NDDB's initiatives to take forward the use of ethnoveterinary medicines (EVM) in the Indian dairy sector

Dr A V Harikumar
Deputy General Manager & Group Head (Animal Health)
National Dairy Development Board
Anand, Gujarat
Presentation overview

- About NDDB
- Dairying in India
- Challenges
- EVM rationale
- The progress
- EVM propagation
- AMR surveillance
- Acknowledgements
Dairying in India

Largest producer in the world since 1998
231 million tonnes in 2022-23

Milk is the single largest agricultural commodity
Valued at ~12 billion USD
More than the combined value of cereals and pulses!

Employment generation
Provides direct employment to >80 million rural households

Production by masses
Average herd size is 2-3 animals

Growth above world average
Milk production grew at a rate >6% annually against the world average of only ~2% over the last decade.

Per capita availability above world average
Per capita availability in India is 444 g/day against the world average of 315 g/day

More than the combined value of cereals and pulses!
Challenges

- Indiscriminate antibiotic usage
- Lack of proper documentation and/or scientific validation of alternate systems like EVM
- Low awareness and/or acceptance among stakeholders on EVM
- Rapid emergence of AMR
- Limited veterinary care access and prohibitive treatment costs
- Probability of antibiotic residues in milk and milk products
- Very low pace of development of new antibiotic molecules
- Probability of antibiotic residues in milk and milk products
- Limited veterinary care access and prohibitive treatment costs
- Probability of antibiotic residues in milk and milk products
- Very low pace of development of new antibiotic molecules
- Rapid emergence of AMR
EVM rationale

**Farmer**
- Cost-effective
- Easy to prepare & administer
- Ingredients easily available at home
- Efficacious and revitalising
- Non-invasive
- No milk withdrawal
- Provides an immediate option in remote areas

**Consumer**
- Reduced antibiotic residues/other drugs in milk.
- Better product quality
- Reduced food allergies
- Better health

**Country**
- Implementation of regulatory agency (FSSAI) norms
- International recognition of Indian Traditional systems
- Better prospects in international market
- Help to tackle AMR

**Climate**
- Antibiotic free dung improves carbon sequestration of the soil by almost double. (Soil stores twice as much carbon as the atmosphere does)
The progress

**EVM coverage**

**Project coverage**
- >1000 DCSs
- >16 Milk Unions
- 8 States

**Training on EVM**
- 1205 vets trained
- 11163 AH personnel

**Period**
- Since 2017-18

**Case records**
- >9.70 lakh cases recorded for various ailments

**Demo plots**
- 679 demo plots established
Training of vets from Milk Unions on EVM

Training of vets at TDU, Bangalore on EVM and antibiotic residue field testing

The 4 day training at TDU followed by a 3 day field training at various locations across the country.
On-line data capture

Animal Health Management Information System

Welcome to the Animal Health Management Information System

It is estimated that about 40% of the milk produced worldwide is adulterated by pathogens. Mastitis, especially sub-clinical mastitis, results in a loss of 1% to 2% of the world’s milk production. mastitis. Also, underestimation of the udder is due to the sub-clinical form. The farmer usually remains unaware of the existence of this form in his animals. A bulk milk sample is taken and submitted to the National Dairy Research Institute (NDRI) for pathogen identification. The data is then captured and compiled. This will also address issues related to antibiotic residues in milk. It is therefore important for the farmer for which posters, hand-outs etc are provided at EVM.

Welcome Admin | Change Password | Log Out

<table>
<thead>
<tr>
<th>Welcome to</th>
<th>Add New DCS</th>
<th>Operational Area</th>
<th>MCP Detail</th>
<th>Upload Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Antibiotic Residue Testing</td>
<td>CMT Testing of Pooled Milk Samples</td>
<td>SCC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CFU</td>
<td>IBC SCC</td>
<td>Ailments</td>
</tr>
</tbody>
</table>
The progress
Ailments covered

>9,70,000 empirical records
~81% cure rate

>100,000 individual records
~83% cure rate

8100 cases with 78% cure rate in 2017-18

Data captured through an online system

Ailments

- Mastitis
- Bloat
- Blood in milk
- Deworming
- Diarrhoea
- Downer
- Ectoparasites
- Fever
- FMD foot lesion
- Prolapse
- Repeat breeder
- Teat obstruction
- Udder Oedema
- Wart
- Wound
- ROP
- Swelling of joints
- Leucoderma
- Anoestrus
- Endometritis
- Milk fever
- Joint ill
- Teilitis
- Metritis
- Pyometra
- Cystic ovary
- Poisoning
- Indigestion
- Agalactia
- LSD

