Ethnoveterinary herbal practices to reduce antibiotic use in the dairy sector

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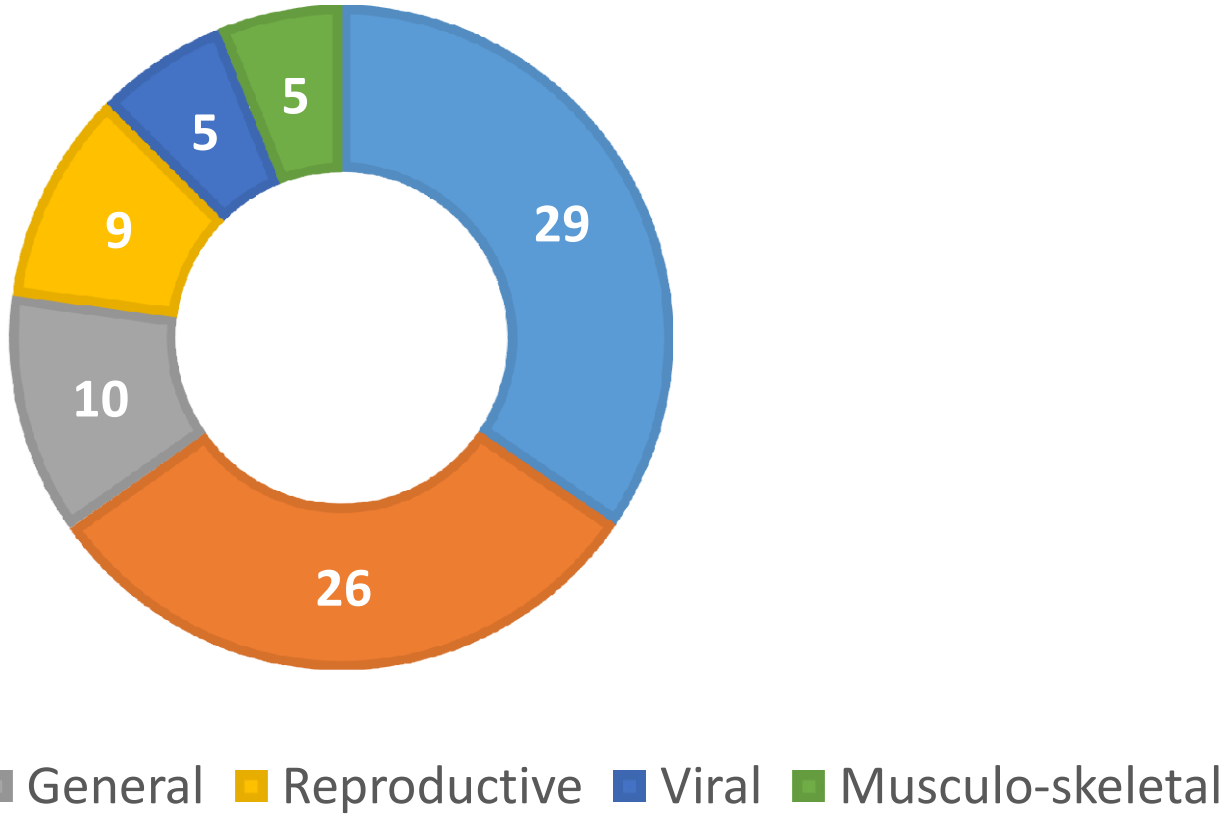
What is EVM

EVM is the compilation of people's traditional practices, knowledge, and beliefs to keep their animals healthy, productive and performing, using local resources in a sustainable manner.

Major disease conditions captured through Information Network on Animal Productivity & Heath (INAPH)



Management of sub-clinical mastitis

Pooled milk sample

- Each farmer
- CMT at DCS

Individual animal milk sample

- Identify CMT positive animal

CMT positive animal

- TSC for 10 days
- Repeat if not recovered

Control of sub-clinical mastitis

- Around 7,77,108 milk samples screened for Sub-clinical mastitis by CMT
- After TSC supplementation 69.92% recovered (Dutta *et al* 2017)
- After repeat TSC supplementation recovery was 89% (Dutta *et al* 2017)
- TSC supplementation effectively prevents the progression of sub-clinical mastitis to clinical form
- Recorded an increase of 10-15% in milk production in most of the animals after TSC supplementation.
- Use of antibiotics for treatment of sub-clinical could be avoided

