



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.03

TPI 2020; SP-9(8): 67-70

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www.thepharmajournal.com

Received: 27-05-2020

Accepted: 26-07-2020

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Management of common ailments of dairy animals with ethno-veterinary herbal preparations in Gujarat

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Abstract

Increasing cost of veterinary inputs, indiscriminate use of antibiotics and drug residues in milk are serious issues requiring immediate attention. There is also an exigent need to combat the global threat of antimicrobial resistance (AMR). A field level study was carried out to evaluate the efficacy of ethno-veterinary herbal preparations (EVHP) as an alternative approach for management of mastitis, diarrhoea and pyrexia in dairy animals. The results revealed that overall clinical success rate of EVHP for dealing with mastitis, diarrhoea and pyrexia cases were 92.09%, 97.41% and 97.79% respectively. These outcomes of EVHP intervention were very encouraging and could emerge as an alternative to the usage of antibiotics in field conditions.

Keywords: Mastitis-Pyrexia-diarrhoea-EVHP-herbal intervention-clinical success

Introduction

In India, limited studies have been conducted on the economic losses due to diseases in dairy animals. Estimated annual economic loss only from bovine mastitis in India was reported to be around Rs 70 billion (Bansal and Gupta, 2009) [1]. Indiscriminate use of antibiotics is not only expensive but also leads to its residues in milk and milk products and also contributes to the emergence of antimicrobial resistance (AMR). The world is presently gearing up to combat the global threat of antimicrobial resistance (AMR) and, the recent report of the Inter-Agency Coordination Group (IACG) on AMR focuses on creating awareness, monitoring and restrictions on the use of antimicrobials, but is silent on alternatives to antimicrobials (WHO, 2019) [18]. Under the aegis of Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Tamil Nadu, and Indian Council of Agricultural Research (ICAR), a unique approach was initiated in documentation, validation, dissemination of ethno-veterinary practices (EVP) with co-operation from community based organizations like The Foundation for Revitalization of Local Health Traditions (FRLHT), traditional-healers, farmers and field veterinarians (Punniamurthy, 2002, 2005, 2008 and 2009) [7-10].

The real time data captured through the Information Network for Animal Productivity & Health (INAPH) of the National Dairy Development Board (NDDB) also indicated that ailments of dairy animals related to the digestive, udder and reproductive system were very common. Alternative approaches, *viz.* use of tri-sodium citrate for management of sub-clinical mastitis (SCM) was found to be quite effective for its control in cattle and buffaloes (Dutta *et al.* 2017) [2].

A pilot project for control of bovine mastitis is being implemented by NDDB in 25 milk unions/producer companies in nine states of India through the use of EVHP comprising of mainly herbs and spices (Rana *et al.* 2017) [14]. This practice has also been reported as a sustainable model for developing world for control of bovine mastitis in the Animal Health Report, 2019, International Dairy Federation (IDF) (Rana *et al.* 2019) [15].

The Sabarkantha Cooperative Milk Producers' Union (Sabar) is one of the largest milk unions in India with an average milk procurement of 25 lakh litres per day and has a posse of more than 150 veterinarians providing veterinary input services. On the basis of encouraging results from the mastitis control project of NDDB, the current study was undertaken to record the efficacy of EVHP for management of common ailments in dairy animals including mastitis. This cost-effective, user friendly approach was adopted as an alternative to use of antibiotics for control of these ailments.

Material and Methods

A field level study was carried out at Sabar Dairy, Himatnagar, Gujarat to evaluate the efficiency of EVHP for management of three commonly reported ailments, viz. bovine mastitis, diarrhoea and pyrexia during the period 2016 to 2018. The ailments were diagnosed by the field veterinarians based on the clinical observations. The animals were provided with EVHP in recommended ratio of herbs or spices as detailed in Table-1. Each animal was considered as clinically recovered when the clinical signs were no longer visible and milk production returned to nearly normal level.

A total of 50 Holstein Friesian (HF) crossbred cows with SCM were treated with EVHP as per the protocol mentioned in Table 2. The cows were in various parity [2nd lactation (n=5), 3rd lactation (n=24), 4th lactation (n=15) and 5th lactation (n=6)] and were positive for SCM by California Mastitis Test (CMT) before application of EVHP. CMT was repeated for each animal after completion of EVHP regimen, the progress was monitored and recorded systematically.

