Changes in the Butyrivibrio group of the rumen in lactating sheep fed a diet supplemented with sunflower oil with or without marine algae

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Abstract. In ruminants, microbial biohydrogenation (BH) of unsaturated fatty acids (FA) can be modulated by diet supplementation with lipids (e.g., sunflower oil -SO- or marine algae -MA-) to improve the fatty acid profile of the milk. The Butyrivibrio group contains the most active biohydrogenating bacteria isolated from the rumen and, for this reason, it has been extensively considered the main responsible for the BH process. With the aim of examining the effect of lipid addition on the Butyrivibrio population, as well as time-dependent variations, thirty-six lactating ewes were divided in 6 lots (3 lots/treatment) and offered a diet supplemented with either 2.5% SO or 2.5% SO plus 0.8% MA. After 0, 26 and 52 days on treatments, individual samples of rumen fluid were collected through a stomach tube, composited for each lot, and analysed using the terminal restriction fragment length polymorphism (T-RFLP) molecular technique. Results showed no significant variations, due to either diet or time, in the Butyrivibrio T-RFLP profiles or in the relative abundances of the major terminal restriction fragments (T-RF) detected. However, some less abundant fragments (i.e., representing less than 4.3% of the total) varied significantly. For example, the frequency of a T-RF compatible with 18:0-producing bacteria increased on day 52 in the diet with only SO (from 0.4 to 4.3%), whereas MA addition precluded this effect. The few changes caused in the Butyrivibrio group by a lipid supplementation that is known to alter rumen BH would indicate a low relevance of these bacteria in the ruminal FA metabolism in dairy sheep. Nevertheless, the effect on some small subpopulations would not allow to rule out their involvement in the process.

Keywords. Lipid supplementation, ruminal bacteria, biohydrogenation, T-RFLP.
14th International Seminar of the FAO-CIHEAM Sub-Network on Sheep & Goat Nutrition

2nd Symposium of LowInputBreeds

"Feeding and management strategies to improve livestock productivity, welfare and product quality under climate change"

Hammamet (Tunisia), 15-18 May 2012

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The event is organised by the National Institute of Agricultural Research of Tunisia (INRAT), the Pasture and Livestock Agency (OEP-Tunisia) and the Mediterranean Agronomic Institute of Zaragoza from the International Centre for Advanced Mediterranean Agronomic Studies (IAMZ-CIHEAM), together with the LowInputBreeds project, and with the collaboration of: the Food and Agriculture Organization of the United Nations (FAO), the Institution of Agricultural Research and Higher Education from Tunisia (IRESA), the National Institute of Field Crops of Tunisia (INGC), Aliments Composés du Nord (CAN), and Groupement Interprofessionnel des Viandes Rouges et du Lait (GIVRAIL).

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