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Match Maker

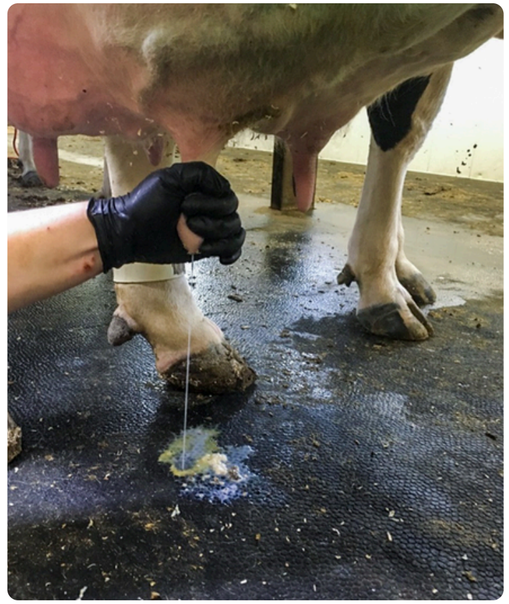
Dairy and Poultry Health Solutions

MastiSense: Low-Cost, On-Farm, Reagent-Free Device for Early Mastitis Detection

Lead Inventor: Dr. Ankita Singh
Organization: MooRopan India Private Limited
TechEx.in Case Manager: kavita.parekh@venturecenter.co.in| 91- 8956457042

Problem Definition

- Mastitis is one of the most prevalent and costly diseases in dairy cattle worldwide, affecting both milk quality and animal health.
- The primary cause is bacterial intra-mammary infection.
- Infection leads to inflammation of the mammary gland, causing changes in milk composition, reduced milk yield, and increased somatic cell count (SCC).



Disease characteristics (key challenge)

- Silent disease (Subclinical mastitis) → No visible symptoms
- Bacterial infection with multiple pathogen types (gram +/-)
- Time-sensitive progression → Early detection = better recovery

Scale and Importance of the problem

High disease prevalence

- High prevalence, especially subclinical mastitis (SCM)→ Affects ~30–50% of animals (≈41% in India)

Significant economic losses

- One of the highest economic burdens in dairy → Global losses: ~$20–30B annually
- Direct impact on farmer income → Reduced milk yield, discarded milk, treatment costs, culling

Existing Methods for diagnosing Subclinical Mastitis

Subclinical mastitis is all about picking up hidden infection before visible symptoms appear.

Traditional Cow-Side Methods

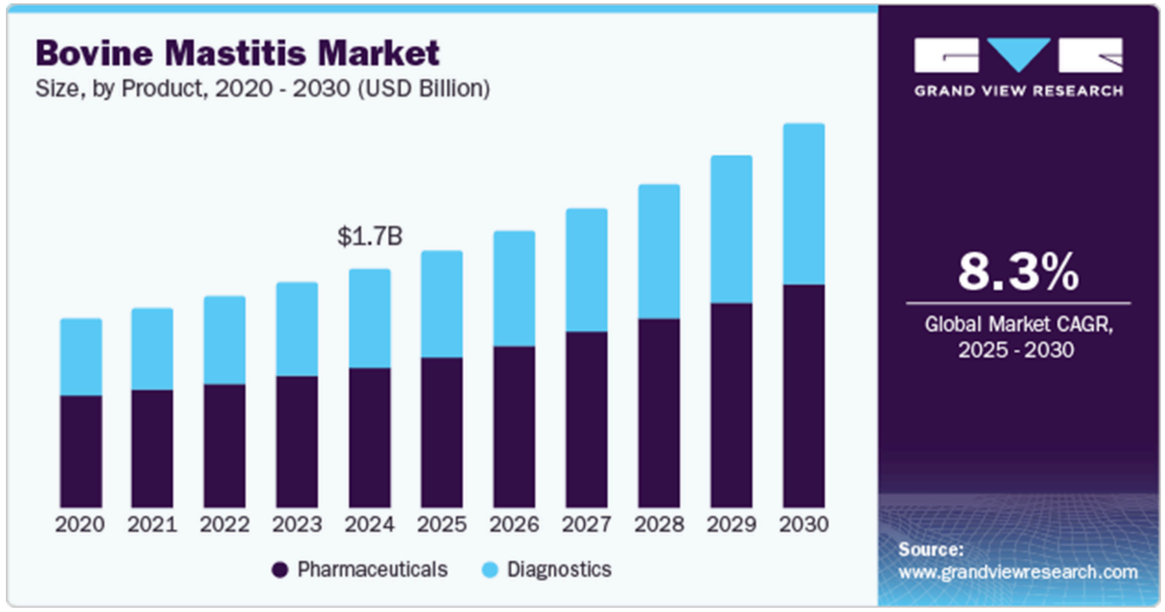
- California Mastitis Test (CMT): quick, on field, limit of detection ~200,000 SCC
- Electrical Conductivity / Sensor-based Tests: quick, on field, limit of detection < ~200,000 SCC
- Visual/Clinical Examination

