



Mastitis pathogen test result interpretation

Bulk milk

This test by qPCR is designed to detect the presence of:

- 15 key mastitis pathogens (responsible for >95% of cases)
- Penicillin resistance in *Staphylococcus* species



Results are available through Micro Monitor on the Herd Companion website (via - www.nmr.co.uk). Please contact customer services for login details calling 03330 043 043.

Result Interpretation - Mastitis Pathogens

Result	Low	Medium	High	Interpretation
NEG				Negative/not detected
POS				Present in low numbers
POS				Present in moderate numbers
POS				Present in high numbers

Where >90% or >99% of the bacterial load is attributed to one pathogen, this will appear in the report.

Pathogens can be split roughly into two groups (though some can fit into both groups)

Contagious mastitis pathogens

Staphylococcus aureus, other *Staphylococcus* species, *Corynebacterium bovis*, *Streptococcus agalactiae*, *Streptococcus dysgalactiae*, *Mycoplasma bovis* & other *Mycoplasma* species.

Contagious pathogens are well adapted to survival and growth in the mammary gland and frequently cause infections lasting weeks, months or years. The infected gland is the main source of these organisms in a dairy herd and transmission of contagious pathogens to uninfected quarters and cows occurs mainly during milking time via cloths, gloves and teat liners.

Presence of *Strep agalactiae* should be looked at as a matter of priority. Please remember that contamination with environmental bacteria could occur if poor sampling technique is used.

Abbreviated hereafter as C.

Environmental mastitis pathogens

Streptococcus uberis, *Escherichia.Coli*, *Enterococcus* species, *Serratia marcescens*, *Truperella pyogenes* & *Peptoniphilus indolicus*, *Klebsiella* species, *Prototheca* species and Yeast.

The primary source of environmental pathogens is the surroundings in which a cow lives. Sources of environmental pathogens include manure, bedding, feedstuffs, dust, mud and water.

Low levels of some bacteria (e.g. Coagulase - negative staphylococcus, CNS) can be treated with less urgency. However, different pathogens can have different infective doses. It is therefore important to discuss result interpretation with your vet.

Abbreviated hereafter as E.

BULK RESULTS SHOULD NOT BE USED AS A TREATMENT GUIDE - CONSULT YOUR VET

Guidance Notes

Staphylococcus aureus - C Bacteria are shed from infected quarters in variable numbers. Damage to the udder tissue reduces milk yield significantly. It can be **resistant to treatment with common antibiotics** see note on penicillin on page 5.

Staphylococcus species (Coagulase Negative Staphylococci (CNS)) - C Sub-clinical mastitis caused by intramammary infections with CNS is common in dairy cows and may cause herd problems. Control of CNS mastitis is complicated by the fact that the CNS group contains a large number of different species and so veterinary advice should be sought. CNS is of **low pathogenicity** and is unlikely to be the sole cause of infection. **The most likely mastitis-causing bacteria should be ruled out before CNS is considered significant in suspected mastitis cases.**

Streptococcus agalactiae - C Very high numbers of bacteria are shed and the cell counts can be as high as 10 million without any clinical signs. Bulk milk cell counts also increase considerably with this form of mastitis. **Careful attention to pre-milking teat preparation (teat dipping) is essential** to minimise transmission of this organism. Treatment success rates are usually good but infected cows should be identified. **If this pathogen is present, veterinary advice should be sought immediately.**

Streptococcus dysgalactiae - C Usually **associated with teat injury, either hyper keratosis or physical damage** that may be caused by **poor milking machine function**. It is essential to **assess teat condition** and consider having the **milking machine tested**. Infections tend to be subclinical.

Corynebacterium bovis - C Sources of *C. bovis* are **infected udders and teat canal**. Spread of *C. bovis* is from **cow to cow at milking**. Correct **pre and post-milking teat disinfection** may control the spread from cow to cow. Most cases are not clinical.

