ASPA 25th Congress Book of Abstract

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Guest Editors

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ASPA 25ᵗʰ Congress
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ASPA 25ᵗʰ Congress Book of Abstract

The 25th congress of the Animal Science and Production Association

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Monopoli (BARI – ITALY),
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considered will influence the outcome. The evaluation of each cluster could be eventually multiplied by a coefficient proportioned to the importance of the function expressed or to the function to be boost. The sum of the clusters evaluation gives the Sustainability Index (SI) of the farm expressed on four classes (A, B, C, D) and three sub-classes for each class (+, 0, −), representable graphically and interpretable in a simple way. In conclusion the method lends itself to be used as (i) sustainability assessment tool (to measure farm sustainability); (ii) farm development tool (to increase sustainability); (iii) policy makers tool (to reach or improve the CAP objectives); (iv) communication tool (as commercial label).

O306
Assessment of individual dairy cows *in vitro* rumen methane emissions

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Research in the last years has resulted in a better understanding of factors influencing methane (CH_4) emissions, the main greenhouse gas produced by ruminants. A large proportion of the variation in enteric CH_4 emissions from animals can be explained by diet composition and feed intake. Nevertheless, differences in CH_4 release might be ascribed to each individual cow. Aim of the study was to screen the CH_4 production in individual dairy cows using the Gas Endeavour® *in vitro* system (GE, Bioprocess Control, Svezia). For this purpose, 58 Italian Friesian dairy cows from the University of Bologna dairy research farm were enrolled. Animals had, on average, 3.5 years of age (±1.36), 176.5 DIM (±110.52), 40 l/day milk yield (±11.79), 3.92% fat (±0.43), 3.45% protein (±0.23). Diet fed to all animals was mainly composed by alfalfa hay (35.1%DM), wheat hay (11.16%DM), and cereal mix (48%DM). Rumen fluid was sampled with an esophageal probe at 9.0 am after feeding. After collection, the rumen fluid was filtered with a sieve (1 mm diameter pores) to eliminate gross material, and then measured for its pH using a pH meter (PH20er, VWR). The rumen fluid was thus used as inoculum for *in vitro* TMR fermentation, according to the Tilley and Terry (1963) modified technique. CH_4 production was measured *in vitro* using the GE. CH_4 production was evaluated at 3 different time points: 8 (T1), 12 (T2) and 24 (T3) hours of incubation. Data distributions were different per time point, as expected (170 mL in T1, 204.4 mL in T2, 228.8 mL in T3, on average). In addition, we observed a significant correlation between CH_4 production at T2 and T3 ($r^2 = 0.99$, $p < 0.01$). Rumen fluid pH was 6.13 (±0.38) on average, and positively correlated with CH_4 production ($r^2 = 0.3$, $p = 0.28$). On the opposite, age ($r^2 = -0.33$, $p = 0.83$) and milk yield ($r^2 = -0.12$,

$p = 0.79$) were negatively correlated. The result showed that cows with the same diet had different CH_4 productions also *in vitro*. Differences between the groups remained constant for all fermentation time points evaluated. Interestingly, a high correlation of CH_4 production was achieved between T2 and T3. In conclusion, these results indicated that 12 h of fermentation are sufficient to have reliable data on CH4 production *in vitro*.

O479
Modelling GWP of milk production using technical efficiency indicators

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The livestock sector is a major source of greenhouse gases (GHG), contributing to climate change. Currently, a range of mitigation strategies has been identified to improve the sustainability of animal production. In particular, among the most important drivers that can help decrease the impact per kg of milk are the increase of individual milk production and feed efficiency, as well as the increase of the on-farm production of highly digestible forages. However, other aspects of farming, and in particular, some indicators of technical efficiency, can play an important role in the mitigation of GHG and, therefore, in the modelling of global warming potential (GWP) related to milk production. In order to assess the relative weight of some technical variables in the estimation of GWP of milk production, data from 50 farms of northern Italy was used. Herd fertility and management data were provided by Associazione Nazionale Allevatori della Razza Frisona, Bruna e Jersey Italiana (ANAFIBJ). The simplified equation for the evaluation of GWP started from the results of Life Cycle Assessment, performed with EF 3.0 method characterization factors, as suggested by PCR Formaggio Grana Padano DOP; differences between biogenic and fossil methane were taken into account. The Functional Unit was 1 kg of Fat and Protein Corrected Milk (FPCM). The average duration of lactation was 316.3 ± 21.7 d, the average calving interval was 425.2 ± 22.0 d and the average lactation number per cow was 2.33 ± 0.26. The average GWP was 2.02 ± 0.29 kg CO_2 eq/kg FPCM. The MIXED procedure was carried out for assessing the relationship between GWP and farm indicators; farms were evaluated as random effect. PROC REG was performed in order to evaluate the predictive capacity of the simplified GWP equation (R^2 0.74 and RMSE of 0.13). The results obtained highlighted that duration of lactation, calving interval and number of lactations per cow were significantly related

