

# **A Practical Mastitis Rollback Program Under Local Dairy Farming Conditions In Pakistan**

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- **Mastitis:** Visible or invisible (hidden) inflammation (swelling) of mammary glands
- 20-30% reduction in milk yield (Radostits *et al.*, 2000; Arshad *et al.*, 1998)
- The most important factor after milk yield to determine the profitability of dairying
- Deterioration of milk quality due to several undesirable compositional changes e.g., ↑ in a protein degrading enzyme (**Plasmin- a UHT resistant enzyme**) → deterioration of milk quality even at vender's shelf → Quality problems in the production of processed products like yogurt, cheese, etc.

- At the very least 20% cows and dairy buffaloes in Pakistan afflicted with mastitis
- Mastitis far more prevalent in dairy cows than in dairy buffaloes
- No mastitis control program in force anywhere in Pakistan
- Control of mastitis: *sine qua none* for profitable dairying in Pakistan

# What causes mastitis in hand milked dairy animals?

- **“If you know your enemies and know yourself, you will not be imperiled in a hundred battles. If you do not know your enemies, but do know yourself, you will win one and lose one. If you do not know your enemies and do not know yourself, you will be imperiled in every battle”**

*(Excerpt from the famous philosophy book “The Art of War” written by Sun Tzu. This book was distributed by FIFA World Cup 2002 Brazilian coach, Luiz Felipe Scolari to each of his players before the big match against England)*

## Findings of some previous studies during 1966–2002 on prevalence of common mastitis pathogens of buffaloes reported in Pakistan.

Workers	Percent Prevalence of Common Mastitis Pathogens				
	S. aureus	Str. agalactiae	E. Coli	Mixed <sup>1</sup> , Str. dysaga-lactiae <sup>2</sup> , Str. uberis <sup>3</sup> , Str. pyogenes <sup>4</sup> , S. epidermidis <sup>5</sup> , CNS <sup>6</sup> , Str. faecalis <sup>7</sup> , S. hyicus <sup>8</sup>	Others (C. pyogenes <sup>1</sup> , Pseudo. aeruginosa <sup>2</sup> , Mycobac. <sup>3</sup> , Yeasts <sup>4</sup> , Klebsiella <sup>5</sup> , C. bovis <sup>6</sup> P. vulgaris <sup>7</sup> , B. cereus <sup>8</sup> , A. aerogenes <sup>9</sup> )
Ahmad (1966)	44.0	–	–	–	–
Ghumman (1967)	91.2	0.8	1.60	–	0.8 <sup>2</sup>
Ahmad (1968)	84.0	2.0	4.00	10.0 <sup>1</sup>	–
Hashmi (1978)*	43.0	36.8	12.5	–	4.2 <sup>1</sup> , 2.9 <sup>2</sup> , 0.4 <sup>3</sup>
Hashmi & Munir (1981)	34.5	34.4	20.0	–	2.0 <sup>2</sup>
Anwar & Chaudhari (1983)	40.0	45.0	25.0	–	5.0 <sup>2</sup>
Sahi (1983)	45.4	33.5	12.5	–	4.2 <sup>1</sup> , 1.4 <sup>2</sup> , 0.7 <sup>4</sup>
Hussain <i>et al.</i> (1984)	28.2	40.2	19.6	8.6	17.3 <sup>1</sup> , 0.2 <sup>2</sup> , 7.2 <sup>9</sup>
Shireen (1984)	54.5	10.6	12.1	12.1 <sup>2</sup>	3.0 <sup>1</sup> , 1.5 <sup>3</sup>
Qamar (1992)*	25.5	9.9	18.8	4.4 <sup>2</sup> , 2.2 <sup>4</sup> , 11.1 <sup>5</sup>	2.2 <sup>1</sup> , 4.4 <sup>6</sup> , 12.2 <sup>2</sup> , 3.3 <sup>7</sup> , 5.6 <sup>8</sup>
Fazal (1995)	39.0	3.1	6.25	10.9 <sup>2</sup>	10.9 <sup>1</sup> , 3.1 <sup>4</sup>
Muhammad <i>et al.</i> (1995)	–	–	10.3	–	–
Muhammad <i>et al.</i> (1997)	53.9	10.3	–	15.4 <sup>4</sup> , 7.7 <sup>8</sup>	–
Razzaq (1998)	53.3	40.0	6.6	–	–
Memon <i>et al.</i> (1999)	38.0	8.0	11.0	13.0 <sup>3</sup>	11.0 <sup>5</sup>
Ahmad (2001)	33.9	35.4	27.0	–	1.4 <sup>1</sup> , 1.9 <sup>2</sup>
Akram (2002)	40.3	14.5	17.7	4.8 <sup>2</sup> , 3.2 <sup>4</sup> , 4.8 <sup>5</sup>	–
Khan (2002)	45.0	23.0	18.0	–	14.0 <sup>8</sup>
<b>Mean Percentages</b>	<b>50.0</b>	<b>23.1</b>	<b>13.9</b>	<b>13.5</b>	<b>10.1</b>

**73 % -- Contagious**  
**50 % → *Staphylococcus aureus***

Mixed<sup>1</sup> = Staphylococci + Streptococci

# Basic premise

- Mastitis in Pakistan: Predominantly contagious in nature
- Transmission of contagious pathogens occurs primarily by milker's hand at milking time

