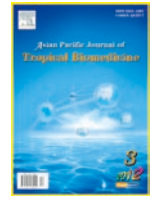


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Ethnoveterinary practices of aborigine tribes in Odisha, India

Bikram K. Mallik¹, Tribhuban Panda², Rabindra N. Padhy^{3*}¹ Department of Botany, Govt. Junior College, Bhawanipatna 766001, Kalahandi District, Odisha, India² Kalahandi Institute for Tribology and Ethnobiology, Jilingdar, Dedar 766014, Kalahandi District, Odisha, India³ Department of Botany & Biotechnology, B. J. B. Autonomous College, Bhubaneswar 751014, Odisha, India

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ABSTRACT

Objective: To record ethnoveterinary information of numerous aboriginal tribes of Kalahandi district of Odisha state, India. **Methods:** A survey of about 20 hamlets in the district was done with a questioner and personal interviews using the snowball technique in survey and sampling. **Results:** Seventy-three plants belonging to 41 families (Acanthaceae, Alangiaceae, Amaranthaceae, Amaryllidaceae, Anacardiaceae, Annonaceae, Araceae, Arecaceae, Asclepiadaceae, Asteraceae, Bombaceae, Brassicaceae, Caesalpinaceae, Cucurbitaceae, Combretaceae, Convolvulaceae, Ebenaceae, Euphorbiaceae, Fabaceae, Lamiaceae, Lecythidaceae, Loganiaceae, Malvaceae, Meliaceae, Menispermaceae, Mimosaceae, Moraceae, Moringaceae, Musaceae, Myrtaceae, Piperaceae, Plumbaginaceae, Poaceae, Ranunculaceae, Rubiaceae, Rutaceae, Solanaceae, Umbelliferae, Verbenaceae, Vitaceae and Zingiberaceae) are used by aborigine tribes of Kalahandi district, Odisha, India, for treating ailments of domestic animals. **Conclusion:** Aborigine tribes of Kalahandi district use about 73 plants for treating ailments of animals.

1. Introduction

Upland agriculture, which is managed without any mechanization, is the backbone of sustenance of hill-dwelling aborigine tribes in Odisha, India. For the purpose of ploughing of strip and contour farm patches, and threshing of rice-paddy, tribals depend on domesticated castrated cattle. Demands for milk and meat are the associated essential corollary of cattle rearing. Specifically, goat rearing has become a part of utilization of green forest that can be called as a part of 'exploitation of ecosystem for economy' or 'ecotechnology', in a crude way. Piggery is a less well adapted practice in Indian tribal society. So to sum up, these three groups of animals along with wild chicks, grown by default, are the animals domesticated by aborigine tribes. Dogs are less often domesticated by tribals and are wild.

Wounds, abscess, warts and inflamed skin lesions are the ones, which are to be addressed with cattle linked to rice cultivation and milk production. Myiasis is a problem in

animal farms and causes severe economic losses through poor hide quality, reduced weight gain, loss of fertility and reduction in the production of milk [1]. Animals die from infections from lesions. The tribals are as for themselves never depend on the distant government veterinary hospitals for the obvious economic reasons or the limitation of resources, and lean to the traditional herbal remedial measures for animals. This paper is an account of such herbal practices in animal health care system followed up by about 12 or 13 numerically important aborigine tribes of the district Kalahandi, Odisha.

The Odishan part of Indian Eastern-Ghat range of mountains, at which Kalahandi district is situated, has rich vegetations compared to other isolated hilly areas of the state, and around a 40% population of the district is a group of aborigines living at or near the forest. They depend on the forest for all their needs; for example, the use of phytodiversity for house construction [2], and raw wild food [3] are described for an numerically important aborigine, the Kandha tribe, who have many commonality (in living) with other aborigine tribes of other hilly zones. Their cultural practices are typically archaic since down the centuries, and they live with a minimum intervention of modernity. Ethnomedicinal reports for human ailments from the state are limited [4–6].

*Corresponding author: Dr. R. N. Padhy, Department of Botany & Biotechnology, B. J. B. Autonomous College, Bhubaneswar-751014, Orissa, India;

Present address: Central Research Laboratory, IMS & Sum Hospital, S 'O' A University, Bhubaneswar – 751003.