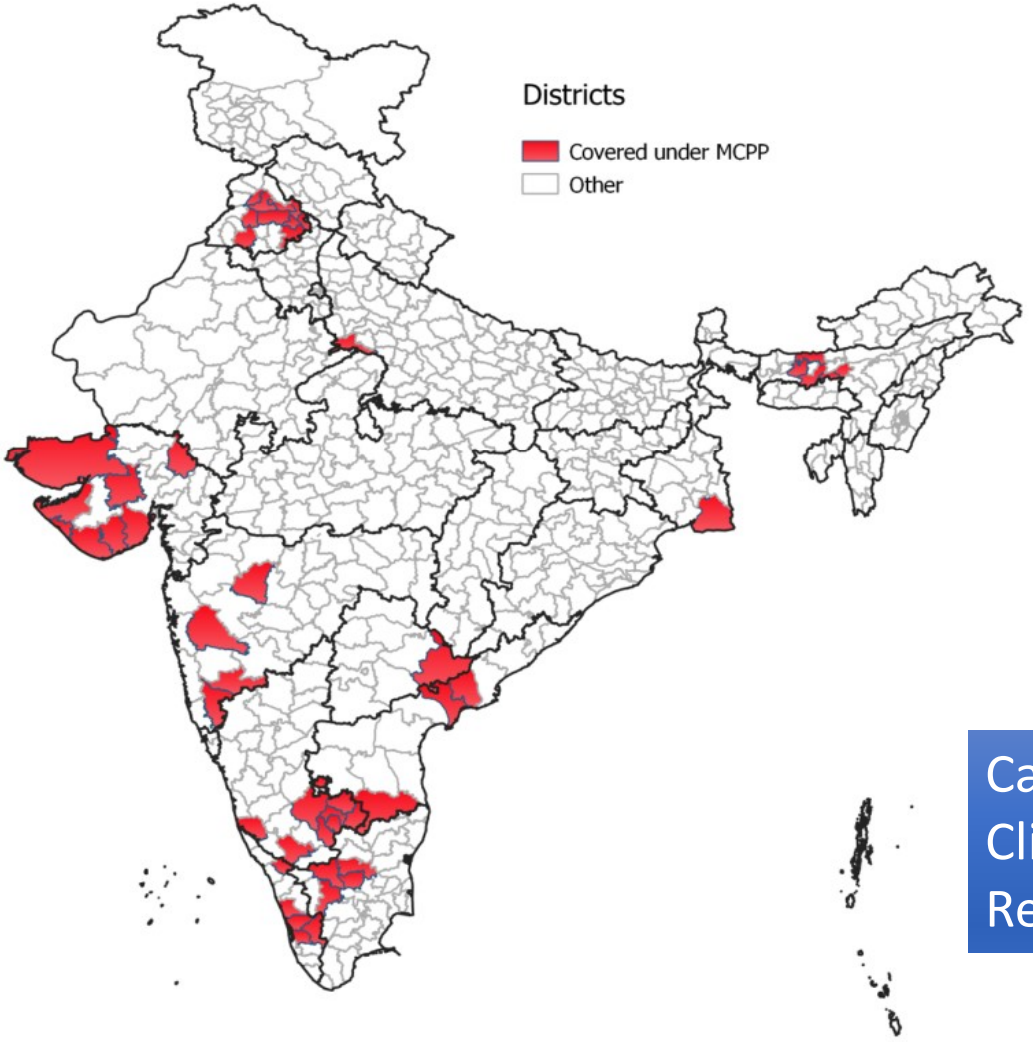
Dutta et al (2017) Prospects of controlling Sub-clinical mastitis in cattle and buffaloes through the use of trisodium citrate. Indian Dairyman: 69 (62-65)

Management of clinical mastitis by EVM

Scientific name	Parts used
Aloe vera	Leaves
Curcuma longa (Turmeric)	Rhizome
Calcium hydroxide	Powder
Citrus limon (Lemon)	Fruit

Sabar dairy – 67,833 cases – 85% clinical recovery

Mastitis Control Popularization Project (MCPP)

