

Herbal treatment for common diseases in ruminants: an overview

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Abstract

Ruminants (cows, sheep, goats and buffaloes) are reared in the rural areas of India mainly to obtain milk and meat, for cultivation and as a source of dung (which is used both as fuel and fertilizer). As India is a sub-tropical country, these livestock are more prone to different contagious diseases. Lack of access to modern veterinary facilities and/or high prices of medicines cause higher mortality due to infectious diseases. India has plenty of natural medicinal plants, so farmers can exploit these advantages for their livestock towards herbal treatment for commonly occurring infectious diseases instead of routine allopathic treatment regimen. A total of 43 plant species distributed into 28 families are described in the present article. Leaves constituted the major plant part used (42%), followed by whole plant, fruit (10%), followed by rhizome, stem, seed (8%), followed by tuber, latex (4%) and followed by gum, bark, petiole (2%). 14 plant species are described for treatment of FMD, 9 plant species each for treatment of HS, BQ, 5 plant species for round worm infestation, 4 plant species for anthrax, 3 plant species each for actinobacillosis, ringworm infection and 1 plant species for fluke infestation. The route of administration is primarily oral followed by topical applications. These herbal treatments can reduce the cost of treatment and can avoid unwanted adverse effect of allopathic medication.

Key words: Herbal treatment; ruminants; medicinal plants; infectious diseases; India

Introduction

Ruminants are the group of animals having compound stomach i.e. multiple compartments in their stomach. Generally their stomach contains 4 chambers & these are rumen, reticulum, omasum & abomasum. Ruminants are the most common domesticated animals in India for their usefulness to human society by their products, by-products & services. Animals included in this group are cattle, buffalo, sheep & goat.

Indian economy mostly depends on these animals as they contribute 4.8 – 6.5 % to the GDP of India every year. As India is agriculture based country, these animals play an important role in the social upliftment of the peoples of India by various means. They are the most common livestock reared in India. According to livestock census 2012 there were 190 million cattle, 108 million buffalo, 65million sheep & 135 million goats. The large ruminants (cattle & buffalo) contribute 58.5% & small ruminants (sheep & goat) contribute 39.1 % to the livestock of India according to 2012 year data. (Ministry of agriculture, according to 19th Livestock Census – 2012).

Generally livestock are reared in the rural parts of the country as these peoples are mostly depends on agriculture & allied sector. These livestock are just like complementary to agriculture sector, so their population is mostly concentrated in rural areas. That is the reason for which livestock are considered as backbone of the rural farmers next to agriculture. Government of India is also promoting livestock rearing through various schemes in rural areas as a vision of combine farming to induce multiple income sources for the farmers & reduce the number of farmer suicide due to crop failure.

But due to inadequate knowledge about animal rearing like housing, spacing, sanitation, feeding practices, ventilation & hygiene in the rural areas, animals suffer from many diseases which reduce production efficacy & loss to the farmers. Commonly occurring diseases to these livestock are FMD, HS, BQ, Anthrax, Tetanus, RP, PPR, Blue tongue, helminth infection etc. These diseases occur due to improper vaccination, poor management practices, contaminated pasture, overcrowding and mixing of both healthy & diseased animals in the grazing land.

Generally people use allopathic medication to treat diseases of their animals, but there are many adverse effects related to dose, site of administration, drug interaction & anaphylactic reactions. To overcome these problems, herbal treatment is one of the alternatives as there is less chance of toxicity, easy availability and also economical. Indian subcontinent is full of plant species having medicinal values, so people can exploit this advantage for treatment of their livestock diseases. Commonly occurring infectious diseases in ruminants can be grouped into following category.

a) Viral b) Bacterial c) Parasitic and d) Fungal diseases

A. Viral disease

Foot and Mouth Disease (FMD)