Laboratory based tests

- Somatic Cell Count (SCC): Lab based, takes 12- 24 hrs, no limit of detection
- Bacteriological Culture: Lab based, takes 2-3 days, no limit of detection
- PCR / Molecular Diagnostics: Lab based, takes 12- 24 hrs, no limit of detection

Market size and opportunity

Market size: The global bovine mastitis diagnostics market size was approximately USD 250-300 million in 2024 and is projected to reach USD 500 million by 2030. (Source: Grandview Search)



Factors driving growth:

- The market is expanding rapidly due to the rising incidence of udder infection,
- Growing awareness of the condition is anticipated to play a significant role in the expansion of the bovine mastitis industry.

Major global players: Boehringer, Zoetis, Merck, Ceva, Elanco, HIPRA, Heilsaa, Immucell Corporation, Forte Healthcare Ltd, Virbac

Limitations of on-field solutions

Highly sensitive, easy to operate and intepret farm side tests are required to catch all cases of subclincal Mastits before disease progression

Parameter	CMT (California Mastitis Test)	Draminski Mastitis Detector Q4
Cost per test	Low (₹20–30/test)	High (device ₹25,000–40,000)
Performance / accuracy	Qualititative detection of high somatic cell count. Detection limit 200,000	Detection limit < 200,000
Ease of use	Requires reagent mixing and visual interpretation	Requires device handling and calibration
Sensitivity	75 % (approx 25% false negatives)	~65% – 75% (approx 25-35% false negatives

About the technology

MastiSense is a portable, electronic, reagent-free screening device designed for rapid, on-farm detection of mastitis at the subclinical stage—before visible symptoms appear.

- The technology is based on electrical conductivity measurement of milk, a well-established indicator of udder health.
- During mastitis, inflammation disrupts the blood–milk barrier, leading to: Increased leakage of ions (Na^+, Cl^-) into milk
- This results in a measurable increase in milk conductivity, which serves as an early biomarker of infection.
- MastiSense uses a calibrated multi-probe sensing system with embedded signal processing to accurately capture these conductivity changes and convert them into an instant, easy-to-interpret digital output

How the technology works

Step 1

Directly extract milk from each teat into the 4 cups

Step 2

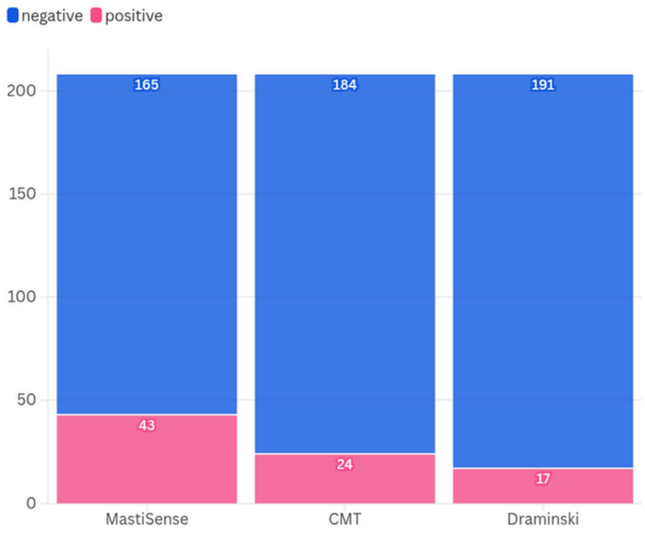
Press the button to get instant results with the LEDs