# Mastitis control

- **Objectives** of an effective mastitis control program:
  - ▶ New infections must be prevented
  - ▶ Duration of existing infections must be reduced
- **Means** to realize these objectives
  1. **POST-MILKING ANTISEPTIC TEAT DIPPING:**
    - “Dipping/spraying of teats in a germicidal solution immediately after milking”
  - The most effective managemental practice to prevent contagious mastitis
  - No effect on existing infections

## ■ **Methods of application of teat-dip solutions:**

- **Dipping (more effective) - Dipping the bottom  $\frac{1}{2}$  to  $\frac{2}{3}$  of bottom of each teat**
- **Spraying**

## Classes of teat-dip:

1. Iodophores
2. Quaternary ammonium compounds
3. Chlorhexidine
4. Sodium hypochlorite
5. Physical barriers dip
6. Dodecyl benzene sulfonic acid (DDBSA)

## Antiseptics available in Pakistan for teat-dipping

1. Hexsan RTU™ (Quat-chem Oldham, UK) a specifically formulated teat-dip containing chlorhexidine (marketed in Pakistan by Sajjad Associates, cattle colony, landhi, Kararachi)
2. NOVADINE<sup>R</sup> (Nova labs, Sepang, Selang, Malaysia)
3. BROMO-SEPT<sup>R</sup> (DAE Sung Microbiological Labs, Seoul, Korea)

**2. PRE-DIPPING** – Optional: required sometimes for environmental pathogens in machine milked herds

**3. DRY COW THERAPY** - The most effective managemental practice to treat existing infections; also prevents new infections during the dry period

Cure rates higher than during lactation

■ Conventional dry cow therapy: infusion of Long-acting antibiotics at drying off into all four teats

– Pakistani farmers generally averse to intramammary infusion – they think that intramammary infusion leads to mastitis

■ Systemic dry cow therapy ( = dry cow therapy by injection) a suitable alternative to intramammary infusions (Soback *et al.*, 1990; Tarabal and Canavesio, 2003)

Spiramycin-lincomycin (Inj. Spiralin, Medivet, Pharma) probably a good preparation for systemic dry cow therapy – two intramuscular injections; one at drying off & second 7-10 days before calving

Observe all aseptic precautions if using conventional dry cow therapy

- **Use of teat sealers at drying off:** Being intensively investigated in Newzealand, UK, and elsewhere as alternative to conventional dry cow therapy (Huxley *et al.*, 2002; Woolford, *et al.*, 1998)
- Teat sealers – 65% w/w Bismuth subnitrate in a paraffin base

#### 4. PROMPT TREATMENT OF CLINICAL CASES:

1. Use macrolide/lincosamide antibiotics (e.g., tylosin, lincomycin, spiramycin) by parenteral route × 4-5 days; they tend to concentrate in the udder
2. Antibiotics like gentamycin, kanamycin, not effective in mastitis – they do not diffuse from blood into the udder
3. Give first generation cephalosporins e.g., veloseph™ 500 mg/affected quarter/day in 30mL water by intramammary route **aseptically**
4. Ideally, antibiotic therapy should be based on the results of antibiotic susceptibility testing; MIC<sub>90</sub>  
MIC<sub>90</sub> – the best guide for selection of dosages
5. Always give some immuno-activators (e.g., Lisovit – 50gm/animal/day for 4-6 days; PO) or Nilverm – 50mL/animal/day for 3-5 days (PO)

## 5. MANAGEMENTAL PRACTICES TO CONTROL MASTITIS:

- Segregation of healthy & infected animals and milking of healthy animals (SURF test negative) ahead of infected ones
- Culling chronic cases
- Purchasing healthy (mastitis-free) animals
- Mastitis control in heifers
- Proper treatment of teat and udder wounds
- Fly control
- General cleanliness at the farm
- Proper disposal of mastitic milk of clinical cases
- Prepartum milking (Animals which develop mastitis close to calving)

- Proper nutrition
- Identifying farm specific risk factors & developing managemental protocols to minimize or eliminate these factors
- Minimizing heat stress
- Use of immuno-stimulators e.g., Lisovit
- Proper milking procedures & consistent application of sanitary procedures
- Provision of cooling ponds to cows and buffaloes
- Control and prevention of diseases that predispose to mastitis

## 6. VACCINATION

Ph.D. Research work done at the Department of Clinical Medicine & Surgery:

1. **Monovalent** (*S. aureus*) Mastitis vaccine – Dextran-sulphate adjuvanted vaccine gave best results (curative as well as preventative)  
Very expensive (Rs. 250/dose) due to high cost of Dextran-sulphate
- **Trivalent** (*S. aureus*, *Strep. agalactiae*, and *E. coli*) – various adjuvants investigated (curative as well as preventative)

More work on development of mastitis vaccines in progress. Hopefully, vaccines would become available in future

# UP SHOTS

- MASTITIS IN PAKISTAN PREDOMINANTLY **CONTAGIOUS** IN NATURE
- TEAT DIPPING, DRY PERIOD ANTIBIOTIC THERAPY, PROPER MILKING TIME HYGEINE WITH PROPER MILKING ORDER (SURF TEST NEGATIVE ANIMALS FIRST) ----- **THE CORNER STONES** OF MASTITIS CONTROL
- MASTITIS CONTROL **A WIN-WIN PROPOSITION** FOR FARMERS, CONSUMERS, AND MILK PROCESSING INDUSTRY
- **Cost-benefit ratio of mastitis control – (1:9; NMC, 1990)**