

diet. At the 20% treatment dose, the beech and chestnut fractions exerted a lower increase in VFA, while the oak doubled VFA production. Furthermore, treatment at 5% for all fractions significantly reduced acetate, valerate, iso-valerate and BCFA, while increasing propionate and butyrate production. In conclusion, although belonging to the same family, the leaves of three species provided extracts with different chemical and nutritional characteristics, resulting in various effects on ruminal fermentations, diversely exploitable.

**O112**

## Relationship between feeding management and milk characteristics in dairy buffalo

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The quality of buffalo milk is strongly influenced by feeding, genetics, season, lactation stage, parity, and management. This study aimed at understanding how feeding management might affect milk quality. The study was carried out in 10 water buffalo farms located in the Amaseno (Italy) for a period of 12 months. On a monthly basis, samples of total mixed ration (TMR), feces, bulk milk, and information of diet and feeding management were collected for each farm. TMR particle size was determined by sieved samples on farm using Penn State Particle Separator (PSPS), and the geometric mean length (GML) was obtained by measuring the particles. TMR and faeces samples were collected and then analyzed at the laboratory for chemical characteristics: crude protein (CP), ash, ether extract (EE), starch, neutral detergent fiber (aNDF), acid detergent fiber (ADF) and acid detergent lignin (ADL). The apparent digestibility of the diet was estimated by an equation using ADL as a marker. The bulk milk sample was analyzed for the determination of fat, protein, and lactose, casein and solid not fat percentages, urea (mg/dL), freezing point (°C), pH, titratable acidity (°SH), somatic cell count (SCC) and cheesemaking attitude (RCT,  $k_{20}$ ,  $a_{30}$ ). To find a correlation between the quality of diet and the quality of milk, Pearson correlation was calculated between all the variables. The content of diet DM (%) was negatively related to the content of milk protein ( $r = -0.43^{**}$ ), fat ( $r = -0.33^{**}$ ), casein ( $r = -0.37^{**}$ ) and  $a_{30}$  ( $r = -0.20^*$ ). Buffaloes fed with diets containing lower DM ( $46.9 \pm 3.5\%$ ) showed higher milk yield (MY,  $+0.53$  l/head/d) and lower SCC. Diets with higher DM ( $57.2 \pm 4.2\%$ ) had lower crude protein and NDF contents compared with low DM %. The content of dietary proteins (%) was negatively related to the content of milk proteins ( $r = -0.31^{**}$ ), fat ( $r = -0.35^{**}$ ) and casein ( $r = -0.29^{**}$ ), and positively related to milk urea ( $r = 0.33^{**}$ ) and

RCT ( $r = 0.31^{**}$ ). Diets with higher proteins ( $13.4 \pm 0.8\%$ ) had lower NDF content, lower GML and higher starch content compared with diets containing low ( $10.6 \pm 1.2\%$ ) proteins. Moreover, buffaloes fed with diets containing higher proteins content showed higher MY ( $+0.52$  l/head/d). Milk yield was negatively related to SCC ( $r = -0.32^{**}$ ). Furthermore, the season also influenced the quality of the milk; there was a greater content of fat, protein and casein in the winter months and autumn months compared with other months.

**O238**

## Tobacco cv. Solaris seed cake in the diet of growing beef calves

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After cold oil extraction from *Nicotiana tabacum* L. cv. *Solaris* (PCT/IB/2007/053412) seeds, the co-product *Solaris* seed cake (CP 34.7 g/100 g DM) was tested as a possible alternative protein source in beef cattle diet.

Ten male crossbred Friesian growing beef calves raised in a commercial farm located in Benevento province, average weight 157.9 ( $\pm 24.5$ , SEM) kg and average age 228.5 ( $\pm 71.9$ ) days, were divided in two homogeneous groups, *Solaris* (SOL) and Control (CTR). According to the nutritional needs of the selected animals, two isoenergetic and isonitrogenous diets were formulated. Groups were daily fed 21 kg of legume and grass haylage, *ad libitum* mature grass hay and concentrates mixture made by 40% of corn, 40% of barley, 10% of commercial feed and 10% of *Solaris* seed cake, and by 40% of corn, 40% of barley, 20% of commercial feed, respectively for SOL and CTR group. The trial lasted 66 days, including 16 days of adaptation to the experimental diets. Group feed intake (offered-refusal) was monitored weekly, individual body weight (BW) was recorded at 0- and 66-days, and body condition (BCS) of animals was scored at 0-, 34- and 66 days. Average daily gain (ADG) was calculated. Feeds offered and left over were weekly sampled and chemical composition was analysed according to official methods. The effect of the dietary treatment on individual BW, BCS and ADG was processed by analysis of the variance also considering the covariate effect at 0 days (GLM, ANCOVA; SPSS Inc., Chicago, IL, USA). Significance was declared at  $p < 0.05$ .