2024
## Empirical data summary from 2017-2024

<table>
<thead>
<tr>
<th>S.no</th>
<th>Ailments</th>
<th># treated</th>
<th># apparently cured</th>
<th>Cure %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mastitis (all forms)</td>
<td>322914</td>
<td>253444</td>
<td>78%</td>
</tr>
<tr>
<td>2</td>
<td>Fever</td>
<td>193056</td>
<td>159012</td>
<td>82%</td>
</tr>
<tr>
<td>3</td>
<td>Diarrhoea</td>
<td>175941</td>
<td>148485</td>
<td>84%</td>
</tr>
<tr>
<td>4</td>
<td>Indigestion</td>
<td>42916</td>
<td>36055</td>
<td>84%</td>
</tr>
<tr>
<td>5</td>
<td>Deworming</td>
<td>31262</td>
<td>28935</td>
<td>93%</td>
</tr>
<tr>
<td>6</td>
<td>Anoestrus</td>
<td>25094</td>
<td>18070</td>
<td>72%</td>
</tr>
<tr>
<td>7</td>
<td>Blood in milk</td>
<td>22335</td>
<td>18598</td>
<td>83%</td>
</tr>
<tr>
<td>8</td>
<td>Repeat breeder</td>
<td>19255</td>
<td>12621</td>
<td>66%</td>
</tr>
<tr>
<td>9</td>
<td>Metritis (all forms)</td>
<td>17555</td>
<td>13874</td>
<td>79%</td>
</tr>
<tr>
<td>10</td>
<td>Udder oedema</td>
<td>15130</td>
<td>12703</td>
<td>84%</td>
</tr>
<tr>
<td>11</td>
<td>FMD mouth lesion</td>
<td>14120</td>
<td>12168</td>
<td>86%</td>
</tr>
<tr>
<td>12</td>
<td>Wound</td>
<td>12749</td>
<td>10350</td>
<td>81%</td>
</tr>
<tr>
<td>13</td>
<td>Retention of placenta</td>
<td>11950</td>
<td>8945</td>
<td>75%</td>
</tr>
<tr>
<td>14</td>
<td>FMD foot lesion</td>
<td>9863</td>
<td>8090</td>
<td>82%</td>
</tr>
<tr>
<td>15</td>
<td>Bloat</td>
<td>8337</td>
<td>6495</td>
<td>78%</td>
</tr>
<tr>
<td>16</td>
<td>Ectoparasites/ticks</td>
<td>7158</td>
<td>5666</td>
<td>79%</td>
</tr>
<tr>
<td>17</td>
<td>Lumpy Skin Disease</td>
<td>6499</td>
<td>4729</td>
<td>73%</td>
</tr>
<tr>
<td>18</td>
<td>Teat obstruction</td>
<td>6376</td>
<td>4335</td>
<td>68%</td>
</tr>
<tr>
<td>19</td>
<td>Agalactia</td>
<td>5255</td>
<td>3974</td>
<td>76%</td>
</tr>
<tr>
<td>20</td>
<td>Wart</td>
<td>4998</td>
<td>3687</td>
<td>74%</td>
</tr>
<tr>
<td>21</td>
<td>Downer</td>
<td>3794</td>
<td>2515</td>
<td>66%</td>
</tr>
<tr>
<td>22</td>
<td>Swelling/ Joint Pains</td>
<td>3633</td>
<td>2680</td>
<td>74%</td>
</tr>
<tr>
<td>23</td>
<td>Prolapse</td>
<td>2350</td>
<td>1622</td>
<td>69%</td>
</tr>
<tr>
<td>24</td>
<td>Joint ill</td>
<td>2126</td>
<td>1524</td>
<td>72%</td>
</tr>
<tr>
<td>25</td>
<td>Teilitis</td>
<td>1711</td>
<td>1001</td>
<td>59%</td>
</tr>
<tr>
<td>26</td>
<td>Cystic ovary</td>
<td>1662</td>
<td>1105</td>
<td>66%</td>
</tr>
<tr>
<td>27</td>
<td>Milk Fever</td>
<td>968</td>
<td>711</td>
<td>73%</td>
</tr>
<tr>
<td>28</td>
<td>Poisoning (unknown origin)</td>
<td>909</td>
<td>621</td>
<td>68%</td>
</tr>
<tr>
<td>29</td>
<td>Leucoderma</td>
<td>309</td>
<td>240</td>
<td>78%</td>
</tr>
</tbody>
</table>