Validation studies

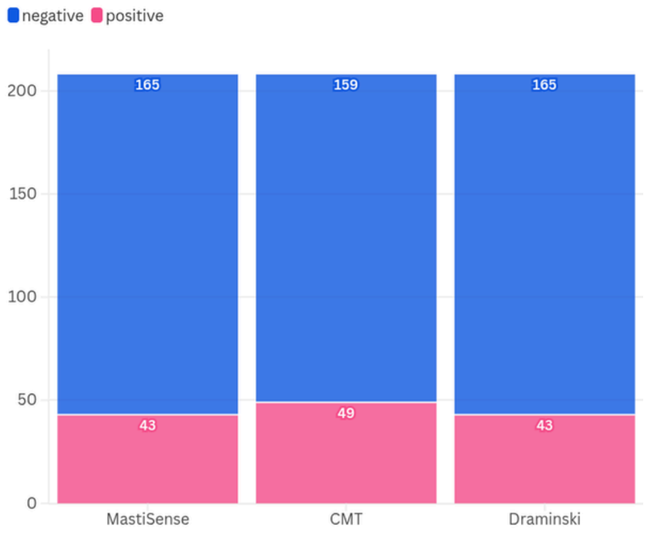
MastiSense detects infections at Day 1 when other methods still miss cases, with all methods aligning only by Day 10—clearly demonstrating superior early sensitivity and a substantial reduction in false negatives.

Sample size: 208 animals at Day 1 and Day 10

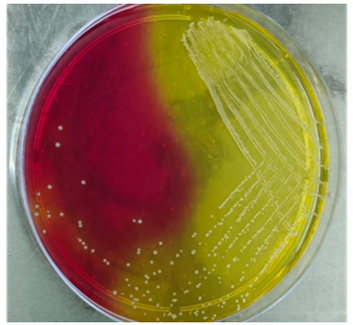
Each animal was tracked using a unique ID and tested with all three methods —MastiSense, CMT, and Draminski—on Day 1, followed by repeat testing on Day 10. All on-field results were benchmarked against bacterial culture plating as the gold standard.

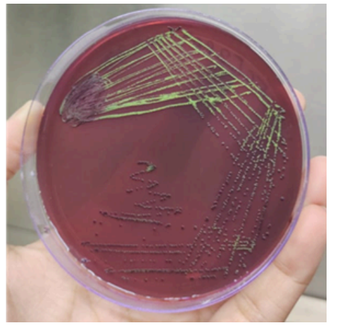


Day 1



Day 10





Considering bacterial lab culturing as gold (S.aureus on mannitol salt agar and E.coli on EMB agar)

Lab culture for day 1 positive for Mastisense and negative cultures for CMT and Draminski demonstrated growth of bacteria.

Competitive analysis

Parameter	CMT (California Mastitis Test)	Draminski Mastitis Detector Q4	MastiSense
Cost per test	Low (₹20–30/test)	High (device ₹25,000–40,000)	One time cost (₹7000/ unit)
Performance / accuracy	Qualititative detection of high somatic cell count. Detection limit 200,000	Detection limit < 200,000	Detection limit < 200,000
Ease of use	Requires reagent mixing and visual interpretation	Requires device handling and calibration	Simple farmer friendly, no training and calibration
Sensitivity	75 % (approx 25% false negatives)	~65% – 75% (approx 25-35% false negatives	100%