It is an infectious and sometimes fatal viral disease that affects cloven-footed animals, including domestic and wild bovids. It is caused by aphthovirus of family picornaviridae. The virus causes a high fever for two or three days, followed by blisters inside the mouth and on the feet that may rupture, cause lameness and predispose to secondary bacterial infection (Brown *et. al.*, 1996). The incubation period for FMD virus generally ranges between 2 and 12 days. But sometimes it may extend up to 24 days. Adult animals may suffer weight loss from which they do not recover for several months, as well as swelling in the testicles of mature males, and in cows, milk production can decline significantly. Though most animals eventually recover from FMD, the disease can lead to myocarditis (inflammation of the heart muscle), death and tigroid heart lesion as post mortem finding, especially in newborn animals. Recovered animals develop hyperkeratosis, profuse hair growth and insensitive to hot environment (Maji & Samanta, 2011). The FMD virus can be transmitted in a number of ways, including close-contact animal-to-animal spread, long-distance aerosol spread and fomites, or inanimate objects, typically fodder and during transport. Control measures include quarantine and culling of infected livestock, and export bans for meat and other animal products to countries which has no previous exposure of this disease (Callis, 1996). Common treatment protocol followed in FMD treatment is as follows, Oxytetracycline - 10mg/kg Bwt. i.v. or Ceftriaxone - 12 mg/kg Bwt. i.m., Flunixin meglumine – 1.1 -2.2 mg/kg Bwt. i.m., supportive like Ca-borogluconate i.v., Glucocorticoid

In contrast to above allopathic regimen, following herbal treatment can be applied for FMD, which is given in Table-1

Table:-1 Herbal plants used for treatment of Foot and Mouth disease

Plant & Local Name in (hindi)	Family	Habit	Parts Used	Method Of Preparation	Route of Adm.	References
<i>Cuscuta reflexa</i> Roxb. (Amar Bel)	Cuscutaceae	Climber	Whole plant	A paste of the plant is applied twice a day to the affected parts	Topical	Malla & Chhetri (2012)
<i>Dalbergia sissoo</i> Roxb. (Shisham)	Fabaceae	Tree	Leaf	Leaf paste is mixed with churning curd & used over the lesions	Topical	Malla & Chhetri (2012)
<i>Rhus javanica</i> L.	Anacardiaceae	Shrub	Fruit	A decoction of fruit is administered to cure animal's foot and mouth diseases.	Oral	Malla & Chhetri (2012)
<i>Carissa caranta</i> L. (Garanda)	Apocynaceae		Leaves	Its leaves are crushed with honey and fed to give relief of foot and mouth disease of cattle.	Oral	Khan <i>et. al.</i> , (2012)
<i>Argemone mexicana</i> L. (Shialkanta, Satyanashi)	Solanaceae	Herb	Leaf	its leaf juice fed to give relief from FMD	Oral	Giday <i>et. al.</i> ,(2013)
<i>Andrographis paniculata</i> (Burm.f) Wall.ex. (kirayat)	Acanthaceae	Herb	Leaf	Leaf paste is applied twice a day for one week	Topical	Panda & Dhal (2014)
<i>Vitex negundo</i> L. (Nirgundi, Sephali)	Verbenaceae	Shrub	Leaf	Leaf paste is applied twice a day for one week	Topical	Panda & Dhal (2014)
<i>Strychnos nuxvomica</i> L. (Bailewa)	Strychnaceae	Tree	Fruit	Unripe fruit paste is applied	Topical	Panda & Dhal (2014)
<i>Calotropis gygantea</i> (L.) R.Br. (Safed aak)	Asclepiadaceae	Shrub	Stem	Wash with root decoction to the infected foot thrice daily for 3-4 days to control foot rot disease	Topical	Rao et al (2014)
<i>Colocasia esculenta</i> (L.) Schott (Arvi)	Araceae	Herb	Petiole	Petiole juice is given twice a day for one week	Oral	Panda & Dhal (2014)
<i>Semecarpus anacardium</i> L. (Bhilawan)	Anacardiaceae	Tree	Latex	Latex is applied externally on cracked foot	Topical	Panda & Dhal (2014)
<i>Sterculia urens</i> Roxb. (Kulu)	Sterculiaceae	Tree	Gum	Gum is applied on foot	Topical	Panda & Dhal (2014)
<i>Mimusops elengi</i> Linn. (Maulsari)	Sapotaceae	Tree	Latex	Latex is applied externally on swollen mouth	Topical	Panda & Dhal (2014)
<i>Lantana camara</i> L.	Verbenaceae	Shrub	Leaf	its leaf juice fed to give relief from FMD	Oral	Giday & Tekllehaymanot (2013)