**Overall** 970225  782255  81%
Individual animal cure rates vs empirical cure rates

- Individual animal cure %
- Empirical data cure %

- Wound
- Blood in milk
- Downer
- Sub-clinical Mastitis
- Udder oedema
- Diarrhoea
- Indigestion
- Agalactia
- Fever
- Acute Mastitis
- Anoestrus
- Swelling/Joint pains
- Retention of placenta
- Metritis
- Teat obstruction
- FMD mouth lesion
- Repeat breeder
- Prolapse
- Ectoparasites/ticks
- Chronic mastitis
- Bloat
- FMD foot lesion
- Wart
- Lumpy Skin Disease
Empirical data vs individual animal data

**Empirical data**

<table>
<thead>
<tr>
<th>Disease</th>
<th>Empirical Data</th>
<th>Individual Animal Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhoea</td>
<td>148485/175941</td>
<td>18724/22042</td>
</tr>
<tr>
<td>Fever</td>
<td>159012/193056</td>
<td>27066 /32662</td>
</tr>
<tr>
<td>Mastitis</td>
<td>253444/322914</td>
<td>34274/44032</td>
</tr>
</tbody>
</table>

- **Diarrhoea**: 84% vs 85%
- **Fever**: 82% vs 83%
- **Mastitis**: 78%
The Progress

Drastic reduction in antibiotic purchase and use

~63% reduction in antibiotic purchase from 17-18 to 22-23

~60% reduction in antibiotic usage per visit from 17-18 to 22-23

Source: The Sabarkantha District Cooperative Milk Producers’ Union Ltd.,
The Progress
Positive change in awareness levels

- Awareness of sub-clinical mastitis: 90% (Annual survey: 32%)
- Awareness of EVM for mastitis: 60% (Baseline survey: 34%)
- Preference for antibiotics for treating mastitis: 47% (Annual survey: 8%)
- Awareness of antibiotic residues in milk: 56% (Baseline survey: 25%)

Baseline survey (1717) vs. Annual survey (1666)
The progress

EVM production by Milk Unions/Federations

- Sabarkantha Milk Union
- Kaira Milk Union
- Malabar Milk Union
- Punjab Milk Federation

To start in 24-25:
- Banaskantha Milk Union
- Kolhapur Milk Union
EVM propagation

- Extension material in 12 languages covering EVM for >30 ailments:
  - Brochures and pamphlets
  - Posters
  - eGOPALA
  - 264 videos, all available on YouTube – 2.66 million views
- Facebook page to document success stories
- IDF Health reports, various journals
- International seminar
- IDF Conferences: Nantes, Dublin, Copenhagen, New Delhi
- WOAH Conference, Marrakesh
- Farmer exhibitions
- Farmer training
- Third party validation
- Scientific validations
Textbooks on EVM

- Veterinary Herbal Medicine by Susan G. Wynn and Barbara J. Fougère
- Integrating Complementary Medicine into Veterinary Practice

(Wiley-Blackwell)
AMR surveillance – An AMR sampling kit contents

- Paper napkin
- Marker pen
- Sterile gloves
- Alcohol swipe
- Sterile tube
- Bronopol tablet
### AMR surveillance - Instruction manual

#### Instruction for milk sample collection from mastitis cases

<table>
<thead>
<tr>
<th>Step 1: Wipe udder with napkin</th>
<th>Step 2: Disinfect with swipe</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.jpg" alt="Step 1" /></td>
<td><img src="image2.jpg" alt="Step 2" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 3: Open vial (wear gloves)</th>
<th>Step 4: Secure the lid of vial</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3.jpg" alt="Step 3" /></td>
<td><img src="image4.jpg" alt="Step 4" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 5: Add tablet into vial</th>
<th>Step 6: Collect milk (10 ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5.jpg" alt="Step 5" /></td>
<td><img src="image6.jpg" alt="Step 6" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 7: Close lid tightly &amp; mix</th>
<th>Step 8: Label sample (dry area)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7.jpg" alt="Step 7" /></td>
<td><img src="image8.jpg" alt="Step 8" /></td>
</tr>
</tbody>
</table>

- Please read the MCPP SOP document for further details

### Transport and storage

- Transport sample in **cold chain** (2-8°C).
- **Freeze** the sample once it reaches the centralized location.
- Intimate the courier agency on the same day on the mobile number provided by NDBB.

