EXTENSION CIRCULAR

Department of Agricultural Research Services (DARS) November 2025

Ministry of Agriculture, Irrigation and Water Development

DETERGENT FORMULATIONS AS COW-SIDE MASTITIS SCREENING REAGENTS

Background Information

Mastitis is one of the serious challenges facing the dairy sector. The disease reduces milk yield, lowers milk quality, and causes significant economic losses for the farmers. The clinical form of the disease is characterized by observable signs of inflammation while the subclinical form is void of visible symptoms. Subclinical mastitis silently undermines productivity and increases the risk of spreading the infection within the herd. Conventional diagnostic tools are often not affordable to smallholder farmers leaving them with no practical options for early detection.

The Lilongwe University of Agriculture and Natural Resources (LUANAR) with support from the Sustainable Food Systems in Malawi (FoodMa) Programme developed a powder detergent-based subclinical mastitis screening reagent. This reagent is locally manufactured, farmer-friendly, and designed to be both sensitive and specific in detecting subclinical mastitis. By enabling early diagnosis, the detergent-based formulation allows farmers to take timely action, improving herd health and increase economic benefits.

Technology Description

- The detergent-based formulation contains surfactants, which dissolve fats and disrupt cell membranes.
- Milk from infected udders contains high numbers of somatic cells.
- The surfactants lyse the somatic cells in the milk from infected udders.
- When the cell membranes break, DNA and other cellular contents are released, which react with the detergent to form a gel-like substance
- The thickness of the gel indicates the level of infection: thicker gel--higher somatic cell count-- subclinical mastitis
- This technology is a low-cost, cow-side screening kit for subclinical mastitis and uses locally available household detergents.
- It is based on the same scientific principle as the standard California Mastitis Test (CMT).

Special Attributes

- Affordable and locally available
- Easy to use by farmers, milk bulking group leaders and extension staff
- Rapid results (30seconds–1 minute)
- Early detection before visible signs appears
- Improves milk quality and reduces rejection at Milk Bulking Group

This Extension Circular was developed based on evidence presented at the Agricultural Technology Clearing Committee and thereafter approved by Ministry of Agriculture, Irrigation and Water Development Malawi.

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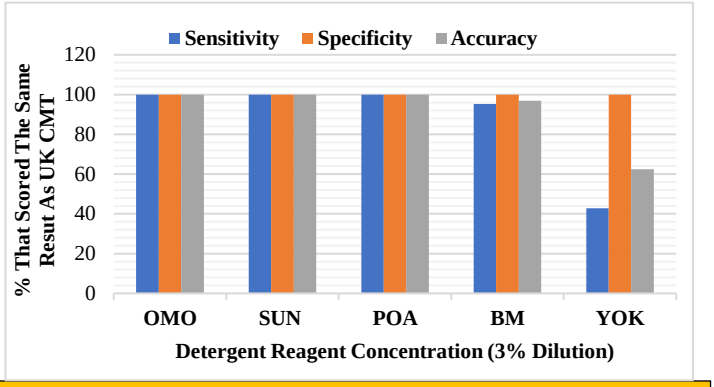
How to Apply

- Wash hands and clean the cow's teats with clean water and a towel.
- Disinfect hands and the teat before and after milking with 75% alcohol
- Discard the first streams of milk.
- Put 10 drops of milk from each teat into separate paddle compartments.
- Add an equal amount of the detergent-based reagent to each milk sample.
- Gently mix the milk and the detergent for 10–15 seconds.
- Observe the reaction:
  - ✓ No change (watery): Healthy udder
  - ✓ Slight thickening: Mild subclinical mastitis
  - ✓ Thick gel: Severe subclinical mastitis
- Record results and take action: isolate the cow, improve hygiene, and consult an extension officer or veterinarian.

When to Apply

Apply for every lactating cows

- Before delivering milk to the Milk Bulking Group
- After calving
- When milk yield suddenly drops
- After treatment for mastitis
- When a cow has a history of mastitis



The Percentage of detergent reagent results achieved the same results and the commercial UK CMT for each 3% dilution when testing 32 milk

Comparison of the California Mastitis Test (CMT) and household detergent-based reagents for screening subclinical mastitis in dairy cows, using bacterial culture as the gold standard.

Tests	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Accuracy (%)
CMT	100	100	100	100	100
OMO	100	100	100	100	100
SUN	100	100	100	100	100
POA	100	100	100	100	100
BM	95.2	100	100	91.7	96 .9
YOK	42.9	100	100	47.8	62.5

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