to GWP. In addition, two genetic indices were related to the GWP: the Economic Health (IES) and the predicted Feed Efficiency (pFE) indices. The simplified equation is a method easily applicable on a farm scale and uses already existing information including herd female fertility and management data. This could represent a useful tool for estimating the impact of milk production of the individual farm, and also for having an overall vision of the impact at a national level, following its evolution over time.

O559
Meat quality assessment of raw meat from two Mediterranean autochthonous pig breeds reared in sustainable conditions

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The sustainability of livestock farming in relation to global anxiety about climate change and the quality of agro-ecosystem services has become a fundamental issue for the world and the scientific community. Many aspects of meat quality are related to genotype, sex, and age of the animals as well as the production system. In Mediterranean countries, farmers in marginal areas engage in environmentally friendly production systems using native genotypes that are well adapted to the environment and are able to exploit the feed resources available on the territory. The black pig breeds are autochthonous in many countries and reared in the interior of the Mediterranean region. Although in Italy, the black pig breeds have been studied and analysed for years, and have been divided in different populations, in Greece, there is a lack of information about the productive performance of black pigs. The current study, funded by the GREEN FUND GREECE no.003141, aimed to evaluate the effect of genotype on the quality parameters, the chemical composition and fatty acid profile on the *Longissisum lumborum* muscle in pig slaughtered at 9 and 12 months of age. For this purpose, 20 piglets were selected from 2 pig farms (1 Greek and 1 Italian) and divided into 4 experimental groups (5 animals per group): E9-Greek breed, slaughtered at the age of 9 months, E12-Greek breed, slaughtered at 12 months of age, I9 Italian breed, slaughtered at 9 months of age, and I12 Italian breed, slaughtered at 12 months of age. Pigs were slaughtered at a licensed abattoir

in their country of birth and meat quality analyses were carried out at the University of Bari. The preliminary results show that the E12 meat is less dark with better values of tenderness than I12. The genotype did not influence the chemical composition of 9 months pigs, but on the other hand the I12 have lower protein content and intramuscular fat than E12. As far as the meat fatty acid composition is concerned, the results show a higher percentage of SFA but a lower of MUFA in Italian groups. The concentration of n-3 and n-6 was higher in E9 and E12 than the Italian groups. The meat health indexes were not influenced by genotype but were influenced by age of slaughter. This trial could be a first step to evaluate meat characteristics of Greek black pigs and, therefore, a tool to exploit the diversity of production systems and to raise awareness of the relevance and value of this animal genotype.

O143
Estimating enteric methane emission in dairy cows exploiting longitudinal data measured on single animal and at farm level to refine IPCC equations

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The dairy sector accounts for approximately 30% of GHG emissions of the global livestock sector and for 4% of total anthropogenic GHG emissions. Around 80% of the CH4 emission of the dairy sector originates from enteric methane, a significant source of anthropogenic greenhouse gas production. To achieve the new global methane pledge to tackle climate change and reduce the emission of 30% by 2030, it is necessary to improve the monitoring tools and foster the adoption of mitigation strategies in farm. This study aimed to refine the estimation of the enteric methane emission of dairy farms in Italy by exploiting the longitudinal Dairy Herd Improvement (DHI) and Livestock Environmental Opendata (LEO) project data collected on single animals or at the farm level.

Data on single animals included monthly milk yields and fat and protein composition, while data at the farm level comprised culling and replacement, herds composition by categories, feeding stuff, and diet administered per animal categories and seasons.

Data were collected by the Italian Breeders Association (AIA) in about 9500 Holstein dairy farms throughout Italy, rearing over one million animals. The effect of implementing IPCC/