B. Bacterial diseases

B.1 Haemorrhagic Septicaemia (HS)

Haemorrhagic septicaemia (HS) is an acute pasteurellosis manifested by an acute and highly fatal septicemia caused by 1 of 2 serotypes of *Pasteurella multocida*. Although it may be seen at any time of year, the worst epidemics occur during the climatic conditions typical of monsoon (high humidity and high temperatures). Although the disease is very similar in cattle and buffalo species, buffalo tend to have more severe clinical signs and a shorter course of disease than cattle. A fever, dullness and reluctance to move may be the first sign. Salivation and a profuse serous nasal discharge develop, and oedematous swellings become apparent in the submandibular region which is the pathognomic clinical sign. That is why it is called as neck swelling disease. Either sudden death or a protracted course up to a few days is also possible. Animals with clinical signs, particularly buffalo, rarely recover. Similar clinical signs including severe depression, profuse salivation, oedema of the head, neck and brisket, and severe respiratory distress with foamy nasal discharge have been reported in some wild ruminants with systemic pasteurellosis (Dhoot & Upadhey 2001).

Common treatment protocol followed in HS treatment is Oxytetracycline (LA) – 10mg/kg Bwt. i.v., or Sulfadimidine – 100 mg/kg Bwt. i.v., or Procaine Penicillin – 30-45 thousand IU/kg Bwt. i.m., or Trimethoprim sulfadoxine – 3ml/45kg Bwt. i.m., or Tilmicosin – 10mg/ kg Bwt. s.c., or Florfenicol – 20 mg/ kg Bwt. i.m.

In contrast to above allopathic regimen, following herbal treatment can be applied for HS, which is given below in Table-2.

B.2 Black quarter (BQ)

Black quarter is an infectious bacterial disease caused by *Clostridium chauvoei*, a Gram-positive bacterium rod-shaped anaerobic that can produce environmentally-persistent spores in unfavourable conditions. These bacterial

Table:-2 Herbal plants used for treatment of Haemorrhagic Septicaemia

Plant & Local Name (hindi)	Family	Habit	Parts Used	Method of Preparation	Route of Adm.	References
<i>Arisaema tortuosum</i> Schott. (Bagh Jandhra)	Araceae	Herb	Rhizome	Its rhizome is crushed to extract the juice and fed to animal	Oral	Santhivimalarani & Pavadi (2014)
<i>Capsicum annuum</i> L. (Shimla mirch)	Solanaceae	Herb	Fruit	Its fruit is powdered and boiled for few minutes. The soup is fed to animal	Oral	Santhivimalarani & Pavadi (2014)
<i>Flacourtia indica</i> (Burm. f) J Merr (Bilangada)	Flacourtiaceae	Tree	leaves	Crushed leaves mixed with water and filtrated	Oral	Yibrah, (2014)
<i>Solanum incanum</i> L. (Indian rennet)	Solanaceae	Shrub	leaves	Chopped leaves mixed with water and then sieved	Nasal	Yibrah (2014)
<i>Vernonia amygdalina</i> Del.	Asteraceae	Tree	Seeds	Crushed seed mixed with water and filtered	Oral, Nasal	Yibrah, (2014)
<i>Calpurnia aurea</i> (Ait.) Benth	Fabaceae	Shrub	leaves	Crushed leaves mixed with water	Topical, Oral	Yibrah, (2014)
<i>Cassytha filliformis</i> L.	Lauraceae	Climber	Whole plant	Whole plant paste is externally applied on the affected neck	Topical	Panda & Dhal (2014)
<i>Cayratia trifolia</i> (L.) Domin	Vitaceae	Climber	Whole plant	Whole plant paste is externally Applied	Topical	Panda & Dhal (2014)
<i>Pueraria tuberosa</i> (Willd.)DC.	Fabaceae	Climber	Tuber	Tuber extract is applied	Topical	Panda & Dhal (2014)

