Comparison of two methods of milk fatty acids composition to detect SARA (subacute rumen acidosis) in dairy goats

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Requirements of high producing ruminants can only be covered by diets of high nutritive value that can induce subacute rumen acidosis (SARA), but not for all animals at the same time and with the same intensity. A challenge is to find noninvasive biomarkers to detect animals suffering from SARA. Milk fatty acids composition is a good candidate as it is partly linked to rumen metabolism. The aim of this work was to compare two methods of measure of milk fatty acids composition: gas chromatography (GC) considered as a "standard", but a time-consuming and expensive method and medium infrared analysis (MIR), a rapid and cheap method which can be applied on field. Eight rumen cannulated dairy goats adapted to a low concentrate diet (20 %) were abruptly switched to a high concentrate diet (50 %). Samples of milk were taken individually on the morning for 2 days before the change, the 4 days following the change and once weekly for 3 weeks. 91 fatty acids were detected by GC and 58 were estimated by MIR. Rumen fluid was sampled simultaneously before the morning feed (T0) and 1, 2, 4 and 6 hours after. Rumen samples were analysed for pH and volatile fatty acid (VFA) composition. A principal component analysis (PCA) was used to examine the relationships among milk fatty acids percentages measured by GC. The projection of the saturated fatty acids on the first two components showed an opposition between the short and medium fatty acids (SMFA) up to 13C and the long (L) chain fatty acids (LFA). An index was calculated as the ratio of SMFA/LFA. It was positively linked to the pH values and negatively to [VFA] ones. A similar ratio was calculated from the MIR estimation. Even if both ratios were correlated (r = 0.60, n = 72), the MIR ratio was higher (0.72 ± 0.06) than the GC ratio (0.50 ± 0.05) and was not correlated with pH and only poorly with VFA. MIR overestimated SMFA and underestimated LFA. In conclusion, GC is a useful tool to detect SARA in dairy goats from milk composition, but MIR is not a relevant method due to the inaccuracy in the prediction of FA.