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Innovations in mastitis detection

Simple, fast, and complete solutions for identifying mastitis pathogens using PCR

Bovine mastitis can be caused by a large number of pathogens and can result in significant losses. Timely identification of pathogens helps farmers take fast and well-informed action. Traditionally, bacterial culture has been used for the identification of pathogens involved in mastitis infections, but this method has several shortcomings. For example, some pathogens are difficult to grow such as *Mycoplasma* and *Prototheca*, or difficult to discriminate, such as *E. coli* and *Klebsiella*. Moreover, conserved milk samples (e.g., for dairy herd improvement) cannot be used for bacterial culture.

Using PCR to identify mastitis-causing pathogens offers many advantages:

- **Faster results**—typical time from sample to result is 2.5–3 hours, compared to up to 10 days for a culture
- **No bacterial culture needed**—detection is independent of viable bacteria, as PCR detects DNA
- **Detection of growth-inhibited pathogens**—e.g., when treatment was already started
- **Highly accurate**—higher sensitivity and specificity for all individual pathogens, compared to up to 40% “no growth” results with bacterial culture
- **More results from your sample**—PCR can identify multiple pathogens simultaneously

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What is bovine mastitis?

Bovine mastitis is the most common and costly disease among dairy cows. It is an inflammation of the mammary gland that is predominantly caused by a bacterial infection. When mastitis is identified in a cow's quarter(s), it is important to identify the pathogen causing the infection because different categories of pathogens require different management strategies. Once the infection is identified, a dairy farmer can work with his or her veterinarian to make an effective treatment plan aimed at reducing antibiotic use. Prudent use of antibiotics reduces the likelihood of resistant pathogens developing and can reduce the duration of treatment a cow may need, which in turn decreases operating costs.

MagMAX CORE Mastitis & Panbacteria Module helps retrieve excellent-quality nucleic acid

Molecular analysis of samples starts with high-quality nucleic acids. The Applied Biosystems™ MagMAX™ CORE Mastitis & Panbacteria Module, when combined with the Applied Biosystems™ MagMAX™ CORE Nucleic Acid Purification Kit, aids in the processing of all bacteria, especially those that are important in the detection of mastitis in cattle and from challenging matrices like mastitic milk. The MagMAX CORE Mastitis & Panbacteria Module includes a specially optimized lysis solution and an alternative script to improve the recovery of nucleic acid from all bacteria, including gram-positive bacteria.

Features include:

- **Convenience**—a complete solution using the same CORE chemistry
- **Ease**—no centrifugation and no aspiration steps
- **Speed**—less than 1 hour for 96 samples
- **Flexibility**—appropriate for fresh, frozen, or preserved milk samples, including samples with high somatic cell count

Mastitis identification workflow

Samples → **Nucleic acid extraction** → **Amplification** → **Interpretation**

Samples compatible with PCR	MagMAX CORE kit with Mastitis & Panbacteria Module	PCR panels to identify:	Applied Biosystems™ VeriVet Software**
• Milk • Bulk milk • Preserved milk* (e.g., with bronopol) • Frozen milk	• Fast extraction of nucleic acids: only 6 steps, 96 samples purified in 1 hour • Convenient, without aspiration and centrifugation • Manual and automated extraction protocols • Automate for higher-throughput sample processing using the Thermo Scientific™ KingFisher™ Flex Magnetic Particle Processor with 96 Deep-Well Head	• Major mastitis-causing pathogens • Major *Mycoplasma* species • Major contagious mastitis pathogens	• Software for automated analysis of results • Easy read-out of positive and negative samples • Innovative cloud-based data analysis and storage • Use with Applied Biosystems™ QuantStudio™ 5 and Applied Biosystems™ 7500 Fast PCR instruments
* Use of preserved milk samples eliminates the need for cooled transport of samples.			
1 hour		**1.5–2 hours**	

Add lysis buffer → Incubate 5 min, RT → Add proteinase K → Add bead mix → Start run on KingFisher Flex instrument → Retrieve samples

The isolated high-quality DNA can then be analyzed by PCR. Our panels detect these bovine pathogens:

Major mastitis-causing pathogens:	Major contagious mastitis-causing pathogens:
• *Staphylococcus aureus* • *Staphylococcus* spp. (including all major coagulase-negative staphylococci) • *Streptococcus agalactiae* • *Streptococcus dysgalactiae* • *Streptococcus uberis* • *Escherichia coli* • *Enterococcus* spp. (including *E. faecalis* and *E. faecium*) • *Klebsiella oxytoca (*and/or *K. pneumoniae)* • *Serratia marcescens* • *Corynebacterium bovis* • *Trueperella pyogenes* and/or *Peptoniphilus indolicus* • Staphylococcal ß-lactamase gene (penicillin-resistance gene) • *Mycoplasma bovis* • *Mycoplasma* spp. • *Prototheca* spp. • Yeast	• *Mycoplasma bovis* • *Staphylococcus aureus* • *Streptococcus agalactiae* • *Streptococcus uberis* **Major *Mycoplasma* species infecting cattle:** • *Mycoplasma* spp. • *Mycoplasma alkalescens* • *Mycoplasma bovis* • *Mycoplasma bovigenitalium* • *Mycoplasma canadense* • *Mycoplasma californicum* • *Staphylococcus aureus* • *Streptococcus agalactiae*

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Ordering information

Product	Quantity	Cat. No.
MagMAX CORE Nucleic Acid Purification Kit with Mastitis & Panbacteria Module	100 reactions	A40289
KingFisher Flex Magnetic Particle Processor with 96 Deep-Well Head	1 instrument	5400630
QuantStudio 5 Real-Time PCR System, 96-well, 0.1 mL, desktop	1 instrument	A28573
QuantStudio 5 Real-Time PCR System, 96-well, 0.2 mL, desktop	1 instrument	A28574
7500 Fast Real-Time PCR System with Dell Notebook	1 instrument	4365464
Related products		
MagMAX CORE Nucleic Acid Purification Kit	100 reactions	A32700
MagMAX CORE Nucleic Acid Purification Kit	500 reactions	A32702

Find out more at **thermofisher.com/animalhealth**

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