Possibilities of rapid MIR analysis of milk to provide information on cow's welfare

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In recent years, the consideration of animal welfare has increased worldwide for citizens and public authorities. Monitoring welfare is thus of growing importance. However, as being multidimensional, animal welfare can only be measured at the herd level, by using complex and exhaustive methodologies. Therefore, having valuable information on cow's welfare from a simple analysis of milk would be very beneficial. Recently, through various projects and international collaborations, several MIR models were developed to extract welfare-related information from milk analysis (on 3 of the 5 welfare freedoms). MIR tools now exist to predict freedom from fear and distress, through 2 chronic stress biomarkers, i.e. hair cortisol and blood fructosamine. Other models were developed to target freedom from diseases, by predicting indicators of ketosis and mastitis, i.e. milk or blood NEFA, NHB, NAGase, Lactoferrin. Finally, models were done for the freedom from hunger, by assessing dry matter intake or negative energy balance. The accuracies of qualitative models vary between 70 and 90% and quantitative models show validation R^2 from 0.4 to 0.7, providing new possibilities for herd management, genetic evaluations and communication toward citizens and public authorities.

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