E-mail: rmpadhy54@yahoo.com

A survey in developed countries indicated that 20% of annual growth of herbal medicinal plants has been recorded in 2001 [7] with an estimated 80% of world population living in developing countries rely on plants for healthcare. In the USA, the total number of visits to non-conventional healers was 425 million with an estimated cost of 13.7 billion US dollars in the non-conventional medicinal market [8]. In view of the prodigious use of plant medicines with man and their livestock led to declare recognition of implicit role of herbal drugs in the 'Alma Marta declaration of health', by the year 2002 [9].

2. Study area and people

Twenty villages of Langigarh Block, inhabiting the most backward aborigine tribes, were surveyed during 2008 to 2011. These villages are situated in Niyamagiri hill area of Kalahandi district, Odisha. Niyamagiri hill is situated at 19°.10' and 20°. 30' north latitude and 82°. 30' and 83°.50' east longitude. The elevation ranges from 400 to 1200 m; temperature varies from 2°C in winter to 46°C in summer and the district experiences an average rain fall of about 128

cm and a rich biodiversity, typical to a sub-tropical forest. Kalahandi has people of a total of 62 different ethnic groups with several socioeconomic categories of both backward castes (scheduled castes) and aborigine tribes (scheduled tribes) living together.

The common and numerically important scheduled castes were Chamar, Dom, Ganda, Ghasi, Dhoba, Mahar and Panik, and the scheduled tribes were Bhunja, Kandha, Gand, Banjara, Sabar, Bhattada and Dal. They were originally a nomadic community, but they are today living in several tribal hamlets, each consisting of 10–25 families disbursed in and around the forest. They have upland agriculture of rice, millet, corn and finger-millet (*Elusine coracana*). These people earn through selling non-timber forest products, honey, beeswax and a few more. Every tribal group has a tribal chief/head. During several visits to villages, interviews were undertaken and information recorded from headmen, traditional healers, priests, housewives and patients randomly irrespective of sex and castes or tribe. Selection of plants from Niyamagiri hills was based on interviews in hamlets with both schedule castes and schedule tribes. All the information on medicinal plants reported by them were collected by taking the help of traditional healers,

Table 1

Ethnomedicinal information for animals.

Sl no.	Plants, family and (local names)	Used part	Ailment	Modalities of uses
1.	<i>Abelmoschous esculentus</i> L. Malvaceae, (Bhendi)	Root	Blocked urination	Root juice is given thrice a day according to the age and size against blocked urination.
2.	<i>Acacia catechu</i> (L.f) Mimosaceae, (Khair)	Wood	Wound	Burnt heart wood is mixed with alum and vaseline to form an ointment and applied on the wound.
3.	<i>Acacia nilotica</i> L. Mimosaceae, (Bamur)	Spines	Colic pain	Decoction of spines is given to relieve colic pain.
4.	<i>Acalypha indica</i> L. Euphorbiaceae, (Indramaris)	Leaf	Scabies	Leaf paste is mixed with lemon juice and applied on scabies zone.
5.	<i>Achyranthes aspera</i> L. Amaranthaceae, (Kukurdanti, Apamara)	Root	Parturition and Bronchitis	1. Root is hung in tail for placental retention during parturition. 2. Root paste is mixed with leaves of <i>Ferula asafetida</i> (Umbelliferae) and two yellow leaves of <i>Calotropis procera</i> and given to cow against bronchitis.
6.	<i>Aegle marmelos</i> L. Rutaceae, (Bel)	Fruit	Internal fever	Ripened fruit pulp is given twice daily till the cure of internal fever.
7.	<i>Alangium salvifolium</i> (L.f) Wang Alangiaceae, (Ankul)	Root	Snake bite	Aliquot of 10 ml of root juice is given orally to cattle in case of snake bite.
8.	<i>Albizia lebbek</i> (L.) Benth Mimosaceae, (Sipo)	Stem bark	Wound of rat bite	Bark paste is applied around the wound of rat bite.
9.	<i>Allium cepa</i> L. Amaryllidaceae, (Piaj)	Bulb	Cough	Bulb paste is mixed with mustard oil and is given to cattle against cough, thrice a day, until cured.
10.	<i>Alocasia macrorrhiza</i> L. Araceae, (Saru)	Petiole	Throat swelling	A lukewarm paste is prepared from the rotted petiole and is applied to the swelling throat due to cold, twice a day for about 3 days.
11.	<i>Andrographis paniculata</i> (Burm f.) Acanthaceae, (Bhuinlim)	Stem Leaves	Fever, Mouth and Foot disease	1. Aerial part is dried, powdered, mixed with jaggery and a pinch of rock salt and applied for about 5–7 days against foot and mouth disease. 2. About 1 kg of stem cuttings and leaves are boiled in 5 l of water for 3–4 h and masked. Decoction is left as such overnight for fermentation. The decoction is filtered and stored; 2 cups of decoction is administered orally twice days in case of acute cases. In chronic cases the preparation is given for about 3–4 weeks.

