Specificity and sensitivity of a mastitis diagnostic method based on the electrical conductivity for single quarter and punctual data elaboration

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Clinical and sub-clinical mastitis have a strong impact on dairy cow breedings, because they cause big economical losses. The monitoring of the electrical conductivity (EC) of milk is the most diffused diagnostic method for mastitis. The aim of this project was to measure the sensitivity and the specificity of a method based on the measure of the EC for quarters and on a relative and punctual data elaboration. The study involved 55 cows in lactation.

The results of this study confirm that the EC is a little sensitive indicator, but that, at the same time, can be a valid aid.

Key words: Milk quality, mastitis, electrical conductivity

On the market two different types of system can be used for the on-line detection of EC of milk: with measurement on the mass milk for single cow or quarter by quarter. The former has problems principally due to the dilution of the milk that comes from the mastitic quarter in the rest of the mass milk. The latter, if it works on the basis of limit value, shows problems connected to the choice of this value, although specific for each
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animal. If it works on the basis of values that are connected to the previous milking, it may highlight some limits when used for the first time on pluriparous cows without suitable previous data.

The aim of this project was to measure the sensitivity and the specificity of a method based on the measure of the EC for quarters and on a relative and punctual data elaboration.

Material and methods

The study involved 55 cows in lactation for a total of 214 mammary quarters. For each cow, after the identification of the quarter with inferior medium value of EC (considered healthy) the relationship with the other electrical conductivities was calculated. Every quarter with relationship $>1.1$ was considered indicative of mammary infection, subsequently verified using as gold standards, bacteriological analysis and the somatic cells count (SCC).

Results

The sensibility and specificity values of the EC parameter, obtained through different gold-standards, were the following: SCC, sensibility 46% and specificity 82%; bacteriological analysis, sensibility 41% and specificity 81%; SCC + bacteriological analysis, sensibility 58% and specificity 78%.

Conclusion

The results of this study confirm that the electrical conductivity is a little sensitive indicator of the presence of mastitis in the mammary quarters (the maximum sensibility was 58%) but that, at the same time, the monitoring of this parameter, through devices of low cost that implements similar method of elaboration and analysis, can however be a valid aid.