The daily group intake of concentrate was in average 35.4 ( $\pm 1.21$ ) kg DM and 36.5 ( $\pm 1.31$ ) kg DM for CTR and SOL group

respectively, indicating the palatability of *Solaris* seed cake. The dietary treatment did not affect ( $p > 0.05$ ) individual BW (207.7 kg vs.  $215.9 \pm 9.8$  kg, respectively for CTR and SOL), ADG (0.86 kg/d vs.  $1.05 \text{ kg/d} \pm 0.15$ , respectively for CTR and SOL), and BCS ( $3.31$  vs.  $3.41 \pm 0.16$ , respectively for CTR and SOL).

Although not conclusive, results suggest that the innovative *Solaris* seed cake represents a promising alternative ingredient in growing calves' diet. This co-product from the innovative energy crop may contribute to the reduction of feeding costs in beef farming and could represent a great opportunity for re-designing the tobacco cultivation, especially in inner Mediterranean areas.

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## O202

### Changes of rumen microbiota composition in dairy cows fed with different lipid source

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Dietary lipid sources can increase beneficial effects in dairy products, but the degree of saturation of fatty acids could affect rumen microbiota. The aim of this experiment was to evaluate the influence of two different lipid sources, one saturated (Megafat88; FAT), and one unsaturated (whole soybean flaked; SOY) on rumen microbiota composition of high-producing dairy cows fed a hay-based ration. The study involved 8 Italian Friesian dairy cows, and reticular pH, rumination time, and microbiota composition (bacteria and protozoa) were determined. DNA from rumen contents was extracted, purified, and sequenced to quantify bacteria populations. Sequencing was performed on Illumina MiSeq. For protozoa count, liquor samples are mixed with glycerol and the microorganism were counted in Burker-chamber counter. Data were analyzed with JMP pro v 17.1. For the statistical analysis, a linear mixed model was used with a fixed effect: Saturated Fat vs Unsaturated fat. The different lipid sources influenced bacteria community, but the differences were not significant. Prevotellaceae family showed a tendency ( $p = 0.1$ ) and decreased in SOY compared to FAT. Selenomonadaceae family had a higher relative abundance ( $p = 0.07$ ) in SOY, as well as Rikenellaceae and Veillonellaceae, while Lachnospiraceae did not differ. Data also revealed differences among cows, even if subjected to the same lipid source. Animals were significantly different within the same treatment for Ruminococcaceae ( $p \leq 0.05$ ) in SOY, while Veillonellaceae and Selenomonadaceae families in both SOY and FAT treatment. Rikenellaceae presented a significant difference

in FAT ( $p \leq 0.05$ ). Protozoa count revealed a higher concentration in SOY compared to FAT (10.2 vs 8.8 respectively,  $p \leq 0.05$ ). The analyzed genera showed a significant increase in SOY for Epidinium, and Entodinium ( $p \leq 0.05$ ), while Isotricha increased in FAT ( $p \leq 0.05$ ). In conclusion, the dietary lipid source affected rumen microbiota composition, especially the protozoa community. The degree of saturation of lipid sources affected microorganisms in different ways for each cow, underlying the individual characteristics of each animal, and how much the host variability remains one of the major aspects to explain the final animal response.

## O215

### Could eating time be a useful indicator in dairy farm management?

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The increasing demand for dairy animal products will require maintaining an efficient dairy livestock system. Feed efficiency represents a relevant part of the whole efficiency because feed inputs are the most important factors that affect dairy farm costs. Precision dairy farming has been well-developed, with an increase in the use of advanced technologies such as milking robots, automatic feeding systems, and accelerometers in commercial farms. This study focuses on the data generated by these sensors, which provide increasingly accurate eating and ruminating times for each animal: the aim is to evaluate the links among milk production, feeding management, and behavior in the perspective to associate eating time with feeding efficiency. Data were collected from about 800 lactating cows of two breeds (Holstein Friesian – HF and Italian Simmental – IS) distributed in 14 dairy farms in North-East Italy. Farms were distinguished by the presence of the same sensor (SenseHub™ Dairy, Allflex® Livestock Intelligence™; SCR Engineers Ltd., Netanya, Israel) validated for recording the eating times. Aspects related to the individual traits of the cow, management choices, and ration characteristics were examined. In general, the milk production corrected for fat and protein (FPCM) was foreseeably higher in HF than in IS (33 vs 27 kg/d). Considering feeding behavior, the two breeds were similar in view of eating time, while rumination time was higher in HF by almost 1 h per day (572 vs 517 min/d). Statistical analysis, in particular Principal Component Analysis, was performed considering animals grouped into five eating time classes ( $\leq 180$ , 181–220, 221–260, 261–300, and  $\geq 301$  min/d). The results showed that cows with longer meal intervals ( $\geq 301$  min/d) had greater values for ruminating time. The production of milk and FPCM followed a similar trend, although there were no differences in milk components (fat and protein). Furthermore, as eating time