



Role of Ayurveda in Improvement of animal health and livestock production – a review.

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Ayurveda, the ancient science of life deals with the improvement of health, prevention from disease and treatment of disease. It has holistic approach to cure and prevent diseases. According to ancient texts ayurveda has been divided in to eight parts, which deals with specialisation like medicine (Kayachikitsa), Surgery (Shalya), Eye & ENT (Shalakya), Paediatrics (Balrog), Toxicology (Agadtantra), Demnology (Bhutvidya), Rasayan and Aphrodisiacs (Vajikaran). Ayurveda also deals with Vriksha ayurveda (Agriculture), Gavya (Cow) Ayurveda, Hasta (Elephant) Ayurveda, Pasu Ayurveda (Veterinary Medicine) etc related to veterinary and related science.

The practice of maintaining livestock and domestic animals has been a centuries old tradition in India. Since ancient time including the Vedas and Puranas, reveals that animal medicine existed in India 3,000 to 4,000 years ago. Veterinary science as it was practiced then was theoretically divided into eight subjects; general surgery, general therapeutics, ophthalmology and otorhinolaryngology (the science of the ear, nose and throat), care of foals, toxicology, demonology and the use of aphrodisiacs.

The foundation of veterinary science in India can be attributed to Shalihotra, 3rd Century BC expert on animal rearing and healthcare. He is known for composing the Shalihotra Samhita, which was based on Ayurveda and extensively documented the treatment of diseases using medicinal plants. This knowledge was believed to have been revealed to Shalihotra by Lord Brahma himself. The principal subject matter of the Shalihotra Samhita is the care and management of horses.

According to the Arthashastra by Kautilya, veterinarians were also posted on battlefields to tend to injured animals. During peace time, these doctors had to ensure that only healthy animals were sent to the markets to prevent the breakout of infections and diseases. He set aside lands for the cultivation of herbal medicines for men and animals alike. Medicines were administered in the form of powders, decoctions and ointments. Although herbal plants were the main ingredients in medicines, animal-derived substances and minerals were also used.

Many books were written on veterinary science during ancient time- Ashwa shastra by Nakul, Ashwayurveda by Shalihotra, Gajalakshan by Brihapati, Gajaayurveda by Palakapya, Gaja Darpan by Hemadri, Gavyayurveda by Sahdev, Hastayurveda by Palakapya, Mrugpada Shastra by Hamsadev etc.

Cattle husbandry was well developed during the Rigvedic period (1500–1000 BC) and the cow (Kamdhenu) was adored and considered the 'best wealth' of mankind. Aryans laid great emphasis on protection of cows. Atharvaveda provides interesting information about ailments of animals, herbal medicines, and cure of diseases. Shalihotra, the first known veterinarian of the world, was an expert in horse husbandry and medicine and composed a text Haya Ayurveda. Sage Palakapya was an expert dealing with elephants and composed a text Gaja Ayurveda. During Mahabharata period (1000 BC), Nakula and Sahadeva, the two Pandava brothers were experts of horse and cattle husbandry, respectively. Lord Krishna was an expert caretaker and conservator of cow husbandry. Gokul and Mathura were famous for excellent breeds of

cows, high milk production, quality curd, butter, and other products. Buddha was a great protector of all kinds of animals and birds in ancient India as he preached lessons of nonviolence to masses. Graeco-Romans imported livestock from India after invasion by Alexander. The great king Ashoka (300 BC) had established the first known veterinary hospitals of the world. He arranged cultivation of herbal medicines for men and animals in his empire and adjoining kingdoms. In a famous text, the Arthashastra (science of economics) composed by Kautilya, a lot of information is available about different animal (elephant, horse, and cow) departments, grazing lands, rules of meat science, livestock products like skin and fur, and veterinary jurisprudence.