Table 1 (continued)

Sl no.	Plants, family and (local names)	Used part	Ailment	Modalities of uses
12	<i>Annona squamosa</i> Annonaceae, (Raikata)	Leaf	Maggot	Leaf paste is applied on wound to expel maggot.
13.	<i>Atylosia scabaeoides</i> L. Benth. Fabaceae, (Bankolthia)	Leaf	Diarrhoea	Leaf paste is given to cattle against diarrhoea.
14.	<i>Azadirachta indica</i> A.Juss. Meliaceae, (Lim)	Leaf, Fruit	Constipation, internal fever, removal of ectoparasites, killing of intestinal worms	1. Equal amount of leaf paste and turmeric powder (<i>Curcuma longa</i>) is given once in early morning for a week against constipation. 2. Fruit–paste is also given to cattle for internal heat (fever). 3. Rubbing of leaf paste on the body is done to repel ectoparasites, lice, bugs, flies. 4. Mixture of leaf paste and molasses kills intestinal worms.
15.	<i>Bambusa arundifolia</i> Ret. Poaceae, (Bauns)	Leaf	Blood dysentery	Finely cut leaves are fed to cattle twice daily for about 3–5 days against blood dysentery.
16.	<i>Bauhinia racemosa</i> Lam Caesalpinaceae, (Kuler)	Leaf	Redness of eye	Leaf juice is applied over forehead to heal redness of eyes.
17.	<i>Bombax ceiba</i> L. Bombaceae, (Simel)	Stem, bark	Dislocated bones	Stem bark paste is mixed with turmeric powder and is applied on the area where bone is dislocated.
18.	<i>Borassus flabellifer</i> L. Arecaceae, (Taal)	Inflorescence	Clearance of uterus	Equal amount of male inflorescence ash and jaggery is given thrice daily for post delivery clearance of uterus.
19.	<i>Brassica campestris</i> L.Var Brassicaceae, (Sorso)	Seeds	Cough and cold	Equal amount of seeds, <i>Nigella sativa</i> (Ranunculaceae) seeds, <i>Piper longum</i> (Piperaceae), <i>Capsicum annum</i> (Solanaceae), <i>Vitis vinifera</i> (Vitaceae) fruits are grounded for paste and diluted with water. This is given to cattle twice daily for 5–7 days for cough.
20.	<i>Brassica nigra</i> (L)Koch Brassicaceae, (Kalasorso)	Seeds	Cough and cold	50 gm seeds of the plant, 50 gm of garlic, 25 gm of stem bark of <i>Moringa oleifera</i> and 50 gm of ginger are finely ground to make a small bolus. 4–5 such bolus are fed to the animal twice a day for 5 days.
21.	<i>Caesalpinia crista</i> Auct.non.L Caesalpinaceae, (Kantakaranj)	Seeds	Shoulder wound	Oil is extracted from seeds and is locally applied for the shoulder wound
22.	<i>Cajanus cajan</i> (L.) Hutch Fabaceae, (Kandul)	Pod	Dysentery	Green pod paste is mixed with water and is given twice a day for dysentery
23.	<i>Calotropis procera</i> (Ait).R.Br Asclepiadaceae, (Arakh)	Flowers	Cough and cold	Flowers are sun dried and stored. 500gm of flowers are boiled in 5 l of water for 3–4h in low flame. Decoction is prepared and stored. 10–15 ml of decoction is orally given 3–4 times daily for about 10–12 days or till cured.
24.	<i>Careya arborea</i> Roxb Lecythidaceae, (Kum)	Bark	Debility in cattle	Bark paste is mixed with curd and given orally for debility in cattle.
25.	<i>Cassia fistula</i> L. Caesalpinaceae, (Sunari)	Fruit	Cold	Ripened dry fruit is warmed and placed over the affected gland in throat or swelling portion due to common cold.
26.	<i>Chloroxylon swietenia</i> D.C. Rutaceae, (Bheruan)	Wood	To relieve neck pain	Wood ash mixed with coconut (<i>Cocos nucifera</i>) oil and is applied over the neck of bullock and male buffalo to relieve pain after ploughing.
27.	<i>Cissus quadrangularis</i> L. Vitaceae, (Hadabhanga)	Stem	Asthma	Succulent stem crushed with onion and Capsicum annum (Solanaceae) powder, given orally for asthma.
28	<i>Coccinia indica</i> Wt&Arn Cucurbitaceae, (Boda)	Leaf	Cough and cold	Equal amount of warm leaf paste of the plant, ginger juice and garlic (<i>Allium sativum</i>) juice is given twice daily against cold and cough of buffalo and cow.
29	<i>Cocculus hirsutus</i> L. Menispermaceae, (Dahipatru)	Leaf	Blood in stool	Leaves crushed with sugar and water given to control blood motion.
30	<i>Curcuma longa</i> L. Zingiberaceae, (Haladi) Turmeric (English)	Rhizome	Blood dysentery, Caprine arthritis, and Blood coagulation	1. Equal amount of rhizome paste of the plant and seeds of <i>Vigna mungo</i> (Fabaceae) and <i>Bambusa vulgaris</i> (Poaceae) leaves is given to cattle against blood dysentery. 2. Depending upon the weight of the animal turmeric powder is given to the animal with moist food against caprine arthritis. 3. The powder of the rhizomes of the plant is locally applied during leech sucking. It helps for blood coagulation.