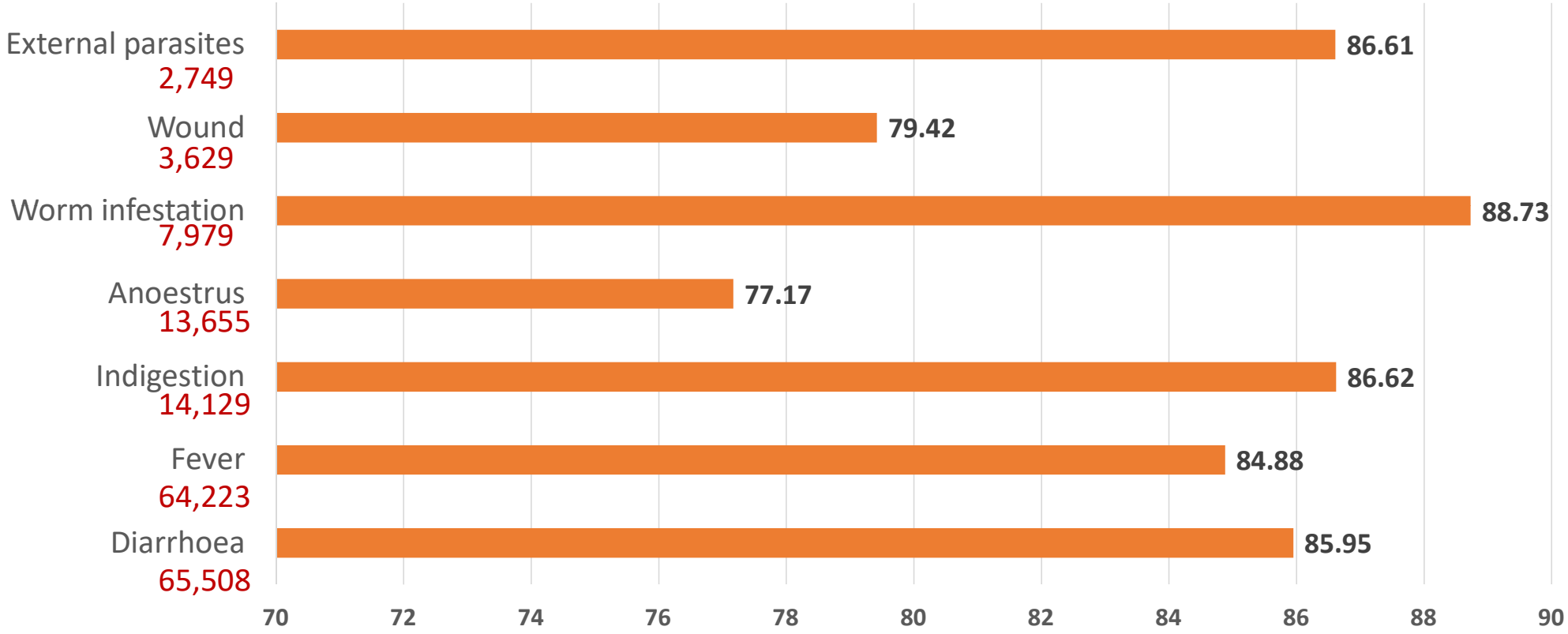


Project coverage

- >1500 DCSs
- 24 Milk Unions
- 9 States