Value proposition

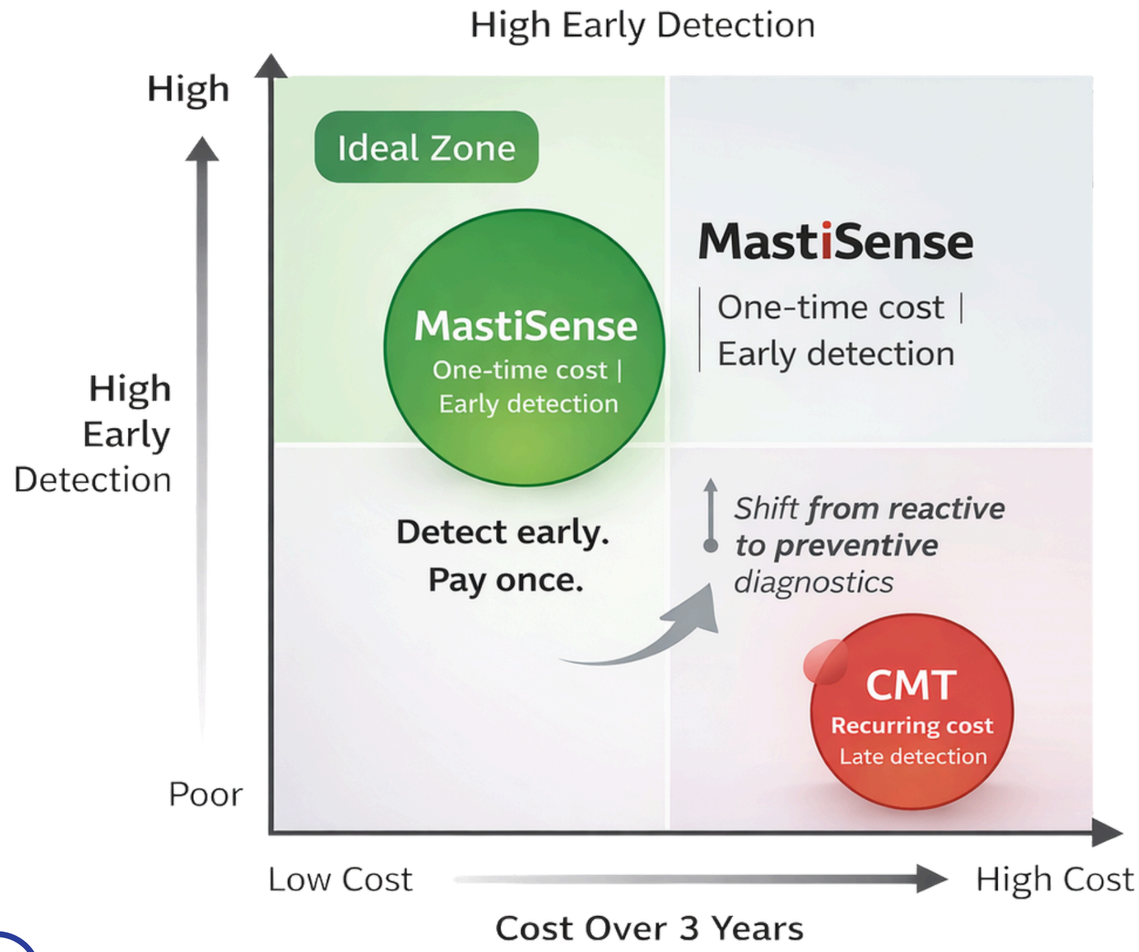
1. Early Detection → Better Outcomes
   - Detects mastitis at Day 1, when other tests miss cases
   - Enables timely intervention → reduces disease progression
   - High sensitivity, low miss rate
   - Improves farm economics
   - Zero consumables required

Pricing Difference

MastiSense	CMT Based Test
One time cost of ₹7,000 for Device	~ ₹350 / 500mL bottle
No additional costs per test	About ₹14 / test
No milk and chemical wastage	Considering a sample of 20mL / cow
Costs the same as just 500 tests with CMT	Recurring Costs of **₹18,200 / year***
Time taken 11 hrs	**Time Taken 43 hrs**

*Assuming a farm of 50 cows and testing once every two weeks

Differentiation Matrix



MastiSense sits in the only quadrant that combines low long-term cost with true early (Day 1) detection—making it fundamentally superior to CMT

Current status

Technology status:

- Status of the technology – TRL: 7
- Currently under validation by NDRI to verify with Somatic Cell Counter (SCC) and other available technologies in an industrial environment
- Evaluated 12000+ samples
- IP STATUS :
- Priority Date: 04/12/2023
- Coverage: IN
- Patent No. 202321082261

Team & Organization

MooRopan India Private Limited

Honorable Mentors:

Dr. Dushyant Sharma (ICAR SHITIJ)

Dr. Raghu Vishweswaraiah (NDRI)

Dr. Ankita Singh

Founder, CEO

- Former Asst. Prof., CVM University Anand
- PhD Microbiology, Post doc exp (USA)
- 20+ years of Teaching / R&D exp
- Mobilized 33 Lakhs worth research projects by DBT/ GSBTM/ SSIP
- Expertise: microbial biofilms

Mr. Aryan Donga

Co-Founder, CTO

- BTech in AI and Data Science
- Driving product development and technology strategy
- Bridging dairy science, electronics and software for practical farm solutions

Facility Photographs

Next Steps

The next phase involves working closely with dairy ecosystem partners to:
Conduct large-scale pilot deployments with dairy cooperatives, FPOs, and veterinary networks
Develop manufacturing processes and cost-efficient supply chains

Seeking

Manufacturing readiness, sourcing, contract manufacturing

Industry partners interested in piloting the product

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For more information, contact:

kavita.parekh@venturecenter.co.in

91- 8956457042

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