Panchmahabhoot theory in Ayurveda-

The concept of Panchmahabhuta (Five elements) is the foundation of Ayurveda to understand its physiology (normal functioning), pathology (disease formation) & pharmacokinetics (movement of drug within the body). Ayurveda believes that everything in this universe is made up of five basic elements. These five elements are earth (prithvi), water (jal), fire (Agni or tej), air (Vayu) and ether or space (akash) and collectively they are termed as Panchmahabhuta.

These are the minutest elements, which constitute living and non-living matters. Everything, including drugs, herbs and living beings are made of these basic elements. Every matter contains all of these five elements. Depending on the predominance of the content, the matter is classified as Parthiva, Apya, Taijasa, Vayaviya and Akashiya (With predominance of earth, water, fire, air and space respectively). The permutation and combination of these elements and its quantity in a given matter determines its properties.

Ayurveda understands body, mind and spirit likewise. It divides the constitution of people into three categories—Vata (ether/air), Pitta (fire) and Kapha (water/earth). These are three basic energies or life forces that are the biological derivatives of the five elements and they govern all the function and structure of the body or its existence as a whole.

Medicinal plants useful in animals-

1. Ashwagandha (*Withania somnifera*)

Ashwagandha, or Indian ginseng, is indicated as a daily rasayana, or anti-aging therapy. It is one of the most highly regarded and widely used Ayurvedic herbs, believed to increase energy and overall health as well as longevity. Ashwagandha literally means “to impart the strength of a horse”. The key constituents of Ashwagandha are called withanoloids, and play an important role in the herb’s ability to promote physical and mental health. Ashwagandha can be used on a long-term daily basis without the risk of side effects. Benefits include:

- Acts as an adaptogen and immunomodulator; supports the activity of lymphocyte and macrophages.
- Is neuro-protective, so helps with nervous tissue injury and inflammation.
- Offers potent anti-inflammatory properties – beneficial for osteoarthritis and other inflammatory conditions.
- Has anti-carcinogenic activity and is supportive during chemotherapy and radiation.
- Possesses high iron content and steroidal lactone which affects bone marrow – helpful for anemia.
- Supports cognitive and brain function in geriatric patients.
- Is an adjunct therapy to seizure disorders.
- Helpful for thyroid problems.
- Stress-related issues such as travel, addition of a new pet or family member, etc.

2. *Boswellia Serrata* (Salai, shallaki)

This is one of Ayurvedic medicine’s most potent anti-inflammatory herbs. *Boswellia* is a promising alternative to conventional NSAIDS, with the added advantage of sparing the GI lining. It is therefore useful for inflammatory disorders of the intestines, respiratory tract and skin. *Boswellia* significantly reduces the production of prostaglandins E2, cyclooxygenase-2 and prevents collagen degradation. The most common use is for osteoarthritis, degenerative

disc disease and any inflammatory condition of bones, joints and spine. It is also neuroprotective, analgesic and antifungal.

3. Turmeric (*Curcuma longa*)

Turmeric is a perennial herb-rhizome commonly used as a cooking spice. Curcumin is the yellow pigment extracted from turmeric. In Ayurvedic tradition, turmeric is a general tonic and blood pacifier. A potent anti-inflammatory agent with analgesic properties, curcumin's essential oil has shown anti-microbial activity against gram positive and gram-negative bacteria in *in vitro* studies. Curcumin also possesses anti-asthmatic, antioxidant, hepatoprotective and anti-cancer activity. It is also known to have strong anti-ulcer activity due to its strong immune modulation and immune-stimulant properties, thus making it very effective in IBD cases. Curcumin maintains healthy cyclooxygenase-2 (Ld4) activity while supporting prostaglandins, leukocytes and thromboxane metabolism. Like *Boswellia*, it has neuro protective properties, so our local neurologists use it for spinal injury and inflammation.