### Label Description

<table>
<thead>
<tr>
<th>Field</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of Collection</td>
<td>DD/MM/YY</td>
</tr>
<tr>
<td>Unique DCS code</td>
<td>As provided in MCPP reporting system</td>
</tr>
<tr>
<td>Species</td>
<td>C - Cattle B - Buffalo</td>
</tr>
<tr>
<td>Farmer member code</td>
<td>(from whose animal sample is collected)</td>
</tr>
<tr>
<td>Quarter collected</td>
<td>LF (Left Fore), RH (Right Hind), RF (Right Fore), LH (Left Hind)</td>
</tr>
<tr>
<td>Composite</td>
<td>(C) if from more than one quarter</td>
</tr>
</tbody>
</table>

**Precaution:** Use only a marker pen for labelling

| Label Example | 04/07/18 | SAB01 | C | 3256 | LF |
Milk samples

Sub clinical mastitis  Clinical mastitis

Isolation & Identification of Organism

Antibacterial Sensitivity

Phenotypic
Disc Diffusion
BD & Vitek System

Genotypic
Identification of Resistance Gene by WGS and PCR

Advisory to MU/States
Surveillance of AMR

Culture & PCR Repository
AMR surveillance- Laboratory studies

Identification/ Characterisation
- By BD & Vitek System
- Confirmation by selective media
- PCR (species specific)

AMR Profiling (Phenotypic /Genotypic)
- BD & Vitek AST system
- PCR for AMR determinants
- Whole genome Sequencing
No. of samples dispatched: 10  
No. of samples tested: 10  
Tested at: NDDHR & D Laboratory, Hyderabad

1. Isolates

2. Antibiotic

**AMR Studies-Reports**

*Note: The results are only indicative since the sample size is very small. Continuous sampling would be required to generate meaningful data.*
Mastitis - Isolation of associated bacterial pathogens

- Isolation of bacterial pathogen from suspected milk samples - YoY Ranging between 51-70%
- Gram +ve bacteria associated mastitis cases - ~86%
- Gram -ve bacteria associated mastitis cases - ~13.5%

- Major associated pathogens
  - S. aureus (23%)
  - Non aureus Staphylococcus (21%)
  - Strep uberis (9%)
  - Klebsiella sp (6%)
  - E. faecalis (4%)
  - Strep. agalactiae (4%)
  - Strep. dysagalactiae (3%)
  - E. coli (3%)

- Isolation is affected due to
  - Loss of viability post collection, storage and shipment
  - Sampling errors-
    - Non C.M sample collection
    - Sample collected post antibiotic treatment
**S. aureus: Molecular characterisation**

**Salient observations (Virulence typing):**

- **18% of the isolates were MRSA** (mecA+ve); mecC gene is not seen in any of the MRSA isolate
- Panton Valentine Leukocidin (PVL) was detected in **two isolates** (Community acquired MRSA type)
- Toxic shock syndrome (*tsst-1*) gene was detected in **one isolate**.
- **90% of the isolates** harbour multiple genetic elements for **biofilm formation** (viz., icaA, icaD, clfA, clfB, fnbA, fnbB, bap, cna)
- Super-antigen toxin (virulence) genes. And Virulence gene(s) *viz.*, *sea, seb, sec, sed, see*- could be identified in **5% of the isolates**.
One Health Training of veterinarians for sample collection
Acknowledgements
Thank you for your attention

For free downloads and apps:
a) Handbook of Dairy Husbandry
b) EVM brochure
c) Cow comfort manual
https://www.dairyknowledge.in/section/manuals
d) EVM tri-fold pamphlet
https://www.dairyknowledge.in/section/booklets-pamphlets
e) EVM poster
https://www.dairyknowledge.in/section/posters
f) Facebook: Success stories
https://www.facebook.com/groups/2319967778024417/
g) e-GOPALA android app
International Seminar on Veterinary Ayurveda – 17th December, 2018
Popularisation measures - Facebook page on success stories

Traditional herbal formulations for cattle and buffaloes
@mopp.nddb.coop

Get Started With Automated Ads
Get personalized ads that adjust over time to help you get better results

Posts

Successful treatment with EVP. A case of bovine mastitis with thetis in a primiparous Buffalo
Name of the owner: Sri Tatineni Raghava.
Village: Chipuru gudem.
District: Krishna district, A.P.

