THE GLOBAL STANDARD FOR LIVESTOCK DATA

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Subject Abstract presented manuscript as presentation

TITLE OF THE PRESENTATION

Mid-Infrared Analyzers: Herd management milk fatty acid calibration and validation of multiple instruments.

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Mid-Infrared Analyzers: Herd management milk fatty acid calibration and validation of multiple instruments.

ABSTRACT

Mid-infrared (MIR) analyzers require calibration with samples that have known reference chemistry values. Traditional milk calibration samples are individual farm, or cow milks, with reference chemistry for each sample. A more advanced procedure for making an orthogonal design (fat, protein, lactose, urea) sample calibration set (14 samples) with all-lab mean (n=8 to 10) reference chemistry was published and updated in 2020. Recently, this same sample set has been used for milk fatty acid calibration. The fatty acid reference chemistry is from gas chromatography run on the extracted fat from the ether extraction used for the fat payment test. Reference values for major individual fatty acids and those used for the most useful dairy herd management decision making (i.e., de novo, mixed origin, preformed fatty acids, and double bonds per fatty acid) are produced for this orthogonal design sample set. Reference chemistry for groups of milk fatty acids utilizes the values for only the major fatty acids (C4, 6, 8, 10, 12, 14, 16:0, C16:1, C18:0, C18:1, C18:2, C18:3) normalized to 100% and expressed as g/100 g of milk. Using only the major fatty acids will achieve better between laboratory agreement and consistency for GLC fatty acid methods. Glycerol is approximately 5.5% of the weight of milk fat. A useful quality control metric for MIR data is the sum of the de novo, mixed origin, and preformed fatty acids (g/100 g milk) divided by the fat test, and should be between 93 and 96% of the fat test in g/100 g milk. If outside this range, there is a problem with ether the MIR fat test or one or more of the MIR values for fatty acid groups. Nine MIR milk analyzers located in different regions of the US were

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calibrated with samples described above and then validated with a group of 8 individual farm milks from collected from different regions of the US by comparison to GLC reference chemistry on the same milks. The best agreement (g/100 g milk) for the mean of all instruments with reference chemistry was for de novo (MD -0.016 and SDD 0.028) and double bonds per fatty acid (MD 0.00 and SDD 0.01). Mixed and preformed had MD of 0.08 and -0.054 and SDD of 0.053 and 0.048, respectively, and were more sensitive to homogenizer performance. :

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