Table 1 (continued)

Sl no.	Plants, family and (local names)	Used part	Ailment	Modalities of uses
31	<i>Dalbergia sisoo</i> Roxb. Fabaceae, (Sisoo)	Leaf	Diarrhoea	Leaf paste is mixed with common salt and is given twice daily for about 3 days against diarrhoea.
32	<i>Datura stramonium</i> L. Solanaceae, (Dudura)	Fruits	Cough and cold	Immature fruits are baked and given once daily against cough and cold.
33	<i>Datura metel</i> L. Solanaceae, (Kaladudura)	Root	Typhoid	Root paste mixed with 5 gm black pepper is applied locally on head region thrice a day for about 2–3 days to cure typhoid fever.
34	<i>Diospyros montana</i> Roxb. Ebenaceae, (Kasi)	Bark	Wound	Bark is ground with common salt and applied over wound.
35	<i>Ficus benghalensis</i> L. Moraceae, (Bordi)	Root	Diarrhoea and dysentery	Prop root paste of the plant mixed with honey and is given to calves once a day for about 3 days against diarrhoea and dysentery.
36	<i>Ficus religiosa</i> L. Moraceae, (Pipel)	Stem bark	Constipation	Bark paste is given to cattle against constipation as per age and weight.
37	<i>Ipomoea aquatic</i> Forssk Convolvulaceae, (Kalamasaga)	Leaves, tender stem	Blood urine	Stem burning leaves is given once a day for 15 days against blood urine.
38	<i>Justicia adhatoda</i> L. Acanthaceae, (Bhaseng)	Leaf	Bronchitis	Leaf paste is mixed with jiggery and is administered against bronchitis.
39	<i>Mangifera indica</i> L. Anacardiaceae, (Aam)	Fruits, seeds	Constipation, snake bite	1. Old pickled fruit is given to cattle against constipation 2. Seed powder is given to cows immediately after snake bite.
40	<i>Mitragyna parvifolia</i> (Roxb). Rubiaceae (Muaid)	Bark	Filariasis	Decoction of bark is given to cows, cattle against filariasis.
41	<i>Momordica charantia</i> L. Cucurbitaceae, (Karla)	Whole plant	Loss of appetite	Whole plant extract is prepared in cold water and bottle-fed to the animal to increase their appetite.
42	<i>Moringa oleifera</i> Lam Moringaceae, (Munga)	Leaves	Wound, swelling due to injury	1. 500 gm of fresh leaves are ground to make a paste and applied over the wound. 2. Warm leaves decoction is applied over the swelling portion due to injury.
43	<i>Musa paradisiaca</i> L. Musaceae, (Kadli)	Flower	Diarrhoea	One flower of the plant ground to paste with 10–15 black pepper and is given to the animal once a day for 4–5 days.
44	<i>Ocimum sanctum</i> L. Lamiaceae, (Tulsi)	Leaves	Cough and cold	100 gm of plant leaves, 100 gm of bark of <i>J. adhatoda</i> (Acanthaceae) are boiled in 200 ml water. When extract is reduced to 100 ml, it is cooled 1–2 teaspoonful of honey is added and given to the animal twice daily for 5 days.
45	<i>Oryza sativa</i> L. Poaceae, (Dhan), Rice	Endosperm	Diarrhoea	To 1 lit of drained out water from cooked rice, 100 gm of dried ginger powder is added and drenched animal twice a day for 3 days.
46	<i>Piper nigrum</i> L. Piperaceae, (Golamarich)	Seed	Indigestion, cough and cold	Equal amount of seed powder of the plant, <i>F. asafotida</i> , ginger, turmeric powder and common salt is mixed and given with rice gruel against indigestion. 2. A paste is made with butter, black pepper (10–15), ginger (50gm) and garlic (50gm). It is divided into two equal halves. One half is fed to the animal and the other half is applied together over.
47	<i>Plumbago zeylanica</i> L. Plumbaginaceae, (Dhala chita–para)	Root	Diarrhoea, tumor, wart	1. Root paste is given twice daily against diarrhoea. 2. Root paste is also applied locally on tumors and warts.
48	<i>Psidium guajava</i> L. Myrtaceae, (Jam)	Leaves	Diarrhoea	500gm of fresh leaves of the plant are boiled in 200ml of water for 10 min The decoction is drenched twice daily for 4–5 days.
49	<i>Solanum melongena</i> L. Solanaceae, (Baigan)	Leaves	Cough and cold	50ml extract of the leaves 50mL of ginger juice and 3–4 pieces of black pepper powder are mixed and given to the animal.
50	<i>Strychnos potatorum</i> L.f Loganiaceae, (Nirmala)	Seeds	Sexual stimulant	Seeds are used as nerval tonic and sexual stimulant.
51	<i>Syzygium cumini</i> (L) Skells Myrtaceae, (Gholijam)	Bark	Dysentery and diarrhoea	Equal amount of bark juice of the plant and leaf juice of <i>J. adhatoda</i> is given thrice daily against dysentery and diarrhoea.