Before treatment:
EVP

In 6th Day of EVP

Before

EVP

In 6th Day of EVP
Management of common ailments of dairy animals with ethno-veterinary herbal preparations in Gujarat

P Datta, AV Hari Kumar, SK Rana, SB Patel, DD Patel, KR Patel, N Punnamiurthy, MNB Nair and GK Manava

HEALTH – MASTITIS

Mastitis control: a sustainable model for the developing world

AUTHOR

P.K. Rani, A. V. Hari Kumar, Pankaj Dutta, R.S. Sridhar, N.P. Mane, and M.N. B Nair

ABSTRACT

Mastitis control is a global challenge for dairy farmers. A sustainable model (SCM) for mastitis control and prevention is presented. The SCM involves the following strategies: (a) education and training of farmers on mastitis, (b) selective cow culling, (c) vaccination of cows against mastitis, and (d) provision of quality feed and water. The SCM has been implemented in a dairy farm in India, which resulted in a significant reduction in the incidence of mastitis. The SCM is simple, effective, and sustainable, and can be implemented in other developing countries with similar conditions.

GLOBAL AGENDA FOR SUSTAINABLE LIVESTOCK

Good practices for responsible use of antibiotics

System 3. Mastitis prevention in effective and sustainable dairy production system

Mastitis is the most important disease in dairy production. It has been responsible for up to 55% of the antibiotics used in dairy production. Ineffective or inappropriate antibiotic use can lead to the development of antibiotic-resistant bacteria. The following practices can help prevent mastitis: (a) good hygiene practices, (b) regular monitoring of mastitis, and (c) early detection and treatment of clinical mastitis. These practices can be implemented in dairy farms to reduce the incidence of mastitis and the use of antibiotics.

USE OF ETHNOVETERINARY MEDICINE FOR MANAGEMENT OF COMMON AILMENTS OF DAIRY ANIMALS

S.K. Rana, A.V. Hari Kumar, P.K. Rani, S. Sridhar, N.P. Mane, and M.N. B Nair

The use of ethnoveterinary medicine for the management of common ailments of dairy animals is discussed. The following are some of the traditional remedies used in dairy farms:

- Ayurvedic medicine: Sonth (Acorus calamus), guggulu (Commiphora mukul), and haritaki (Terminalia chebula) are used to treat digestive disorders.
- Siddha medicine: Brulthil (Dipterocarpus alatus) is used to treat respiratory disorders.

These traditional remedies are effective and safe, and can be used in combination with modern veterinary practices to improve the health and productivity of dairy animals.

Case reports on management of LSD like conditions with ethnoveterinary practices

Dr. Pankaj Dutta, AV Hari Kumar, AC Mahajan, S Shroff, SK Rana, FJ Saharliah, P Gopin, D Borah, N Punnamiurthy and MNB Nair

Management of repeat breeding in bovine by herbal combination

Dr. Pankaj Dutta, Hari Kumar AV, Shroff SG, Rana SK, Mogale UV, Magar Y, Punnamiurthy N, Nair MNB and Garde SB
Popularisation measures - Brochures
Popularisation measures - eGopala
# Popularisation measures - Posters (12 languages)

## Ethnoveterinary Formulations for Important Ailments in Bovines

The common plants, spices and other materials mentioned here are generally regarded as safe and these are only suggestive. Nearby veterinarian may be consulted for proper disease diagnosis and management.

