomedicine*, 1520-1525.
- McCorkle, C.M. 1986.** An Introduction to Ethnoveterinary Research and Development. *Journal of Ethnobiology*, 6(1): 129-149.
- Mishra, D. and L. Patro. 2010.** Ethno veterinary practices among the rural people of Ganjam District (Orissa) India: A case study on some common veterinary ailments. *The Bioscan*, 3: 739-746.
- Sahu, A.R., N. Behera and S.P. Mishra. 2010.** Use of Ethnomedicinal Plants by Natives of Bargarh District of Orissa, India. *Ethnobotanical Leaflets*, 14: 889-910.
- Sahu, A.R., A.K. Nayak and S.K. Panigrahi. 2013.** Survey of some important ethno-medicinal plants of Sohela Block, Western Odisha, India. *Life Sciences Leaflets*, 11: 1-9.
- Sahu, A.R., J. Panigrahi and S.P. Mishra. 2016.** A preliminary report on the Ethnoveterinary Medicinal Plants of Bargarh District, Western Odisha, India. In: Conservation, Cultivation, Diseases and Therapeutic Importance of Medicinal and Aromatic Plants, (Eds.) Chourasia H.K. and A.K. Roy. Today & Tomorrows Printers and Publishers, New Delhi, pp. 315-325.
- Sahu, M. and A.R. Sahu. 2017.** A Preliminary Report on the Traditional Practice for Dental and Oral Health Care in Bargarh District of Western Odisha, India. *Journal of Medicinal Plants Studies*, 5(5): 120-125.
- Saxena, H.O. and M. Brahman. 1994-96.** The flora of Orissa. Regional Research Laboratory, Orissa and Orissa Forest Development Corporation Ltd. Vol: I-IV
- WHO. 2002-2005.** Traditional medicine strategy. World Health Organisation, Geneva.
- Yadav, S.S., R.K. Bhukal, M.S. Bhandoria, S.A. Ganie, S.K. Gulia and T.B.S. Raghav. 2014.** Ethnoveterinary Medicinal Plants of Tosham Block of District Bhiwani (Haryana) India. *Journal of Applied Pharmaceutical Science*, 4(6): 040-048.

How to cite this article?

Alok Ranjan Sahu and Maninee Sahu. 2017. A preliminary report on the indigenous knowledge on animal health care practices in bargarh district of Odisha, India. *Innovative Farming*, 2(3): 154-161.