spores can remain in the soil for years in an inactive state, and return to their infectious form when consumed by grazing livestock and infect the large muscles of the animal where the bacteria grow and produce large amount of gas. Contaminated pasture is a predominant source of these organisms, which are also found naturally in the intestines of animals. Disease can occur over many years in areas where there is soil or manure contamination with the bacteria, and it is extremely difficult to remove the spores from the environment (Busch *et. al.*, 2000). The disease is characterized by inflammation with gaseous oedema of skeletal muscle and severe toxemia. The acute nature of the disease makes successful treatment difficult, but there is an effective vaccine available to provide animals with protective immunity. Initially animal may develop fever, and the affected limb is hot to touch. The limb swells significantly, and the animal develops lameness on the affected leg. Crepitating, or the sensation of air under the skin, can be noticed as the area seems to crackle under pressure. Common treatment protocol followed in BQ treatment is Penicillin (LA) – 40,000 IU/ kg Bwt. i.m., Antiserum. In contrast to above allopathic regimen, following herbal treatment can be applied for BQ, which is given below in Table-3.

Table:-3 Herbal plants used for treatment of Black Quarter

Plant & Local Name (hindi)	Family	Habit	Parts Used	Method Of Preparation	Route of Adm.	References
<i>Acalypha indica</i> L. (Kuppi, khokli)	Euphorbiaceae	Herb	leaf	Its leaf juice is extracted and fed to the animal	Oral	Giday & Tekllehaymanot(2013)
<i>Barleria acanthoides</i> Vahl	Acanthaceae	Shrub	root	Its root is crushed to extract the juice and given to animal	oral, nasal, ear, eye,	Giday & Tekllehaymanot(2013)
<i>Boscia coriacea</i> Pax	Capparidaceae	Shrub	leaf	leaf juice twice a day about 50 ml. is sieved and given	oral, nasal	Giday & Tekllehaymanot(2013)
<i>Bourreria orbicularis</i> (Hutch. & E.A. Bruce) Thulin	Boraginaceae	Shrub	leaf & bark	Chopped leaves mixed with water and then sieved	oral, nasal	Giday & Tekllehaymanot(2013)
<i>Cadaba rotundifolia</i> Forssk.	Capparidaceae	Shrub	leaf	Its leaves are crushed with water and given	oral, nasal	Giday & Tekllehaymanot(2013)
<i>Rute chalepesis</i> (pismaram)	Rutaceae		Seed	Homogenizing in water	Topical	Gidey <i>et. al.</i> , (2012)
<i>Synadenium cupulare</i> (Boiss.) L.C. Wheeler [EV0001LT] [Dead - man's tree (Eng.)]	Euphorbiaceae	Shrub	Stems	Strike with latex branch on the affected area	Topical	Luseba & Tshisikhawe (2013)
<i>Lobelia giberroa</i> Hemsl	Lobeliaceae	Shrub	leaves	Crushed leaves mixed with water	Topical	Yibrah ,(2014)
<i>Pergularia extensa</i> (Jacq.) N.E. Br.	Asclepiadaceae		Whole plant	plant is crushed to extract the juice and given to animal	Oral	Santhivimalarani & Pavadi (2014)

