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M240

The use of H-nuclear magnetic resonance (H-NMR) in ewes suffering milk fat depression: Could blood metabolomic differences explain the individual variations?

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Dietary supplementation of dairy ewes with marine lipids improves milk fatty acid (FA) profile, but causes milk fat depression (MFD). A large individual variation in the MFD response has been observed, and factors causing this variation are not clear. This study was conducted in dairy sheep to test whether differences in the blood metabolomic profile would clarify causes of individual variations in terms of MFD when marine lipids were added to the diet. Assaf dairy ewes (n = 15) received a total mixed ration supplemented with 0 (control; n = 5) or 20 g of fish-oil/kg DM [n = 10; with animals divided in those showing a strong (RESPO+, n = 5) or slight (RESPO-) MFD]. Blood samples collected before (d 0) and after (d 36) oil supplementation were analyzed by H-NMR spectroscopy operating at 600 MHz. For better metabolite detection, spectral editing was done based on spin-spin relaxation time (CPMG filter) and molecular diffusion (DOSY filter). Multivariate analyses of data were carried out by the ChemoSpec package of R program and the web-based MetaboAnalyst program. Principal component and partial least square–discriminant analyses were used to detect metabolite differences among treatment groups. Both RESPO- and RESPO+

ewes supplemented with fish oil had lower concentrations of proline, valine, isoleucine, keratin, lactate and β -glucose. The reductions in amino acid concentrations were in accordance with lower ($P < 0.05$) milk protein content in lipid-supplemented ewes (4.75%) compared with control ewes (5.03%). Additionally, some monounsaturated FA increased in RESPO- and RESPO+ ewes, which could include some potential antilipogenic FA that are supposed to be able to induce MFD. However, there was no clear discrimination between RESPO+ and RESPO- ewes. In conclusion, lipid supplementation caused significant differences in blood H-NMR metabolomics, but no clear discrimination was observed between animals showing slight and strong MFD. Study funded by Project AGL2014-54587 (Plan Nacional, MINECO, Spain).

Key Words: fish oil supplementation, H-NMR metabolomics, cheep