EVHP was also applied to 3203 cattle and 500 buffaloes with clinical mastitis as per the schedule mentioned in Table 1. Based on the improvement in clinical signs such as, reduction in udder inflammation, normalcy in milk consistency/colour and, recovery of milk yield to normal levels, the animals were considered as recovered from clinical mastitis. CMT was also repeated after completion of the course of EVHP application for 5 days.

Similarly, two more studies were conducted for treatment of (a) 1661 cattle and 579 buffaloes having non-specific diarrhoea and (b) 1228 cattle and 399 buffaloes with pyrexia by application of EVHP as per the protocol mentioned in Table 2.

The animal included in the present study were classified into 4 age groups: Group I: Below 3 years, Group II: 3-5 years, Group III: 6-9 years and Group IV: above 9 years.

Result and discussion

EVP is the knowledge that evolved over generations by native traditional healers and livestock holders. EVP also involves various disciplines related to people's knowledge and practices in animal healthcare, productivity and performance. EVP based herbal preparations has been reported for management of mastitis and many other common ailments (Punniamurthy 2002, 2005, 2008 and 2009; Satheshkumar and Punniamurthy, 2009, 2010; Punniamurthy and Udayasurian, 2010; Nair *et al.* 2017) [7-10, 16-17, 11, 5].

In this study, 44 (88%) out of 50 SCM positive cows turned CMT negative after completion of EVHP application and an average increase of 605 ml (7.3 %) of milk production per day was recorded in recovered animals. More than 92% of 3703 cattle and buffaloes treated with EVHP for clinical mastitis were clinically recovered after a 5-day treatment protocol. The recovery rate recorded in cattle and buffaloes were 92.6% and 89% respectively. The average cost of EVHP application

for clinical mastitis per animal was around Rs. 300 against a conservative estimate for conventional allopathic medication cost of around Rs.1000-1500 excluding Veterinarian's fees. In earlier study comparable cure rate for bovine clinical mastitis using EVHP was recorded by Punniamurthy *et al.* (2017a; b) [6, 13] and Nair *et al.* (2017) [5].

Bacterial agents viz. *Streptococcus uberis* (19%), *Staphylococcus aureus* (14%), *Streptococcus dysgalactiae* (14%), *Streptococcus agalactiae* (4%), *Klebsiella sp* (7%), *E. coli* (5%), *Staphylococcus xylosus* (4%), other non *S. aureus* (23%), *Aerococcus viridians* (2%), *Streptococcus epidermidis* (2%) have been reported to be associated with SCM and bovine clinical mastitis (Rana *et al.*, 2019) [15] in Indian conditions. High clinical cure rate of SCM and clinical mastitis with EVHP probably indicates the effectiveness of this preparation in mastitis management caused by wide range of bacterial agents.

Diarrhoea is a common ailment of varied causes in bovines, both infectious and non-infectious, which ultimately results in severe productivity losses. In the present study, cattle and buffaloes with acute diarrhoea were included and history with chronic diarrhoea was not considered for management with these herbal preparations. A total of 2240 cattle and buffaloes with non-specific acute diarrhoea were treated with EVHP and 97.4% clinical recovery was recorded. Comparable rate of recovery was noted in cattle (96.99%) and buffaloes (98.62%).

Pyrexia in dairy animals, primarily a symptom of the body trying to cope up with causative agents, has been attributed to various reasons. During fever, animals generally becomes off feed causing subsequent reduction in productivity. Animals with longer duration of fever and symptoms related to haemo-protozoan infection were excluded from this study. A total of 1627cattle and buffaloes were included in the study and the overall recovery rate for pyrexia through EVHP application was found to be 97.79%. The recovery rate in cattle and buffaloes were 97.72% and 97.99 % respectively.

A detailed species-wise and age-wise analysis of EVHP treatment carried out for clinical mastitis, diarrhoea and pyrexia are provided in Table 2. A slight lower recovery rates with an increase in age was observed both in cattle and buffaloes treated by EVHP for mastitis (Table -2). In respect to cattle, recovery rate in Group I (n=74) recorded the highest cure rate of 98.65% followed by Group II (n=439) at 96.36%, Group III (n=1405) at 92.46% and Group IV at 91.05%. A similar trend was also recorded in buffaloes with Group II (n=58) recording the highest cure rate of 94.83% followed by Group III (n=206) at 89.32% and group IV (n=236) at 87.29%. There were no animals in Group I in lactating buffaloes due to their delayed maturity. On the contrary, no such age dependent trends was observed in cattle and buffaloes treated by EVHP for non-specific pyrexia and diarrhoea.