Table 1 (continued)

Sl no.	Plants, family and (local names)	Used part	Ailment	Modalities of uses
52	<i>Syzygium jambos</i> L. Myrtaceae, (Gholijam)	Root, Bark	Wound	Equal amount of root paste and bark paste is applied over wound.
53	<i>Tagetis erecta</i> L. Asteraceae, (Makmel phul)	Leaves	Wound	Fresh leaves along with turmeric powder are ground to form a paste and are applied over the wound.
54	<i>Tamarindus indica</i> L. Caesalpinaceae, (Tetel)	Fruit	loss of appetite, higher milk production	1. Tamarind fruit pulp is mixed with 10 gm dried <i>Terminalia chebula</i> powder to make a preparation and is drenched directly or mixed with feed once a day against loss of appetite. 2. The leaves of the plant and plants of <i>Amaranthus spinosus</i> (Amaranthaceae) are boiled in water with broken rice and a pinch of rock salt is added and then fed to cattle once a day for higher milk production.
55	<i>Terminallia bellerica</i> (Gaertn) Roxb Combretaceae, (Behada)	Bark	Tumors Warts	Bark paste is applied on tumors and warts.
56	1. <i>Terminallia chebula</i> Retz , (Harida) 2. <i>Terminallia bellerica</i> (Gaertn) Roxb, (Bahada) 3. <i>Terminallia officinalis</i> , (Anla) Combretaceae	Fruit	Loss of appetite	(Powder masses of these 3 plants—fruits of first two and bark of the 3rd plant) mixed with cold water and is given to cattle and act as the best appetizer.
57	<i>Tridax procumbens</i> L. Asteraceae, (Bisalyakarani)	Leaves	Wound	Leaf extract of the plant is applied over the wound till healing.
58	<i>Vigna radiate</i> (L) Wilczek Fabaceae, (Mung)	Leaves	Wound	Dried leaf powder of the plant is dusted over the wound of horse to heal.
59	<i>Vitex negundo</i> L. Verbenaceae, (Nirguni)	Leaf	Breathing	Leaf paste is mixed with water and is given to cattle thrice daily against breathing problem.
60	<i>Zingiber officinale</i> Rosc. Zingiberaceae, (Ada) Ginger	Rhizome	Loss of appetite	50 gm each of dry rhizome of the plant and <i>Foeniculum vulgare</i> (Umbelliferae) seed powder, molasses and 25 gm black salt are mixed together. One tablespoonful of the preparation is to be given and to rub over the tongue of the animal.