Prepared with technical input from Prof. R. Pundrakumthry (arupurnam@gmail.com). For further information contact anand@ilri.org

<table>
<thead>
<tr>
<th>Mastitis (all types)</th>
<th>Mastitis (all types)</th>
<th>Teat obstruction</th>
<th>Udder Odema</th>
<th>Retention of Placenta</th>
<th>Repeat breeding</th>
<th>Prolapse</th>
<th>FMD mouth lesions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FMD foot lesions/wound</th>
<th>Fever</th>
<th>Diarrhoea</th>
<th>Bloated and indigestion</th>
<th>Worms</th>
<th>Tick/Ectoparasites</th>
<th>Pox/wart/cracks</th>
<th>Allergy/Toxic/toxeric sting/like</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hygroma (swelling of joints)</th>
<th>Cough</th>
<th>Downer (not able to get up)</th>
<th>Toxicity (Pesticide/RCA/Mycotoxin)</th>
<th>Blood in Milk</th>
<th>Anoestrous</th>
<th>Lumpy Skin Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
<td>Santa Laura Conventio</td>
</tr>
</tbody>
</table>

---

For and additional information about the formulations, please contact the nearest veterinary clinic or the local agricultural extension officer.
Popularisation measures - Exhibitions
Popularisation measures - EVM plot and saplings
Down to Earth Report

SOME GROWING AWARENESS solutions are so simple and effective that their potential is too often underutilized. Such is the case with probiotics, beneficial bacteria or microorganisms that can be used to enhance the health of animals and plants. Probiotics are already widely used in human foods and are increasingly being explored for their potential to improve the health and production of livestock and crops.

When used with organic pesticides and other sustainable practices, probiotics can protect crops and livestock against disease and improve their nutrient uptake. They can also help reduce the need for antibiotics and other synthetic chemicals that are harmful to the environment and human health.

Probiotics work by competing with harmful bacteria for nutrients and space in the gut, which helps to prevent the growth of harmful organisms. In addition, probiotics can help to improve the immune system and overall health of animals and plants.

In recent years, there has been a growing interest in probiotics for both human and animal health. However, more research is needed to fully understand their potential and how they can be used most effectively.

EASY TO SWITCH

Pharmaceuticals are a low-cost alternative to reduce antibiotic use in Indian dairy sector

DEEPAK BHATI, RAJESHWARI DHAMA, AMIT KUMAR

NEW DELHI

REVIVING LOVE WISDOM

Innovative dairy management and technology interventions for sustainable dairy sector development

Dr. Sagar Shashidhar, Director, National Dairy Research Institute


Hindi


document
Scientific validations

Department of Veterinary Physiology & Biochemistry
College of Veterinary Science & A.H.
Kamdhenu University
Anand-388001

NDDB Project Report:
Title of the Project: Validating efficacy of the EVM formulation for immunity enhancement

The salient observations are as follows:

1. Haematological parameters:
   - The number of RBCs increased significantly (<0.05) in the supplemented group as compared to the non-supplemented (Control) group indicating supplementation of the EVM

PROJECT PROPOSAL SUBMITTED
TO
NATIONAL DAIRY DEVELOPMENT BOARD
Anand, Gujarat

By
Dr. Ratheesh M (PI)
Assistant Professor in Biochemistry
St. Thomas College, Pala, Anuragurham (PO)
Kottayam (DT), Kerala-686574
&
Dr. Sandhya S (Co-PI)
Inorganic and Physical chemistry
IISc, Bangalore (Co-PI)

PROJECT PROPOSAL
TO EVALUATE THE EFFECT OF HERBAL FORMULATION AND TRADITIONAL PLANT EXTRACTS AGAINST TICK-INFESTED CATTLE
A PROJECT SUBMITTED TO
NATIONAL DAIRY DEVELOPMENT BOARD
Govt. of India

BY
Dr. H. S. Sohla
Assistant Professor
Department of Veterinary Medicine
College of Veterinary Science & Animal Husbandry
Kamdhenu University, Anand