B.3 Anthrax

Anthrax is a zoonotic disease caused by the spore forming bacterium *Bacillus anthracis*. Anthrax is most common in wild and domestic herbivores (eg, cattle, sheep, goats, camels, antelopes) but can also be seen in humans exposed to tissue from infected animals, contaminated animal products or directly to *B anthracis* spores under certain conditions. In herbivores, anthrax commonly presents as an acute septicaemia

with a high mortality rate, often accompanied by hemorrhagic lymphadenitis. In dogs, humans, horses, and pigs, it is usually less acute. *B anthracis* spores can remain infective in soil for many years. During this time, they are a potential source of infection for grazing livestock. Grazing animals may become infected when they ingest sufficient quantities of these spores from the soil. In addition to direct transmission, biting flies may mechanically transmit *B anthracis* spores from one animal to another. Typically, the incubation period is 3–7 days (range 1–14 days). The clinical course ranges from peracute to chronic. The peracute form (common in cattle and sheep) is characterized by sudden onset and a rapidly fatal course. Staggering, dyspnoea, trembling, collapse, a few convulsive movements, and death may occur in cattle, sheep, or goats with only a brief evidence of illness. In acute anthrax of cattle and sheep, there is an abrupt fever and a period of excitement followed by depression, stupor, respiratory or cardiac distress, staggering, convulsions, and death. The body temperature may reach 107°F (41.5°C), rumination ceases, milk production is drastically reduced, and pregnant animals may abort. There may be bloody discharges from the natural body openings after death. Some infections are characterized by localized, subcutaneous, oedematous swelling that can be quite extensive. Areas most frequently involved are the ventral neck, thorax, and shoulders (Stefos *et. al.*, 2012). Common treatment protocol followed in Anthrax treatment is Penicillin – 20,000 IU / kg Bwt. i.m. BID, or Streptomycin – 8-10 g / day in 2 doses i.m., or Oxytetracycline – 5 mg / kg Bwt./ day i.v., Antiserum – 100-250 ml daily for 5 days. In contrast to above allopathic regimen, following herbal treatment can be applied for Anthrax, which is given below in Table-4. **However extra caution be taken before decision to treat Anthrax case and it should be reported to authorities.**

Table:-4 Herbal plants used for treatment of Anthrax

Plant & Local Name in (hindi)	Family	Habit	Parts Used	Method of Preparation	Of	Route of Adm.	References
<i>Acalypha indica</i> L (Kuppi, khokli)	Euphorbiaceae	herb	whole part	Whole part > juice extract > fed		Oral	Giday & Tekllehaymanot(2013)
<i>Aloe trichosantha</i> berger	Aloaceae	shrub	Leaf	Grinded leaf juice sieved and applied		oral, nasal	Giday & Tekllehaymanot(2013)
<i>Balanites aegyptiaca</i> (L.) Del.	Balanitaceae	Tree	Root	Homogenized juice with water		Oral	Giday & Tekllehaymanot(2013)
<i>Boscia coriacea</i> Pax	Capparidaceae	shrub	Leaf	Grinded leaf juice sieved and applied		Nasal	Giday & Tekllehaymanot(2013)

B.4 Actinobacillosis

Actinobacillosis is a specific infectious disease caused by a gram-negative coccibacilli belonging to the genus *Actinobacillus*. Infection with *Actinobacillus lignieresii* is responsible for the wooden tongue disease characterised by the presence of granulomas with pus containing small, hard yellow to white granules. Many other *Actinobacillus* spp. (e.g. *A. actinoides*, *A. suis*, *A. pleuropneumoniae* and *A. equuli*) are also pathogens affecting soft tissue (Farjani *et. al.*, 2014). In cattle, actinobacillosis mainly affects the tongue ('wooden tongue'), the lymph nodes of the head and neck. The characteristic lesion is a granuloma of the tongue, with discharge of pus to the exterior. Infection usually begins as an acute inflammation with sudden onset of inability to eat or drink for several days, drooling saliva, rapid loss of condition, painful and swollen tongue, nodules and ulcers on the tongue.