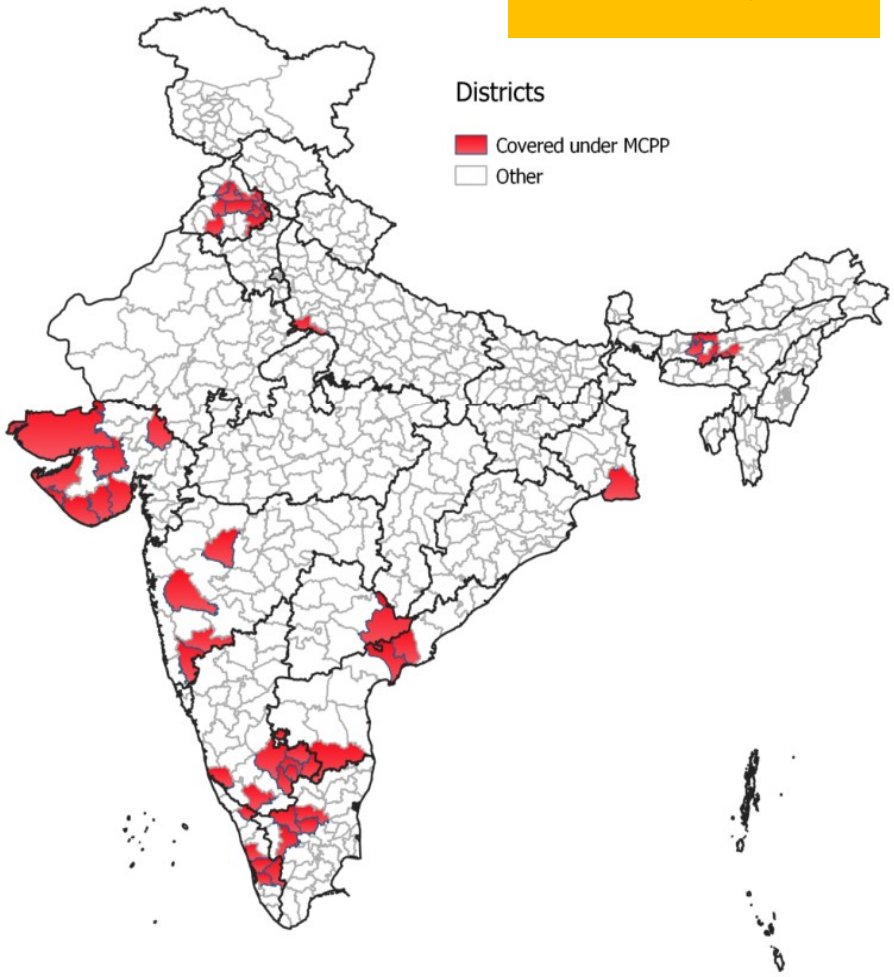
Cases treated by EVM – 92,917
Clinically recovered – 72,129
Recovery rate – 79.78%