4. Neem (*Azadirachta indica*)

Neem has attracted worldwide attention in the medical community due to its wide range of medicinal, insecticidal and fungicidal properties. Practically all parts of the Neem tree are used in Ayurvedic medicine. Fresh new leaves are used in concoctions for a variety of skin and other inflammatory disorders. Oil extracts from the leaves and seeds are potent antiseptics and insect repellents. Neem has immuno-modalities, anti-inflammatory, antifungal, antibacterial and antiviral properties. It is also considered anti-hyperglycaemic. Since it is considered a valuable insecticidal, it can be used for external parasites. All parts of the Neem plant – leaves, bark and oil-based products – are used for this purpose.

5. Trifla-

This is a combination of three plant fruit – *Terminalia chebula* (Haritaki), *Terminalia bellerica* (Bahera), and *Emblica officinalis* (Amla). This long-almost every Ayurvedic textbook. This mixture is considered apoptogenic. It

has synergistic action as well as digestive properties. It is also considered a powerful antioxidant. Terminalia chebula is rich in tannins, amino acids, succinic acid and beta-sitosterol. Terminalia bellerica is rich in tannins. Emblica officinalis supports the immune system and is one of the best available sources of vitamin C. Trifla has bowel-regulating and mild laxative properties and aids both digestion and elimination (constipation/diarrhoea, IBD, pancreatitis). It is useful for respiratory and allergic illnesses as well as heavy metal toxicity. It is anti-ulcer, anti-cancer, anti-mutagenic, and promotes healthy eyes.

List of Medicinal plants useful in animals-

S. No.	Plants Name	Bot. Name	English Name	Veterinary Use	Useful Part
1	Nimb	<i>Azadiracta indica</i>	Margosa tree	Wound healing; lice killing; skin disease	Leaves
2	Tulsi	<i>Ocimum sanctum</i>	Holi basil	Wound healing; anxiolytic, immunomodulator; adaptogen (antistressor)	Leaves
3	Bilva	<i>Aegle marmelos</i>	Bael, Bengal quince	Wound healing; ant inflammatory; antipyretic; antidiarrheal	Leaves, Fruit
4	Haridra	<i>Curcma longa</i>	Turmeric	Wound healing	Rhizome
5	Kumari	<i>Aloe vera</i>	Aloe	Wound healing; gastritis	Leaf pulp
6	Shigru	<i>Moringa oleifera</i>	Drum stick tree	Wound healing; anti-inflammatory; antipyretic;	Seeds, Leaves, Fruit
7	Vasa	<i>Adhatoda vasica</i>	Malabar nut	Wound healing; pneumonia	Leaves and

					whole plant
8	Sitafal	<i>Annona squamosa</i>	Custard apple	Wound healing; foot and mouth diseases	Leaves
9	Manduk parni	<i>Centella Asiatica</i>	Indian Penny Wort	Wound healing; anxiolytic; memory enhancer	Whole plant
10	Rasona	<i>Allium sativum</i>	Garlic	Wound healing;	Tuber
11	Pippali	<i>Piper longum</i>	Long pepper	Antiflatulence; appetizer; digestant	Fruits
12	Gokshura	<i>Tribulus terrestris</i>	Calotrops root	Antiflatulence; appetizer; digestant	Root
13	Aamalaki	<i>Emblica officinalis</i>	Indian gooseberry	Antiflatulence; appetizer; digestant Immuno-modulator	Fruit pulp
14	Bibhitaki (Baheda)	<i>Terminalia bellerica</i>	Beleric myrobalan	Antiflatulence; appetizer; digestant	Fruit pulp
15	Adrak	<i>Zingiber officinale</i>	Ginger	Antiflatulence; appetizer; digestant	Rhizome
16	Guduchi	<i>Tinospora cordifolia</i>	Tinospora	Aphrodisiac; appetizer; digestant	Stem
17	Jeerak	<i>Cuminum cyminum</i>	Cumin	Antiflatulence; appetizer; digestant	Fruits
18	Vidang	<i>Embelia ribes</i>	Babreng	Antiflatulence; appetizer; digestant	Fruits
19	Hingu	<i>Ferula foetida</i>	Asafoetida	Relives gastroenteritis	Exudate
20	Jeevanti	<i>Leptadenia reticulata</i>	Jeevanti	Galactagogue (increases milk production)	Whole plant

