

A ETHNO-VETERINARY ANTHELMINTICS OF KASHMIR VALLEY

S.S.Kubra¹, Shereen², M.M.Shah³

¹Research Assistant, D.I. L, Department of Sheep Husbandry(J&K). ²P.G Scholar (Vety. Medicine, SKUAST-Jammu). ³Deputy Director Research, D.I.L., Department of Sheep Husbandry(J&K).

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The Indian sub-continent possesses largest livestock population in the world and plays an important role in Indian economy. The livestock sector has a major significance in the rural economy of Jammu & Kashmir contributing 5.04% to the state GDP (19th livestock sector, 2012). Despite the great contribution of livestock sector to the economy and livelihood of the people of Kashmir valley, it is constrained by many challenges including less availability of feed and pastures throughout the year, adverse climatic conditions, poor managemental practices and lack of enough capital to buy inputs (Tariq *et al.*, 2008). It is further aggravated by various bacterial, viral and parasitic diseases. Parasitic infections are considered to be the most prevalent and important health problems in grazing ruminants inflicting losses through mortality, morbidity, reduced feed conversion ratio and by way of costs incurred upon their treatment and control (Shahardar, 2013). In developed and developing countries, synthetic anthelmintics and other antiparasitic drugs have been the primary prophylactic treatment for control of parasitic diseases. However, there has been a rapid development of resistance against these anthelmintic drugs. In the absence of efficient drugs, switching to less conventional methods such as medicinal plants can be a probable solution. In addition, the presence of drug residues in animal products has spurred quest to develop safe alternatives to conventional anthelmintic.

A switch to Ethno-veterinary drugs:

The cultural heritages of an area that involve the interaction between plants and people including the traditional use of medicinal plants and their management is referred to as ethnobotany (Gaikwad *et al.*, 2011). A plant with therapeutic properties naturally synthesizes and accumulates some secondary metabolites like alkaloids, glycosides, volatile oils, vitamins and minerals in different body parts such as leaves, fruits, seeds and rhizomes (Ahmad *et al.*, 2009) (Madhu & Sharada, 2018) and play a significant role in providing health care and improving economy of the country (Shinwari & Gilani, 2003). These natural compounds derived from plants are more stable and provide greater structural diversity than synthetic ones. They are therefore a source of low molecular weight structures active against a wide range of target agents and this diversity can preclude the occurrence of resistance.

Traditional veterinary medicine has been practiced as early as 1800 B.C at the time of King Hammurabi of Babylon (Veen, 1996). A number of studies have been carried out showing that certain plant species not only affect the nutrition but also show promising results in reducing the parasitic infection in sheep (Githori *et al.*, 2006) (Waghorn & Mc Nabb, 2003). Kashmir valley is a temperate agroclimatic zone of north-west Himalayan region of India and is blessed with diverse variety of medicinal flora owing to which it has been a

favorable place for local hakims to practice unani system of medicine (Dar *et al.*, 2002). Traditional use of plants against parasitic infections in human beings and livestock is common practice in valley as most of the population is rural and conventional veterinary drugs are expensive and therefore unaffordable.

Mode of action of anthelmintic plant extracts:

The action can be due to:

- Direct action of extract on the worms
- Or through induction of G.I irritation and diarrhea causing dislodgement of parasites.

Studies conducted for some plants:

< Khobragade *et al.*, 1994 reported complete cessation of motility of *Bunostomum trigonocephalum* worms using crude aqueous extracts of *Allium sativum* (**Rohun**).

< Seeds of *Peganum harmala* (**Isband**) containing active constituent tetrahydro-harmin has been claimed to be active against mixed gastrointestinal nematode infection in goats (Akhtar & Ahmad, 1999).

< *Chenopodium ambrosioides* (**Ganhar**) has been reported to cause paralysis and death of worms (Tariq & Tantray, 2012).

< The leaves and flowering tops of *Artemisia absinthium* (**Tethwan**) contain volatile oil rich in thujone which has been reported to treat infections with nematodes (Meschler & Howlett, 1999)

< Crude aqueous and ethanolic extracts of *Achillea millefolium* (**Pahal gassa**) has shown significant anthelmintic activity in sheep infected with mixed species of G.I nematodes (Lourenco *et al.*, 1999).

< *Punica granatum* (**Daein**) and *Cucurbita* spp. (**Aal**) have been exclusively employed to treat parasitism due to *Taenia sagginata* (Tariq, 2012).

< Eugenol (**extract of Rong**) has also been confirmed to possess anthelmintic activity (Asha *et al.*, 2001).

< Crude powder and crude aqueous extract of *Zingiber officinale* (**Adrak**) has exhibited anthelmintic activity against gastrointestinal nematodes of sheep (Iqbal *et al.*, 2006)

< Wagay, 2018 in his study from north Kashmir has identified some plants with anthelmintic activity viz, *Angelica glauca* (**Chorafrin**), whole plant extract of *Cardamine macrophylla* (**Pahal laish**), oil of *Chenopodium urbicum* (**Zewa Dawda Kual**), seeds of *Portulaca oleracea* (**Nunner**), leaf extract or paste of *Prunus persica* (**Chinan**), whole herb extract of *Verbena officinalis* (**Hutmool**) etc.

< Tariq & Tantray, 2012 in their studies on plants in Kashmir revealed the anthelmintic properties of root and stem bark of *Acacia arabica* (**Kekar**), leaf of *Cannabis sativa* (**Bangh**), seeds of *Datura stramonium* (**Dattur**), roots of *Daucus carota*

(**Gazzer**), aerial parts of *Euphorbia royleana* (**Guir sochel**), fruit and bark of *Ficus carica* (**Anjeer**), bark and leaf of *Juglans regia* (**Doon**), whole plant of *Nelumbo nucifera* (**Pamposh**), whole plant of *Nepeta cataria* (**Soi**), seeds of *Ocimum basilicum* (**Babri byol**), root and stem bark of *Prunella vulgaris* (**Kalaveuth**), roots of *Raphanus sativus* (**Muj**) etc.

Some constraints:

There is a possible threat of herbal preparation being toxic. These preparations may have simultaneous high anthelmintic activities and high non-selective cytotoxic activity. Tannin compounds present in plant extracts have cytotoxic effects besides being linked to poisoning in avian species. Rapid decline in medicinally important plants also limits their use as anthelmintic agents. Despite ample evidence of antiparasitic properties of several plant products, there is still a need to provide validated experimental data of reductions in infection levels to support the view that plants play a role in sustainable control of helminth infections under farming situation.

Conclusion:

Medicinal plants have proved to be an important bioresource. Earlier it was used exclusively by the herbal healers and rural communities but now these herbal products have become the first choice of every household. The novel plant anthelmintics can prove to be more efficacious because the parasites won't be able to manifest resistance potential towards newly introduced drugs as manifested against conventional anthelmintics. However, plant anthelmintics will generate a new selection pressure for the parasite to develop resistance because the resistance can develop in the target population to any chemical group. Therefore, the process of selection of resistance can't be broken but can be delayed by providing alternate and novel drugs as alternative to conventional ones. Although there is a need of time, patience and expertise to standardize these plant anthelmintics, but their use will offer a cheap, reliable and readily available alternative to highly expensive and unavailable conventional anthelmintics to the poor farmers worldwide.

Future Prospects:

The role of plants in extending the use and increasing the efficacy of existing anthelmintics should be explored.

Studies need to be carried out to identify more plants with medium to high efficacy against parasites.

Since the intensity and acquisition of such knowledge are fading away among youth due to their changing lifestyle and reliance on chemical medicines, hence the documentation of this prized knowledge can prove useful for ethno conservation.

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