(Co-PI)
Dr. V. D. Chauthan
Assistant Professor
Department of Veterinary Pathology
College of Veterinary Science & A.H.
Kamdhenu University, Anand
<table>
<thead>
<tr>
<th>No</th>
<th>Description</th>
<th>Hindi</th>
<th>English</th>
<th>Gujarati</th>
<th>Kannada</th>
<th>Telugu</th>
<th>Bengali</th>
<th>Odia</th>
<th>Malayalam</th>
<th>Punjabi</th>
<th>Assamese</th>
<th>Tamil</th>
<th>Marathi</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mastitis water-based</td>
<td>9534</td>
<td>12643</td>
<td>973</td>
<td>8075</td>
<td>44866</td>
<td>758</td>
<td>44008</td>
<td>8964</td>
<td>898</td>
<td>2438</td>
<td>3382</td>
<td>1985</td>
<td>155524</td>
</tr>
<tr>
<td>2</td>
<td>Mastitis oil-based</td>
<td>7197</td>
<td>2078</td>
<td>2066</td>
<td>28774</td>
<td>3223</td>
<td>16491</td>
<td>4254</td>
<td>8369</td>
<td>2750</td>
<td>1265</td>
<td>8022</td>
<td>4529</td>
<td>347992</td>
</tr>
<tr>
<td>3</td>
<td>Teat Obstruction</td>
<td>6213</td>
<td>172259</td>
<td>6945</td>
<td>3845</td>
<td>21016</td>
<td>4098</td>
<td>712</td>
<td>12649</td>
<td>993</td>
<td>1065</td>
<td>2730</td>
<td>2034</td>
<td>234559</td>
</tr>
<tr>
<td>4</td>
<td>Pox, warts and cracks</td>
<td>7525</td>
<td>14507</td>
<td>2314</td>
<td>68103</td>
<td>3349</td>
<td>1991</td>
<td>747</td>
<td>25970</td>
<td>2232</td>
<td>1020</td>
<td>11288</td>
<td>7409</td>
<td>146455</td>
</tr>
<tr>
<td>5</td>
<td>Retention of Placenta</td>
<td>12173</td>
<td>18289</td>
<td>2294</td>
<td>23655</td>
<td>28239</td>
<td>18748</td>
<td>1323</td>
<td>1226</td>
<td>1001</td>
<td>795</td>
<td>2384</td>
<td>1417</td>
<td>111544</td>
</tr>
<tr>
<td>6</td>
<td>Repeat Breeding</td>
<td>23889</td>
<td>25546</td>
<td>2344</td>
<td>4275</td>
<td>4522</td>
<td>1882</td>
<td>41768</td>
<td>1563</td>
<td>1034</td>
<td>1376</td>
<td>2056</td>
<td>2229</td>
<td>112484</td>
</tr>
<tr>
<td>7</td>
<td>Udder Oedema</td>
<td>11751</td>
<td>11425</td>
<td>1290</td>
<td>4883</td>
<td>9036</td>
<td>977</td>
<td>679</td>
<td>8590</td>
<td>160880</td>
<td>1163</td>
<td>6798</td>
<td>2134</td>
<td>219606</td>
</tr>
<tr>
<td>8</td>
<td>FMD Oral lesions</td>
<td>5891</td>
<td>7504</td>
<td>1562</td>
<td>41399</td>
<td>10536</td>
<td>7068</td>
<td>425</td>
<td>1240</td>
<td>567</td>
<td>787</td>
<td>41253</td>
<td>1116</td>
<td>119348</td>
</tr>
<tr>
<td>9</td>
<td>FMD Foot Lesions</td>
<td>5564</td>
<td>2819</td>
<td>1102</td>
<td>9390</td>
<td>6705</td>
<td>788</td>
<td>15492</td>
<td>1270</td>
<td>3067</td>
<td>1606</td>
<td>155698</td>
<td>3876</td>
<td>207377</td>
</tr>
<tr>
<td>10</td>
<td>Diarrhoea</td>
<td>6434</td>
<td>6804</td>
<td>1759</td>
<td>23122</td>
<td>15265</td>
<td>886</td>
<td>632</td>
<td>9273</td>
<td>674</td>
<td>674</td>
<td>8449</td>
<td>15255</td>
<td>89227</td>
</tr>
<tr>
<td>11</td>
<td>Ticks, Ectoparasites</td>
<td>6136</td>
<td>10556</td>
<td>4411</td>
<td>28889</td>
<td>16099</td>
<td>713</td>
<td>629</td>
<td>3666</td>
<td>769</td>
<td>1103</td>
<td>2710</td>
