

## **Broad-spectrum infrared thermography for detection of M2 digital dermatitis lesions on hind feet of standing dairy cattle**

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### Objectives

Test the association of infrared thermography (IRT) measurements with M2 lesions under farm conditions, with the ultimate goal of lesion detection.

Primary objective of this study was if broad spectrum IRT effectively detected M2 lesions on unwashed hind feet of cows standing in a milking parlor. As secondary objectives, we also investigated the association of IRT with M2 lesions on pre-washed hind feet of standing cows and the association of IRT with the presence of any digital dermatitis (DD) lesion on unwashed and washed hind feet of standing cows.

### Material and methods

Thermal images were collected from the plantar aspect of 529 unwashed and 558 washed hind feet of cows from 5 different Canadian dairy farms. After washing, the feet were also M-scored while being in the milking parlor. From these feet 205 unwashed and 229 washed feet also had a locomotion score and lower leg cleanliness score available.

The association between maximum IRT values and the presence of M2 lesions was assessed using multivariable logistic regression analysis. The dependent variable was M2 lesion (1 = present, 0 = absent) and independent variables were maximum IRT, cleanliness score, and locomotion score. Farm was fixed into the model as a mean to account for farm effect and clustering of cows within farm. The final reduced model was based on the lowest Akaike information criterion using a backward elimination approach.

This multivariable logistic regression analysis was repeated with any DD lesion (1 = present, 0 = absent) as dependent variable.

### Results

Higher maximum IRT values were associated with an increased odds for M2 lesions on both unwashed and washed hind feet, as was presence of dried manure on the lower hind legs. Higher maximum IRT values were associated with an increased odds for DD presence on both unwashed and washed hind feet.

### Conclusion

The presence of M2 lesions on hind feet was associated with higher maximum IRT values of the plantar aspect of the pastern region, both on unwashed and wash feet of standing dairy cattle. For conditions with a low true prevalence, which generally is the case for M2 lesions, diagnostic tests with a very high specificity are needed. It is unlikely that cut-off values of IRT max can achieve this. Maximum infrared temperature does have a potential role in identifying feet at-risk

for poor foot health that need further checking and thereby is a tool that can aid in the automation of monitoring the foot health status on dairy herds.

Preliminary results were presented at the European Bovine Congress 2019, 's Hertogenbosch, the Netherlands.