21	Mishreya (Souf)	<i>Foeniculum vulgare</i>	Fennel	Galactagogue	Fruits
22	Shatavari	<i>Asparagus racemosus</i>	Asparagus	Galactagogue, immunomodulator	Root
23	Brahmi	<i>Bacopa monnieri</i>	Bacopa,Thyme leaved gratila	Anxiolytic, memory enhancer	Whole plant
24	Vacha	<i>Acorus calamus</i>	Sweet flag	Anxiolytic, memory enhancer	Root
25	Haritaki	<i>Terminalia chebula</i>	Myrobalan	Immunomodulator	Fruit
26	Ashwagandha	<i>Withania somnifera</i>	Winter Cherry	Immunomodulator, an anti-stressor; weight gain	Roots
27	Palash	<i>Butea monosperma</i>	The Forest flame, Bastared tree	Fracture healing	Bark, Flower
28	Asthishrankhala (Hadjod)	<i>Cissus quadra angularis</i>	Bone setter,Adamant creeper	Fracture healing	Stem
29	Kutaj	<i>Holarrhena antidysentrica</i>	Kurchi, Ester tree,Tellicherry tree	Antidiarrheal	Bark
30	Mustak(Nagar motha)	<i>Cyperus rotundus</i>	Nutgrass	Antidiarrheal	Rhizome
31	Dhatki (Dhay)	<i>Woodfordia fruticosa</i>	Fire flame bush	Antidiarrheal	Flowers

Ayurvedic Drugs / Medicinal plants used in specific animal as per disease-

S. No.	Drug Name	Animal	Disease
1	Arka	Not Specific	Scorpion bite
2	Ashthi-Shrinkhala	Cat	Fracture
3	Amarvalli (Oil)	Not Specific	Rheumatic/Muscular pain
4	Dugdhika	Not Specific	Diarrhoea
5	Hingu	Milch cattle	Flatulence
6	Dronapushpi	Sheep	Overall strength
7	Tamrapatra	Not specific	Flatulence
8	Rohitak	Not Specific	Skin rashes
9	Mahanimba	Milch Cattle	Intestinal Parasites
10	Aswattha	Buffalo	Dysuria, Haematuria
11	Shinshapa	Camel	Dysuria, Sunstroke
12	Shleshmantak	Not specific	Foot and mouth disease
13	Rason	Not Specific	Impaction, lumbago
14	Baboola	Milch cattle	Easy removal of placenta
15	Apamarga	Camel	Stomach ache
16	Chirbilva	Not specific	Eczema
17	Palasha	Not specific	Diarrhoea
18	Ankola	Milch cattle	Dog bite

Basti Chikitsa (Medicated Enema) in Animals -

Basti Karma is one of the modalities among the five biocleansing/detoxifying procedures (Panchakarma procedures/ Samshodhan Chikitsa) advocated in

Ayurveda as i.e. Vaman (Therapeutic emesis), Virechan (Therapeutic Purgation), Basti (Medicated Enema), Nasya (Infiltration of drugs through nostrils) & Raktamokshana (Bloodletting by different methods). Basti is a major procedure of panchakarma, where the medicated oil/kashayam/fluid which is given through the anal route gets absorbed in the intestine with simultaneous action of the medicines which are there in the oil or decoction given. In modern medicine enemas are most commonly given to clean the lower bowel as a last resort for constipation treatment when, all other methods fail. But rather than this, Basti Karma mentioned in Ayurvedic classics is having broader therapeutic action on almost all the tissues of the body and have rejuvenative, curative, preventive and health promotive actions.

Lipid soluble drugs are absorbed by passive diffusion and some of the active ingredients are absorbed through active transport. The bioavailability of the drug i.e., the part of the drug which is able to produce an active effect on the body, will be higher when given as Basti.