Clinical recovery observed for various conditions after EVM supplementation



NDDB's experience in EVM supplementation

Since 2016-17



Training & Extension

>6150 Animal Husbandry personnel trained in EVM

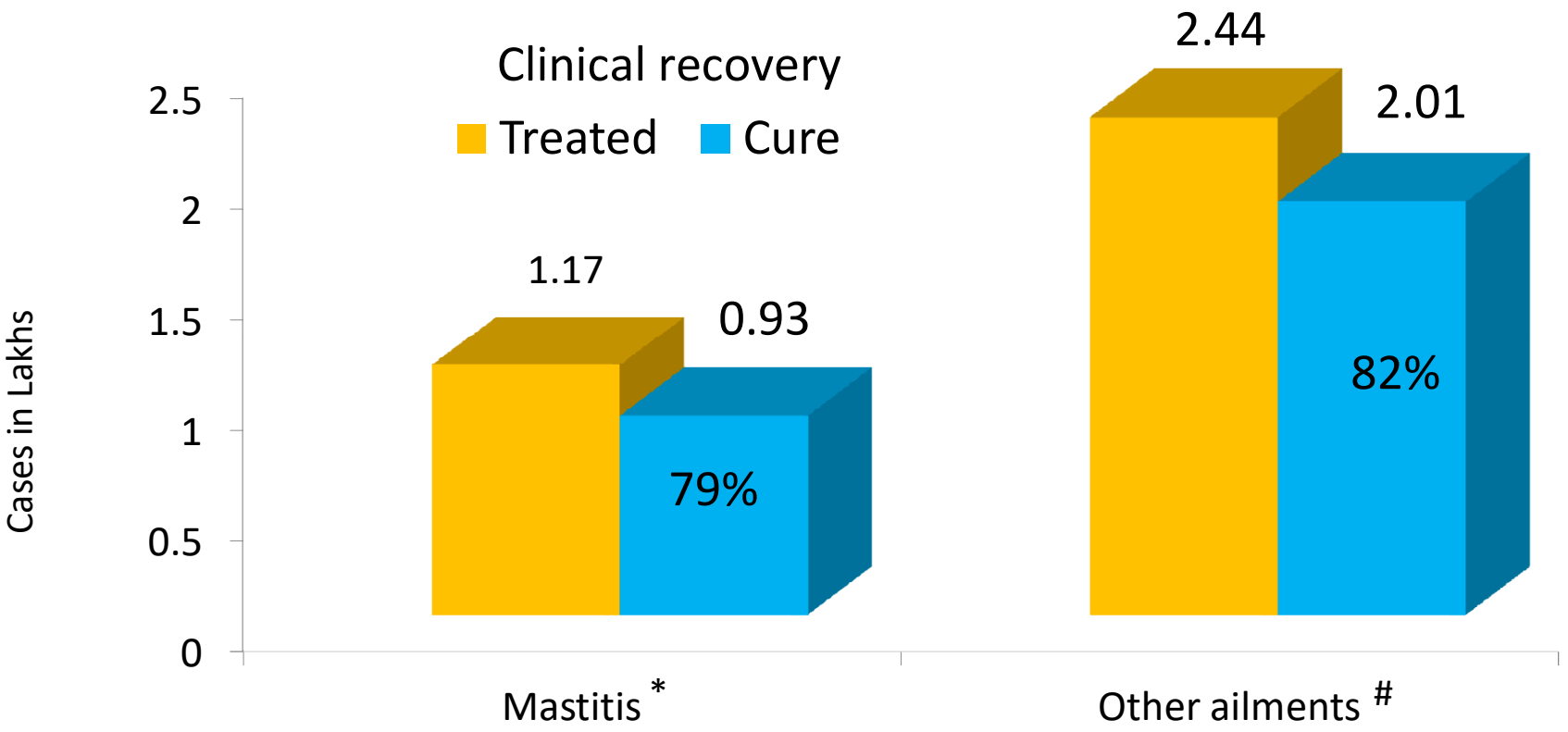
EVM records

3.61 Lakh cases recorded for various ailments

EVM Demo plots

378 AVM demo plots established

NDDB's observation on EVM effectiveness



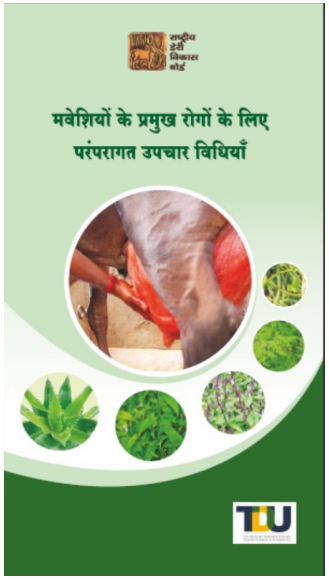
* Includes acute, sub clinical and chronic cases.

Includes 29 other common ailments like fever, diarrhoea, FMD, repeat breeding etc.

- ***Cases are being recorded through an online reporting system.***

Extension and Training on EVM supplementation

- Module in farmer training at NDDB – Demo plot
- Short video of application of EVM supplementation in various health conditions in different languages – YouTube
- EVM Brochure in different languages



Booklets and videos in 14 languages

Publications

HEALTH – MASTITIS

Mastitis control: a sustainable model for the developing world

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UN SDGs

SUMMARY

- **Location:** National Dairy Development Board's (NDDB) model for control of bovine Mastitis Control Popularisation Project (MCPP) is being implemented in more than cooperative societies (DCS) across nine states in India (Figure 1) focusing on a sim efficacious, environmentally friendly and sustainable approach.
- **IDF Welfare Action Area:** Animal Health management
- **Resource based measure:** (i) Reduction in treatment costs in bovine mastitis (ii) D knowledge to the farmers, especially ethno-veterinary medicine (EVM) (iii) Manage common bovine ailments (other than mastitis) by EVM.
- **Animal based measure:** i) Increase in milk production (ii) High cure rates (iii) Non-i therefore painless.
- **Group demographics:** Small-holder livestock farming is largely practiced in India. More than 80% of dairying activities in the household are carried out by women who also carry out measures for control and management of mastitis.