Animals may occasionally die from starvation and thirst in the acute stages of the disease. As the infection becomes chronic, fibrous tissue is deposited and the tongue becomes shrunken and immobile and eating is difficult. Local lymph nodes may be enlarged and abscesses may form and discharge creamy pus, which may contain granules. Common treatment protocol followed in Actinobacillosis treatment is Potassium iodide – 6-10 g/ day for 7-10 days orally, Sodium iodide – 1 g/12 kg Bwt. i.v. (single dose), Streptomycin – 5 g/ day for 3 days i.m., Isoniazide – 10 mg/ kg Bwt. for 3-4 weeks i.m. In contrast to above allopathic regimen, following herbal treatment can be applied for Actinobacillosis, given in Table-5

Table:-5 Herbal plants used for treatment of Actinobacillosis

Plant & Local Name in (hindi)	Family	Habit	Parts Used	Method of Preparation	Route of Adm.	References
<i>Ipomea</i> sp. (Behaya)	Convolvulaceae	Climber	Seed	Grinded seed mixed with water and then applied	Oral	Yibrah, (2014)
<i>Acmella caulirhiza</i> Del.	Asteraceae	Herb	Leaves	Roasted leaves grinded and mixed with salt and then applied	Topical	Yibrah, (2014)
<i>Calotropis procera</i>	Asclepiadaceae	Shrub	Seed	Crushin and queezing with butter and fed	Oral	Gidey <i>et. al.</i> , (2012)

C. Parasitic disease

C.1 Roundworm infestation

In most cases roundworm infection is without signs and symptoms. However, heavy infections directly damage tissues as the parasites can block internal organs or exert immense pressure in the gut. Infections are

predominantly found in alimentary tract and sometimes in circulatory system, as the parasites inhabit these organs. General symptoms are stomach ache, fever, vomiting, diarrhoea, loss of appetite, loss of blood, significant weight loss and listlessness. In humans, under chronic infections, such as those in schistosomiasis, extreme morbidity is the common symptom. Morbidity is accompanied by persistent poverty, decreased productivity (Pearce & MacDonald, 2002). Ruminant host over 14 different species of gastro-intestinal roundworms. Different species live in different locations in the intestine (Roeber *et. al.*, 2013). Four species live in the abomasum: barber pole worm (*Haemonchus placei*), brown stomach worms (*Ostertagia ostertagi* and *O. bisonis*), threadworm (*Trichostrongylus axei*). Six species live in the small intestine, thread-necked worm (*Nematodirus helvetianus*), Four species of cattle bankrupt worms (*Cooperia* spp.), cattle hookworm (*Bunostomum phlebotomum*). Four species live in the large intestine: nodular worm (*Oesophagostomum radiatum*), whipworm (*Trichuris discolor*), large-mouthed bowl worm (*Chabertia ovina*), hairworm (*Capillaria bovis*). Some of roundworms listed above are rare or occur only in specific geographic areas. Other roundworms are common throughout the world wherever cattle are raised. Common treatment protocol followed in Roundworm infection treatment is - Ivermectin – 0.2 mg/ kg Bwt. s.c., or Albendazole – 7.5 mg/ kg Bwt. orally, or Febantel – 7.5 mg/ kg Bwt. orally, or Levamisole – 7.5 mg/ kg Bwt. orally or parenterally, or Piperazine citrate – 2-3 g/10 kg Bwt. Orally with drinking water.

