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Mini Review

Ethno-Veterinary Practices (EVP) as a New Approach for Management of Cattle Health without Antimicrobial and Other Chemical Veterinary Drugs

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Abstract

The promotion of the farmer oriented cost effective ethno-veterinary practices (EVP) based on natural products is an important approach to sustainable dairy farming. The application of EVP will largely reduce the use of antibiotics, other chemical veterinary drugs and hormones in the large-scale management of animal health. This would help elimination/reduction of antibiotics and other chemical drug use in animal production and the associated residue in the animal products. It also reduces antimicrobial resistance in the long run. EVPs were documented 24 locations and assessed to understand their safety and efficacy. Three hundred and fifty three were safe and efficacious. One thousand seven hundred and fifty veterinarians, 30,000 farmers and 552 village resource persons were trained to use these formulations. This will enhance the health of livestock and reduce dependence of antimicrobials. This approach promotes organic production of animal products and supports the concept of "One Health". Ethno-veterinary Science and Practices to combat infectious diseases and other clinical conditions in livestock are the key alternatives to antibiotics and other veterinary drugs. These formulations can be prepared and used by the farmers themselves to prevent and manage the health care of their cattle. So, the aim of this article is to emphasize the value of using EVP to combat infectious diseases and other clinical conditions in livestock as a viable alternative to antimicrobials and other veterinary chemical drugs in livestock health management.

Keywords: *Ethno-Veterinary Practice; Herbal Formulation; Antimicrobial Residue; AMR; Livestock Health*

Antimicrobial residue and AMR

The introductions of exotic strains enhanced the production of milk but were susceptible to diseases. The misuse of antibiotics in dairy animals causes high antibiotic residue in the animal products like milk and meat [1-4]. Antibiotic resistance (AMR) is a worldwide problem affecting both human and animal health [5-7]. The antimicrobial resistance (AMR) will cause 10 million deaths per year by 2050 [8]. The urgent need in the livestock sector in India is to replace cost-effective herbal remedies from medicinal plants with high cost antibiotics and other chemical veterinary drugs.

Documentation and rapid assessment of ethno-veterinary practices (EVP)

In India, codified veterinary knowledge exists in the form of medical texts and manuscripts on various aspects of veterinary care and has a documented history of around 5000 years [9]. The rich ethno-veterinary health tractions existing in the villages of India are location

and ethnic community specific health related knowledge, practices, beliefs lifestyles, food habits, customs and skills related to health care and management of livestock [10-12].

The university of trans-disciplinary health sciences and technology (TDU) along with Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) has documented 441 Ethno-veterinary practices from 24 locations in 10 states. These documented practices were rapidly assessed for their safety and efficacy using Ayurveda and reported that 353 formulations are safe and efficacious [13]. *In-vitro* antimicrobial activity of the extracts of the herbal formulation against mastitis had inhibitory activity against *Escherichia coli* and *Staphylococcus aureus* [14]. A clinical study using the traditional formulation for Mastitis showed that the parameters tested become normal within 6 days indicating cure of mastitis [15]. The *in silico* approach using molecular docking studies to find the effect of the herbal preparation against the infection shows that the bioactive compounds were tested effective against the target proteins of *Staphylococcus aureus* [16]. It has been shown that traditional medicine can be used during the dry periods to reduce the incidence of mastitis [17] and reduce ROP [18].

Field study

Veterinary services provided in India are almost completely based on western science. The university of trans-disciplinary health sciences and technology has trained 1750 veterinarians from the National Diary Development Board (NDDB), AMUL, Karnataka milk Federation (KMF) and 30 milk unions from 14 states in India, veterinarians from the government of Sikkim, LUVAS Haryana, Abbott India Ltd. and BAIF to use Ethno-veterinary practices for 20 clinical conditions in cattle. Thirty thousand farmers and 552 Village resource persons were also trained to use Ethno-veterinary practices. The feedback indicates that the recovery of the cattle treated with EVP rages from 71.2 to 100% for various health conditions (Table 1). An intervention impact study indicates a reduction in the incidence of mastitis, enteritis, repeat breeding and cowpox from 2016 to, 2018 and 2019 when herbal alternatives were used (Under publication). A microbiome study of the milk from cows having mastitis before and after treatment with EVP indicates a reduction of the abundance of the mastitis causing bacteria like *Streptococcus, Staphylococcus, Enterobacteriaceae* family and *Pseudomonas* to a minimum after 6 days of treatment.

No	Clinical condition	Number of Animal treated	% cure
1	Mastitis	39470	93.30
2	Indigestion	9398	92.32
3	Foot and Mouth (FMD)	11828	96.5
4	Foot lesion	4665	96
5	Fever	51758	96.25
6	Diarrhea	50838	96.02
7	Joint swelling	500	90
8	Bloat	1830	86.75
9	Udder edema	2267	96.5
10	Repeat breeding	4744	71.2
11	Deworming	7308	96.5
12	Wound	1335	83
13	Uterus prolapse	429	76
14	Retention of Placenta (ROP)	1175	73.54
15	Downer	999	76
16	Udder pox, warts	1000	75
17	Teat obstruction	1592	83.12
18	Ectoparasites /Ticks	1401	93.57
19	Haemogalactia	1441	98.6
20	Metrirtis	4	100.00

Table 1: *Feedback from various milk societies through NDDB through ENAP and ABBOTT private ltd on the efficacy of EVPs for 20 clinical conditions in cattle.*

The use of EVP is a new approach for reducing dependence on antibiotics and other chemical veterinary drugs in veterinary care. Ethno-veterinary practices would help elimination/reduction of antibiotics and another chemical residue in animal products. This approach will lead to safer and cost effective organic dairy products. The EVP formulations could be prepared from few plants that are grown as a home herbal garden and the spices from the kitchen. The farmers can use this preparation themselves to prevent and manage certain clinical conditions of the cattle.

Conclusion

Adopting the EVP to combat infectious diseases and other clinical conditions in livestock has been identified and tested as a key alternative in reducing the use of antimicrobials and other chemical veterinary drugs in the management of cattle health. The EVP formulations are simple and cost effective. The farmer oriented herbal EVP is an important way to sustainable dairy farming and would help elimination/reduction of antibiotic and other chemical residues in animal products ensuring the production of safer dairy products.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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