Mycoplasma bovis - C Infection can **spread from cow to cow at milking**. Mastitis cases can be severe and have a poor response to treatment. Cows with Mycoplasma mastitis should be **kept in a hospital pen and always milked last** to prevent infection spreading. **If this pathogen is present, veterinary advice should be sought immediately.**

Mycoplasma species - C Although *Mycoplasma bovis* is the most common cause of Mycoplasma mastitis cases, other Mycoplasma species are occasionally identified. Cows should be kept in the hospital pen and milked last to prevent infection spreading. **If this pathogen is present, veterinary advice should be sought.**

Streptococcus uberis - E/C A common cause of new infection in the dry period. It can produce mild to severe mastitis that may be difficult to treat. It can be shed in very high numbers by infected quarters. Sub-clinical infections may occur resulting in high cell count cows. Cow to cow transmission is also possible so good teat preparation and disinfection can be useful to minimise transmission. *S. uberis* can be found in bulk milk samples as a contaminant if milking hygiene processes are not maintained.

Prototheca species - E/C *Prototheca* are algae **found in the environment** and often associated with contaminated water and recycled sand bedding. If found in bulk milk samples then it is likely there are one or more infected cows in the herd. **If this pathogen is present, veterinary advice should be sought.**

Escherichia coli (E.coli) - E *E.coli* rarely causes persistent sub-clinical mastitis and thus care must be taken when interpreting bulk milk results when *E.coli* is present. It can be found in bulk tank samples as a contaminant if milking hygiene processes are not maintained. Also **pre-dipping and drying teats** prior to milking may reduce levels in the bulk tank.

Enterococcus species - E These bacteria are **found in the gut** and are an **indicator of faecal contamination**. Recommended control procedures include **effective milking time hygiene** and pre- and post-milking teat disinfection. Also consider dry cow and cubicle bedding hygiene

Klebsiella species - E This is a member of the **coliform** family and are **found in the faeces, in bedding and on wet, dirty udders**. If found in bulk milk samples, it is likely that contamination is the cause.

Serratia marcescens - E Infection can be sub-clinical or clinical. Transmission can be minimised by ensuring good bedding and teat hygiene. It is possible that this pathogen could be shed into the bulk milk from sub-clinical cows.

Trueperella pyogenes & Peptoniphilus indolicus - E Sources include wound infections, teat injuries, udder infections, abscesses and genital tracts. As *T. pyogenes* often causes acute mastitis, leading to clinical cases and milk withdrawal from the bulk tank, it is unlikely to be found in bulk tank samples.

Yeast – E Cows are at risk of infection if they lie on mouldy bedding and yeast organisms contaminate the teats. **If this pathogen is present, veterinary advice should be sought.**

Penicillin Resistance: Staphylococcal beta-lactamase gene

If a positive *Staphylococcus* result is detected (this applies to both *Staphylococcus aureus* and other *Staphylococcus* species) then a beta-lactamase gene may be present. The presence of a beta-lactamase gene may indicate a resistance to penicillin based treatment.

This is reported as follows:

Result	Low	Medium	High	Interpretation
NEG				Susceptible to penicillin; suitable for use in treatment
POS	<div style="width: 25%;"></div>			Resistant to penicillin; do not use in treatment
POS	<div style="width: 50%;"></div>			Resistant to penicillin; do not use in treatment
POS	<div style="width: 75%;"></div>			Resistant to penicillin; do not use in treatment

Presence of the Staphylococcal beta-lactamase gene in the sample indicates there is a degree of penicillin resistance in the herd. You should discuss mastitis treatment options with your vet.

Somatic Cell

Test	Indicated Problem	Target levels	Recommended actions
Somatic cell count (cells/ml)	Sub-clinical mastitis	Green < 150,000 Amber 150,000 – 250,000 Red > 250,000	Review of mastitis management to prevent spread of infection

NEXT STEPS

- **ALWAYS** discuss treatment of individual cows and the points below with your vet
- If Bacillus or fungi are suspected (in rare cases), consider the use of culture (available through your vet)
- In the case of environmental pathogens, consider reviewing milking hygiene with advice from your vet
- Monitor teat condition and discuss treatment with your vet
- Ensure milking machine function is optimal

If you have any questions about the testing please contact:



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