Basti Karma is broadly divided in two types according to the consistency of the drugs Sneha Basti (Anuvasan) and Niruha Basti (Aasthaapana). In Sneha Basti/ Anuvasan Basti i.e. in this type medicated Oil/ Ghee, lipids are used, word Anuvasan indicates "To stay", the administered medicines stay inside for a longer duration, but still do not cause any untoward problem. In Niruha Basti/ Aasthaapana Basti, decoction of medicinal plants is the main content wherein other ingredients like honey, salt, lipids & other drugs are incorporated to form a colloid or a suspension. Word Niruha, indicates "To eliminate" or eliminate morbid Doshas or Disease from body, & its synonym word "Asthapana" indicates "establish life span & age".

- It nourishes the body, pacifies the vata and allied dosha in the body.
- Major site of vata is the colon area.
- It is a varied type according to pathology of the disease in an individual.
- The doshas from all over body are initially brought into abdomen by Therapeutic ayurvedic abhyangam and swedan i.e. massage and steam, after that they are expelled through the basti treatment.

- Some drugs are absorbed by passive diffusion and some by active transport, bioavailability of the medicine, will be higher when given as Basti.

Animal	Basti Netra (Enema pot nozzle)	Anuvasan Basti Matra (Dose)	Asthapan Basti Matra(Dose)	Basti Dravya (Medicine used)
Elephant	1 Aratni (approx. 40 cm)	2 Prastha (approx. 1280 ml)	4 Aadhak (approx. 10 l.)	Aswatha. Vata Aswakarna, Khadira Aaragvadha, Shal, tala
Camel	18 Angula (approx. 32 cm)	1 Prastha (approx. 640ml)	2 Aadhak (approx. 5 l.)	For camel and donkey: Pilu Karir, Khadira Aaragvadha, Dashmoola
Horse and Cow	16 Angula (approx. 28 cm)	4 to 6 Pala (approx. 160 to 240 ml)	3 Prastha (approx. 2 l)	For Horse: Palash Danti, Devdaru, Katruna Dravanti, For Cow: Mudgaparni, Mashaparni Dhava, Shigru, Patla, Madhook, Danti, Chitrak Palash, Ajmoda Devdaru, Kutaki
Goat and Sheep	10 Angula (approx. 18 cm)	2 Pala (approx. 80 ml)	1 Prastha (approx. 640 ml)	Triphala, Parushak Badar, Kapittha

Ayurveda strengthening the body defence system to fight infection and emphasizes mainly on prevention of illness and maintenance of health. Seven types of vital tissues (Dhatus) in the bodies of humans and animals are nourished from food. These tissues include Plasma, Blood, Muscle, Fat, Bone, Bone Marrow and Nervous Tissue, and Reproductive Tissue. In Ayurveda pharmacological actions of medicinal plants understand on the basis of rasa (taste), guna (property), virya (potency), vipaka (postdigestion effect), karma (action), prabhava (special potency) of the particular drugs and its doses depends on the Prakriti (natural characteristics of individuals), Agni bal

(digestive fire) and physical status. According to dincharya (daily regimen) and ritucharya (seasonal regimen) selection of food has been adopted in ayurveda. According to ayurvedic texts Milk and its product mentioned in Dugdha Varga and mutton & poultry mentioned in Mamsa varga, are major components of our food that get from animals. With the help of ayurvedic principles we can also improve the quality of breeding, lactation and animal product, by which improvement in economic status of farmer may occur.

Therefore, the integration of Veterinary Ayurveda with traditional Allopathic system of medicine is complementary to each other and a way forward for sustainable livestock production. Veterinary Ayurveda provides comprehensive approach by using herbs tackling the root cause besides the symptoms. According to Charaka Samhita “Everything that exists in the vast external universe also appears in the internal cosmos of the body, the microcosm, in altered form.”

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