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INVITED REVIEW

Ethnoveterinary medicine for responsible dairying

Dilip Rath[1], Girish Kumar Sharma[1] and Yogesh C Joshi[2]

NATIONAL DAIRY DEVELOPMENT BOARD

APPLIED MANAGEMENT OF BOVINE MASTITIS MINIMISING THE USE OF ANTIBIOTICS

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ABSTRACT:
Alternative approaches were applied for bovine mastitis management thereby minimising the use of antibiotics. Milk samples (n=2,43,181) at dairy cooperative society (DCS) level were screened by California Mastitis Test (CMT) for sub-clinical mastitis (SCM) and positive animals were given tri-sodium citrate (TSC) regimen which resulted in reduction in the incidence of SCM as detected by CMT by about 60% in a span of three years. Management of clinical mastitis (CM) through Ethno-Veterinary Herbal Preparations (EVHP) was undertaken by application of herbal paste comprising *Aloe vera*, turmeric and lime on the affected udder which resulted in successfully managing around 80% of the CM cases (n=26,342) using EVHP alone in the last two years. The mastitis control programme is being implemented by NDDB in 24 milk unions covering nearly 1500 DCSs targeting more than 2,00,000 lactating animals. Characterisation of bacterial agents involved in mastitis was also undertaken in this project.
Staphylococcus sp., *Klebsiella sp.*, *Streptococcus sp.* and *E coli* were the leading bacterial agents identified from mastitis cases using traditional, molecular and BD Phoenix system. Anti-microbial resistant (AMR) profile of these pathogens were studied by phoenix antibiotics panel, detection of AMR genes by PCR and whole genome sequencing. Molecular studies reveal that some of *E. coli* isolates harbour bla_{TEM}-1B, bla_{CTX-}, qnrS1, sul1, sul2, and tet(A) genes. Presence of bla_{TEM}, mecA, aph(3')-III, ant(6)-Ia; aac(6')-aph(2'')-,tet(K) and dfrG genes were recorded in some of the *Staphylococcal* isolates. Antibiotic sensitivity results by BD Phoenix indicate only some isolates have resistance against commonly used antibiotics of beta-lactam, cephalosporin, fluoroquinolone, sulphonamide, trimethoprim and tetracycline groups.
The present study reveals that application of TSC and EVM can be used for management of bovine mastitis rationalizing the use of antibiotics thus minimising the likelihood of development of AMR as well as antibiotic residues in milk.

Figure 1 – MCPP implementation in 25 locations covering more than 1600 DCS across nine states in India.

INTRODUCTION:
Small holder dairy system is widely practiced in India where bovine mastitis causes significant losses to the dairy farmers. Due to bacterial infection (s), dairy cows encounter a clinical and sub-clinical condition called as Mastitis, wherein inflammation of the udder occurs as a part of host immune defence mechanism. It is one of the common reason that dairy animal are treated with antibiotics (Saini et al., 2012). Around 60% of the losses due to mastitis in India have been attributed to the sub-clinical form. Treatment protocol for mastitis by antibiotics, demands time to review the history of the animal, thus finalising the antibiotic regime
Mastitis control through Ethno-Veterinary Herbal Preparations (EVHP) is gaining significant interest during recent years in India and abroad. EVHP are also cost effective, farmer and environmental friendly, and, can minimise antibiotic usage, resulting in lesser antibiotic residues in milk of dairy animals, thus reducing the probability of development of anti-microbial resistance (AMR). Nair *et al.* (2017) reported that a combination of *Aloe Vera*, *Curcuma longa* and calcium hydroxide was effective in managing bovine mastitis. For this Ethno-Veterinary Herbal Preparation (EVHP) combination, the mechanism of action through molecular docking studies has been reported by Punniamurthy *et al* 2017.

OBJECTIVE:
The study has been conducted with the objectives to:
1. Understand the utility of trending alternate therapy for management of sub-clinical mastitis by TSC and clinical mastitis by EVHP , thus rationalising the non prudent use of antibiotics for mastitis treatment.
2. Profiling the organisms, causing clinical and sub-clinical mastitis under Indian field, and their antibiotic susceptibility.

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Conclusion

- EVM is
  - Effective
  - Farmer friendly
  - Affordable
  - Sustainable
  - Environment friendly - No residues or resistance
- EVM requires
  - Popularization
  - Mainstreaming and focus
  - Research on formulations

Our Team

Dr. G K Sharma

Dr. SK Rana

Dr. Pankaj

Dr. Sagar

Dr. Hari Kumar

Dr. Surendra

Dr. Vijay

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Thank You