

## JOHNE'S DISEASE

Pasteurisation may be an option for providing an extra level of assurance for farmers actively managing the risk of Johne's disease

## FACTSHEET

# Pasteurisation of milk and colostrum and Johne's disease

**P**asteurisation is a process used in food processing to reduce the number of pathogenic bacteria in a product to render it safer for consumption. The term is often associated with milk where pasteurisation has been used for more than 100 years to reduce the pathogen load and increase the shelf life. There are two types of pasteurisation that can be applied to milk. Commercial pasteurisation is a High Temperature Short Time (HTST) continuous process which heats milk to 72°C for 15-25 seconds. The second form of pasteurisation is Low Temperature Long Time (LTLT) batch pasteurisation where milk is heated to 63°C for 30 mins. There is some evidence to suggest that MAP may be minutes more sensitive to LTLT pasteurisation.

Although either method may be used with milk, it is important to note that neither HTST pasteurisation, nor LTLT pasteurisation if carried out above 62°C, are suitable for the pasteurisation of colostrum. Several studies have shown significant reductions in immunoglobulin levels and thickening and coagulation of colostrum when heated to temperatures of greater than 62°C. Calves fed

colostrum heated to these temperatures are at increased risk of diarrhoea due to changes in the colostrum consistency and failure of passive transfer of colostral antibodies, leading to increased susceptibility to calf-hood diseases. Therefore, the current recommendation which is used in many of the purpose-built commercial colostrum pasteurisers is to heat colostrum to 60°C for 60 minutes\*.

*Pasteurisers should be regarded as only one tool in the armoury to control JD rather than a silver bullet; calf hygiene remains a crucial component of managing dairy calves, providing benefits beyond just control of Johne's disease.*

\*Conditions for colostrum pasteurisation should more accurately be termed "heat treatment" but pasteurisation is retained as the term of choice in this document because this is consistent with the term used in the literature in the context of calf feeding and rearing.

Pasteurisation can be an effective means to enable farmers to use colostrum and transition milk for calves, provided careful attention is paid to the temperature and length of time at which milk is pasteurised. However milk from cows being treated with antibiotics should not be used for feeding to calves, irrespective of whether it is pasteurised or not, because it could contain antimicrobial residues which, in turn, could lead to the development of bacteria that are resistant to these antibiotics.

Colostrum pasteurisation may be of use in farms as an additional layer of security to reduce MAP content. Pasteurisation may also be useful in farms where there is difficulty in tracing transition milk from dam to calf through the parlour. The main advantage of using pasteurised milk over other methods of feeding calves comes from the convenience of having a local source of low-risk milk from test negative low-risk and antibiotic-

free cows when it is required. The disadvantages include the purchase price of the equipment and the technical input required for installation, calibration and ongoing maintenance of the unit. Each commercial system has specific requirements for optimal operation so consult the supplier for best advice on this. After pasteurisation the milk or colostrum, if not fed immediately, should be stored in a refrigerator at 4°C in clean, preferably sterilised capped bottles or lidded containers to avoid any inadvertent contamination, and used within two days, or frozen for longer term storage.

Where Johne's disease is endemic and infection has been confirmed, pasteurisation of milk from test-negative cows, collected in a manner to avoid faecal contamination, may increase the confidence that milk contains minimal MAP levels. However, it is recommended that pasteurised colostrum/milk from



Photo courtesy of Dr Rob Bonano, Australia

test-positive or high-risk animals (cohorts of clinical or test-positive animals), or indeed transition milk from any animals in heavily infected herds, should not be used to feed any calves that will be retained for breeding purposes. MAP bacteria may survive the pasteurisation process, and although pasteurisation results in a significant decrease in the number of viable MAP, there is still a level of risk that contaminated milk could contain viable MAP bacteria.

Farmers and veterinary practitioners should consider whether Johne's disease is likely to be present in the herd and determine the costs and benefits when considering on-farm pasteurisation of milk for calves as an alternative to using milk replacer. Pasteurisers are useful in reducing risk but are best used with low-risk colostrum/milk and should not be used to attempt to 'sterilise' high-risk milk. Farmers with infected herds should always avoid using milk from test-positive cows (high-risk animals) when feeding milk to calves to be used for breeding, irrespective of whether the milk or colostrum is pasteurised or not.

Pasteurisers must be maintained so that they perform at the correct temperature for the correct time – if the temperature is too high, there is a risk of the antibodies in colostrum being destroyed, while if the temperature is too low the risk arises from reducing the MAP-killing capacity of the pasteurisation process.

While the MAP organism can be excreted directly into milk or colostrum, probably most MAP that is found in milk is derived from faecal contamination. It is therefore critical that milk harvested for feeding to calves is collected hygienically to avoid faecal contamination during milking and that all utensils for collection, storage and feeding are clean and disinfected.

Pasteurisers should be regarded as only one tool in the armoury to control JD rather than a silver bullet; calf hygiene remains a crucial component of managing dairy calves, providing benefits beyond just control of Johne's disease. Useful information on a range of calf management practices can be found on the AHI website [click here](#).

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## **Further Reading**

McAloon, C.G., Whyte, P., O'Grady, L., Lorenz, I., Green, M.J., Hogan, I., Johnson, A. and Doherty, M.L., 2016. Relationship between selected perinatal paratuberculosis management interventions and passive transfer of immunity in dairy calves. *Veterinary Record*, 179(2), pp.47-47.

McMartin, S., Godden, S., Metzger, L., Feirtag, J., Bey, R., Stabel, J., Goyal, S., Fetrow, J., Wells, S. and Chester-Jones, H., 2006. Heat treatment of bovine colostrum. I: Effects of temperature on viscosity and immunoglobulin G level. *Journal of dairy science*, 89(6), pp.2110-2118.