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On farm evaluation of multi-parametric models to predict SARA on dairy cows

M. Coppa¹, C. Villot^{2,3}, C. Martin³ and M. Silberberg^{*3}

¹*Independent researcher, Université Clermont Auvergne, INRAE, VetAgro Sup, UMR 1213 Herbivores, F-63122 Saint-Genès-Champanelle, France*

²*Lallemand SAS, F-31702 Blagnac, France*

³*Université Clermont Auvergne, INRAE, VetAgro Sup, UMR 1213 Herbivores, F-63122 Saint-Genès-Champanelle, France*

*mathieu.silberberg@inra.fr

The aim of this research was to validate on farm and, if needed, re-calibrate the multi-parametric models based on non-invasive indicators to detect induced subacute ruminal acidosis (SARA) in dairy cows developed by Villot et al. (2019) under controlled trial. Fifteen farms were selected for their farming practices to cover a wide range risk of observing cows under SARA. In each farm, 4 Holstein early-lactating primiparous cows were selected based on the last on farm analysis of their milk composition (MY, fat/protein ratio, SCC). Each animal was equipped with a reticulo-rumen pH sensor (eCow, Exeter, UK). The pH kinetics were analyzed over a subsequent 7 days period and relative pH indicator (NpH) described by Villot et al., (2018) were used to classify cows as under SARA (22 cows) or not (37 cows) (1 cow missed). Meanwhile, milk, blood, feces, and urine samples were collected for analysis of all indicators included in previous models (Villot et al., 2019). An external validation of Villot et al. (2019) models was performed on farm data. Then, the same indicators included in each model were used to build new models by linear discriminant analysis and leave-one out cross-validation using controlled trial and on farm datasets. The sensitivities (true positive rate) in external validation on farm were largely lower than those from cross validation by Villot et al. (2019) (range: 0.1-0.75 vs 0.79-0.96), and the specificities (true negative rate) showed a larger range with lower minimum values (range: 0.18-1.0 vs 0.62-0.97). The sensitivities of new models was lower than those of the models by Villot et al. (2019), but higher than those of their external validation on farm data (range: 0.63-0.77). Blood cholesterol and

milk n-6 fatty acids based model had the highest performance, whereas feces sieving residual and urine pH based one had the lowest. Multi-parametric models based on non-invasive indicators to detect SARA in dairy cows seem promising.