In contrast to above allopathic regimen, following herbal treatment can be applied for Roundworm infection, which is given below in Table-6

Table 6: Herbal plants used for treatment of Roundworm infestation

Plant & Local Name in (hindi)	Family	Habit	Parts Used	Method Of Preparation	Route of Adm.	References
<i>Dioscorea deltoidea</i> Wall. ex Griseb. (Baniatakari, Harvish)	Dioscoreaceae	Climber	Tuber	Tuber juice about 5-7 teaspoons twice a day is given to treat roundworm and constipation of sheep.	Oral	Malla & Chhetri (2012)
<i>Mallotus philippensis</i> (Lam) Muell (Kamala, Raini)	Euphorbiaceae	Tree	Fruits	Red powder obtained from surface of the fruits is used medicinally to remove the Threadworms and Ascaris	Oral	Khan <i>et. al.</i> , (2012)
<i>Carissa caranta</i> L. (Garanda)	Apocynaceae		Root	Its root is mixed with pericarp of mango (<i>Mangifera indica</i> L. Anacardiaceae) in water and used as wormicide of intestine	Oral	Khan <i>et. al.</i> , (2012)
<i>Adhatoda vesica</i> Nees.	Acanthaceae	Shrub	Root & Leaves	The decoction of root and leaves is given orally to calves for elimination of intestinal worms as anthelmintic.	Oral	Khan <i>et. al.</i> , (2012)
<i>Rhamnus purpurea</i> Edgew	Rhamnaceae	Tree	Fruit & Leaves	Fresh fruits and leaves are given to the cattle as anthelmintic	Oral	Khan <i>et. al.</i> , (2012)

C.2 Fluke infestation

It is an important helminth disease caused by two trematodes like *Fasciola hepatica* (the common liver fluke) and *Fasciola gigantica*. This disease belongs to the plant-borne trematode zoonoses where snail population is high. In Europe and America only *F. hepatica* is a concern, but the distributions of both species overlap in many areas of Africa and Asia (Mas-Coma *et. al.*, 2005). The definitive host range is very broad and includes many herbivorous mammals, including humans. The life cycle includes freshwater snails as an intermediate host of the parasite. Recently, worldwide losses in animal productivity due to fasciolosis were conservatively estimated at over US\$3.2 billion per annum. In addition, fasciolosis is now recognized as an emerging human disease. It has estimated that 2.4 million people are infected with *Fasciola*, and a further 180 million are at risk of infection. The disease is a type of helminthiasis and has been classified as a neglected tropical disease according to WHO (Technical Series No. 849)

Clinical signs of fasciolosis are always closely associated with infectious dose (amount of ingested metacercariae). In sheep, as the most common definitive host, clinical presentation is divided into 4 types (Behm & Sangster, 1999)- Acute Type I Fasciolosis, Acute Type II Fasciolosis, Subacute Fasciolosis, Chronic Fasciolosis. Anaemia, hypoalbuminemia, and eosinophilia may be observed in all types of fasciolosis. Elevation of liver enzyme activities, such a glutamate dehydrogenase (GLDH), gamma-glutamyl transferase (GGT), and lactate dehydrogenase (LDH), is detected in subacute or chronic fasciolosis from 12-15 week after ingestion of metacercariae (Phiri *et. al.*, 2006). Economical effect of fasciolosis in sheep consists in sudden deaths of animals as well as in reduction of weight gain and wool production. However, acquired resistance to *F. hepatica* infection is well known in adult cattle. Calves are susceptible to disease but in excess of 1000 metacercariae are usually required to cause clinical fasciolosis (Sykes *et. al.*, 1980). In sheep and sometimes cattle, the damaged liver tissue may become infected by the *Clostridium* bacteria *C. novyi* type B. As *C. novyi* is

common in the environment, black disease is found wherever populations of liver flukes and sheep overlap. Common treatment protocol followed in Fluke infection treatment is Triclabendazole – 10-12 mg/ kg Bwt. orally, or Albendazole - 7.5-10 mg/ kg Bwt. orally or Netobimin – 20 mg/kg Bwt. orally, or Closantel – 10 mg/kg Bwt. orally, or Oxyclozanide – 18.7 mg/ kg Bwt. orally 2 days apart. In contrast to above allopathic regimen, following herbal treatment can be applied for Fluke infestation, which is given below in Table-7.