Table 1: The herbal combinations and protocols for various clinical conditions as per "Ethnoveterinary Formulations for Important Ailments in Bovines" published by NDDDB with technical guidance of Prof N. Punniamurthy, TANUVAS and Dr. MNB Nair, TDU were used for the treatment of different ailments. (EVM booklet, NDDDB, 2018)

S. No	Disease condition	Ingredients used	Preparation procedure	Application procedure
1	Bovine mastitis	Aloe vera – 250 g; Turmeric powder- 50 g; Calcium Hydroxide (lime)-15 g	1. Aloe vera, turmeric and lime were blended to form a reddish paste. 75 g of this paste was taken into a bowl and 150 ml mustard oil was added to make it liquid. 2. Along with this external application, 2 lemon fruits were also fed to the affected cattle after	Udders of the affected cattle were cleaned, washed and milk stripped out completely. Then the mixture was applied thoroughly with firm application of palm pressure. The application was repeated 3 times a

			cutting it into halves twice daily for 3 days. 3. For animals with clinical mastitis with blood in milk, in addition to the above, a paste of curry leaves (30 g) and jaggery (100 g) was also feed orally twice daily till condition was resolved.	day for 3-5 days. The milk yields before and after treatment was also recorded.
2	Non-specific diarrhoea	Fenugreek seeds – 10 g; Cumin seeds- 10 g; Poppy seeds – 5 g; Pepper- 10 g; Turmeric- 10 g; Asafoetida- 5 g. Garlic- 1 pearl; Onion- 1 no.; Curry leaves- 25 g Jaggery- 100 g	The cumin seeds, asafoetida, poppy seeds and fenugreek seeds were dry fried till smoke emanated. This was then cooled and blended with rest of the ingredients to form a paste.	Small balls (20g approx.) were prepared by rolling the paste. Administration was done orally giving one ball once daily for 1-3 days till the condition cured.
3	Non-specific pyrexia	Garlic– 2 pearls Coriander- 10 g Cumin-10 g Tulsi- 1 handful Dry cinnamon leaves-10 g Black pepper- 10 g Betel leaves- 5 no.s; Shallots- 2 bulbs Turmeric powder- 10 g Chirata leaf powder-20 g Sweet basil- 25 g (1 handful) Neem leaves- 25 g (1 handful) Jaggery- 100 g	Cumin, pepper and coriander seeds were soaked in water for 15 minutes and then blended to mix all the ingredients to form a paste.	Small balls were made (20 g wt.) of the paste and administration was done orally twice daily for 3 days.

Table 2: No. of animals treated for clinical mastitis, pyrexia and diarrhoea. (Figure in parenthesis indicates clinical cure rate in percentage)

Disease condition	Animals below 3 years	Animals in age group 3-5 years	Animals in age group 6-9 years	Animals above 9 years
No of cattle treated				
Clinical mastitis	74 (98.65)	439 (96.36)	1405 (92.46)	1285 (91.05)
Non-specific pyrexia	91 (97.80)	231 (99.13)	561 (97.50)	345 (97.10)
Diarrhoea	184 (98.91)	273 (98.17)	706 (98.30)	498 (93.78)
No of buffaloes treated				
Clinical mastitis	Nil	58 (94.83)	206 (89.32)	236 (87.29)
Non-specific pyrexia	11 (100.00)	63 (98.41)	163 (98.77)	162 (96.91)
Diarrhoea	67 (100.00)	92 (98.91)	205 (98.54)	215 (98.14)

(Total animals covered: 7620 nos.)

Conclusion

The results of EVHP intervention without the use of synthetic drugs was very encouraging in terms of clinical remission for SCM, clinical mastitis, diarrhoea and pyrexia, both in cattle and buffaloes. In developing countries like India, where the resources with the stakeholders are limited, EVHP has a great potential as a cost-effective and efficacious alternative bovine disease management option. This also minimises the drug residues in milk and milk products and thereby helps to stall the emergence of AMR. Following the success of EVHP at Sabarkantha Milk Union, Gujarat, in treatment of mastitis, Animal Health Group of NDDB, Anand is now is implementing a mastitis control project in 25 milk unions in nine states of India with focus on EVHP and, the data accruing from the project areas will throw more light on the role of EVHP rationalizing the use of antibiotics in the dairy husbandry.

Acknowledgement

The authors are grateful to the management of the National Dairy Development Board (NDDB), Anand for providing necessary facilities and funding to carry out this work. The authors are also thankful to Sabarkantha Milk Union, TANUVAS and TDU for technical support.

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