<td>1304</td>
<td>76985</td>
</tr>
<tr>
<td>12</td>
<td>Prolapse</td>
<td>6106</td>
<td>8669</td>
<td>1089</td>
<td>3817</td>
<td>2590</td>
<td>1542</td>
<td>484</td>
<td>8283</td>
<td>794</td>
<td>634</td>
<td>14513</td>
<td>900</td>
<td>49421</td>
</tr>
<tr>
<td>13</td>
<td>Fever</td>
<td>8062</td>
<td>6454</td>
<td>921</td>
<td>10252</td>
<td>7574</td>
<td>40946</td>
<td>1384</td>
<td>10301</td>
<td>1104</td>
<td>1283</td>
<td>2919</td>
<td>1320</td>
<td>92520</td>
</tr>
<tr>
<td>14</td>
<td>Bloat/ Indigestion</td>
<td>10572</td>
<td>16903</td>
<td>3099</td>
<td>6800</td>
<td>15208</td>
<td>706</td>
<td>1233</td>
<td>6978</td>
<td>575</td>
<td>1739</td>
<td>2876</td>
<td>1747</td>
<td>68436</td>
</tr>
<tr>
<td>15</td>
<td>Deworming</td>
<td>10679</td>
<td>6404</td>
<td>1225</td>
<td>10252</td>
<td>3869</td>
<td>773</td>
<td>940</td>
<td>24495</td>
<td>745</td>
<td>1444</td>
<td>3924</td>
<td>1167</td>
<td>65917</td>
</tr>
<tr>
<td>16</td>
<td>Poisoning</td>
<td>1576</td>
<td>4024</td>
<td>1518</td>
<td>1905</td>
<td>1159</td>
<td>584</td>
<td>1576</td>
<td>1140</td>
<td>538</td>
<td>620</td>
<td>1712</td>
<td>2301</td>
<td>18653</td>
</tr>
<tr>
<td>17</td>
<td>Allergy</td>
<td>4304</td>
<td>4948</td>
<td>1518</td>
<td>1470</td>
<td>4343</td>
<td>511</td>
<td>545</td>
<td>964</td>
<td>964</td>
<td>760</td>
<td>1055</td>
<td>1825</td>
<td>23207</td>
</tr>
<tr>
<td>18</td>
<td>Anoestrus</td>
<td>4418</td>
<td>8620</td>
<td>1564</td>
<td>4463</td>
<td>1796</td>
<td>1394</td>
<td>966</td>
<td>1178</td>
<td>623</td>
<td>872</td>
<td>1381</td>
<td>1518</td>
<td>28793</td>
</tr>
<tr>
<td>19</td>
<td>Blood in milk</td>
<td>18734</td>
<td>2920</td>
<td>1322</td>
<td>4521</td>
<td>3231</td>
<td>1239</td>
<td>1399</td>
<td>1484</td>
<td>668</td>
<td>913</td>
<td>1994</td>
<td>1041</td>
<td>39466</td>
</tr>
<tr>
<td>20</td>
<td>Cough</td>
<td>2486</td>
<td>13684</td>
<td>704</td>
<td>1400</td>
<td>1383</td>
<td>535</td>
<td>720</td>
<td>1866</td>
<td>673</td>
<td>547</td>
<td>1431</td>
<td>1188</td>
<td>26617</td>
</tr>
<tr>
<td>21</td>
<td>Downer</td>
<td>6589</td>
<td>11339</td>
<td>1088</td>
<td>2730</td>
<td>1393</td>
<td>963</td>
<td>1127</td>
<td>11339</td>
<td>887</td>
<td>690</td>
<td>11339</td>
<td>2390</td>
<td>51874</td>
</tr>
<tr>
<td>22</td>
<td>Hygroma</td>
<td>6589</td>
<td>3073</td>
<td>1088</td>
<td>1833</td>
<td>1354</td>
<td>661</td>
<td>536</td>
<td>1061</td>
<td>699</td>
<td>813</td>
<td>1084</td>
<td>1164</td>
<td>19955</td>
</tr>
<tr>
<td>23</td>
<td>LSD</td>
<td>137301</td>
<td>12699</td>
<td>10299</td>
<td>76406</td>
<td>28930</td>
<td>28026</td>
<td>8507</td>
<td>26225</td>
<td>1496</td>
<td>6731</td>
<td>15847</td>
<td>872</td>
<td>353339</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>319723</td>
<td>384167</td>
<td>52495</td>
<td>629233</td>
<td>235686</td>
<td>132280</td>
<td>130086</td>
<td>178094</td>
<td>184631</td>
<td>30338</td>
<td>304845</td>
<td>77721</td>
<td>2659299</td>
</tr>
</tbody>
</table>