Table:-7 Herbal plant used for treatment of Fluke infestation

Plant & Local Name in (hindi)	Family	Habit	Parts Used	Method Of Preparation	Route of Adm.	References
<i>Schima wallichii</i> (DC.) Korth. (Chilauni, Kanak, Makrisal)	Theaceae	Shrub	Stem bark	The powder of stem bark is used to treat liver flukes in animals.	Oral	Malla & Chhetri (2012),

D. Fungal disease

Ringworm infection

Ringworm is one of the commonest skin diseases in cattle. Ringworm is a transmissible infectious skin disease caused most often by *Trichophyton verrucosum*, a spore forming fungi and in Dermatomycosis infection. The spores can remain alive for years in a dry environment. It occurs in all species of mammals including cattle and man. Although, fungal infections cause little permanent damage or economic loss but sometimes it may cause severe epidemic. Direct contact with infected animals is the most common method of spreading the infection. The symptoms are, grey-white areas of skin with an ash like surface, usually circular in outline and slightly raised, size of lesions are variable, can become very extensive, in calves most commonly found around eyes, on ears and on back, in adult cattle chest and legs more common, sometimes it also occurs in different internal organs like lungs, placenta and brain which are very much fatal. Common treatment protocol followed in Ringworm infection treatment is Amphotericin B – 0.4-1.5 mg/ kg Bwt. for 10-40 days i.v. Itraconazole – 3 mg/ kg Bwt. orally BID for 3-4 months, Potassium iodide – 6-10 g daily orally for 7 days, Sodium iodide – 1 g/ 12 kg Bwt. intravenous (1 dose), Griseofulvin – 5-10 mg/ kg orally SID for 3-6 weeks. In contrast to above allopathic regimen, following herbal treatment can be applied for Ringworm infection, which is given below in Table-8

Table:-8 Herbal plants used for treatment of ringworm infection

Plant & Local Name in (hindi)	Family	Habit	Parts Used	Method Of Preparation	Route of Adm.	References
<i>Solanum indicum</i> L. (Badi Kateri, Vanabhanta)	Solanaceae	Herb	Leaves	The leaf juice twice a day about 50 ml. is given for treating ringworm in cattle	Oral	Malla & Chhetri (2012)
<i>Maesa chisia</i> Buch.-Ham. ex D. Don. (Bilauni)	Myrsinaceae	Shrub	Stem bark	Juice of the stem bark is applied to treat ringworm in animals.	Oral	Malla & Chhetri (2012)
<i>Clausena dentate</i> (Willd.) M. Roem	Rutaceae	Tree	Leaves	Leaf paste is applied on the affected parts	Topical	Santhivimalarani & Pavadi (2014)

Conclusion

Nature is full of flora and fauna. About 4 lakh of plant species present in the world. Most of them are having medicinal values which need to be explored. This article is an attempt to cite some common herbal medication applied to treat disease of livestock and create interest among the researcher to exploit the gift of nature for the benefit of the human civilization. In India livestock are generally kept in rural areas just as a backbone of social status, source of income and livelihood for village people. The livestock population are affected by common infectious diseases like Hemorrhagic Septicaemia (HS), Black Quarter (BQ), Anthrax, Foot and Mouth Disease (FMD), Brucellosis, Intestinal worm infestation, Fluke infestation, infection of skin by fungus (Ringworm) etc. For the treatment of these livestock disease, people take the help of allopathic medication which are having many adverse reactions, costly and generally unavailable in actual field condition of India. So this article is an approach to treat common infectious livestock disease with the use of herbal treatment instead of allopathic medication skill so that people will be benefited. Livestock can also be prevented from unwanted side effect of commercial medicines. This technique will also be cost effective, having fewer side effects, easily available and beneficial for the health of livestock population

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