Note: Additionally 13 plants are used as mentioned in modalities of uses.

and were botanically identified with flora books of the state [10]. Photographs and voucher specimens (herbaria) were preserved at Department of Botany, Govt. Junior College, Bhawanipatna. A survey of about 20 hamlets in the district was done with a questioner and personal interview using a snowball technique in survey and sampling [11].

3. Survey and Discussion

Seventy-five plants belonging to 41 families (Acanthaceae, Alangiaceae, Amaranthaceae, Amaryllidaceae, Anacardiaceae, Annonaceae, Araceae, Arecaceae, Asclepiadaceae, Asteraceae, Bombaceae, Brassicaceae, Caesalpinaceae, Cucurbitaceae, Combretaceae, Convolvulaceae, Ebenaceae, Euphorbiaceae, Fabaceae, Lamiaceae, Lecythidaceae, Loganiaceae, Malvaceae, Meliaceae, Menispermaceae, Mimosaceae, Moraceae, Moringaceae, Musaceae, Myrtaceae, Piperaceae, Plumbaginaceae, Poaceae, Ranunculaceae, Rubiaceae, Rutaceae, Solanaceae, Umbelliferae, Verbenaceae, Vitaceae and Zingiberaceae) are used by aborigine tribes of Kalahandi district of Odisha, India, for treating ailments of domestic animals.

A majority of interviewees reported that incidences of 74.0% wounds, approximately caused by ectoparasitic infections. Blocked urination occurred in 34 to 42% of cases, approximately. Colic pain was recorded 25 to 30% cases, approximately. Microbial skin infections, scabies were the minimum. Incidences of cough and cold, attended by internal fever were at the maximum; bronchitis and throat swelling were less frequent, at 8–10% in cattle. Constipation was reported to be less frequent, but dysentery and diarrhoea was more frequent, with reports more than 22% incidences. Loss of appetite is moderately reported, 30 to 35% cases among ailing cattle. Remedies used for other ailments are recorded infrequently, but for post delivery clearance of uterus of cattle, use of herbal remedies are the most frequent (Table 1).

This work recorded the ethnoveterinary uses of 63 to 75 plants of the sub-tropical rain forest by aborigines of Kalahandi district. Yohimbine, a traditional medicine is used as veterinary medicine as an aphrodisiac [12]. The neem, *Azadirachta indica* have been utilized independently in many culture as inflammatory and antipyretic remedy [13]. Further, the efficacies of herbal products against ecto- and endo-parasitic attacks had been reported [14]. Anti-inflammatory and analgesic properties of methanolic

extracts of *Ramalina farinacea* was comparable in action to a standing drug, indomethacin [14]. Moreover, the hot water extract of *Ocimum grattissimum* was recorded to cause a significant reduction in the duration of emesis comparable to that of metaclopramide, a standard antiemetic drug [15]. Leaves of *Cassia fistula*, a potent purgative were used as convalescent and *Andasonia digitala* as an anti-diarrhoeic in cattle, and *Erythrina senegalensis* has a potent diuretic property [16]. Pawpaw leaves when burnt into ashes were used as a topical agent to control lice in poultry [12]. Trypanosidal activity of *Allium sativum* in rabbits and *Morinda lucinca* in mice against *Trypanosoma brucei* has been reported [17]. Anthelmintic efficacies of *Nauclea latifolia* against stroglye nematodes of small ruminant have been documented to have comparable efficacy with the anthelmintic drugs, levamisole and albendazole [18]. High anthelmintic efficacy against *Nippostrongylus brasiliensis* have been documented with *Cassia occidentalis*. Anthelmintic activity of *Carica papaya* against ascaridic and copilaria species was recorded as high as 77.7% [19]. The anti-microbial properties of the crude extract of the weed, *Ageratum conyzoides* had been recorded [20]. In fact, the cost of drugs determines the alternate choice for use of herbal remedies; those are cheap and environmental friendly [21, 22].

Conflict of interest statement

We declare that we have no conflict of interest.

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