



## ASPA 25th Congress Book of Abstract

Pasquale De Palo

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**O452**

## Impact of decreased nutrient density at dry-off on inflammatory conditions in dairy cows

Luca Cattaneo<sup>a</sup>, Fiorenzo Piccioli-cappelli<sup>a</sup>, Giorgia Lovotti<sup>a</sup>, Vincenzo Lopreato<sup>b</sup>, Erminio Trevisi<sup>a</sup> and Andrea Minuti<sup>a</sup>

<sup>a</sup>*Dipartimento di scienze animali di nutrizione e degli alimenti (DIANA), Università Cattolica del Sacro Cuore, Piacenza, Italy*

<sup>b</sup>*Dipartimento di Scienze Veterinarie, Università degli Studi di Messina, Messina, Italy*

Dry-off is a stressful event in dairy cows, particularly if milking is stopped abruptly. A safety threshold of 15 kg/d of milk at dry-off has been proposed and several ways are used to achieve this yield and concurrently promote mammary involution. Nutrient restriction effectively reduces yield but can alter metabolism and result in slightly lower production at lactation resumption. This study aimed at assessing whether reducing nutrient density at dry-off would affect inflammatory conditions and liver function from dry-off to early lactation. Twenty-four Holstein cows with yield greater than 15 kg/d were fed either only grass hay ad libitum for 7 days before dry-off (HF;  $n = 12$ ) or continued to receive a standard lactation diet (CTR;  $n = 12$ ). After dry-off, both groups received only grass hay for 7 d. Blood samples were collected at -7, -3, 0, 1, 4, 7, 14 and 28 d from dry-off (DFD), and -14, -3, 3, 7, 14 and 28 d from calving (DFC) to assess blood cell count and inflammatory biomarkers. Data were analyzed with repeated measures mixed models (proc GLIMMIX of SAS). Dry-off significantly altered blood cell count and concentrations of inflammatory biomarkers. No differences between groups were noted in red and white blood cell counts and hematocrit. Compared with CTR, in HF monocytes were lower ( $0.81$  vs  $0.64 \pm 0.04$  K/ $\mu$ L;  $p = 0.01$ ) and eosinophils higher ( $0.44$  vs  $0.68 \pm 0.11$  K/ $\mu$ L;  $p = 0.02$ ) at 0 DFD. The lower haptoglobin ( $0.08$  vs  $0.19 \pm 0.03$  g/L;  $p = 0.02$ ) and ROM ( $14.4$  vs  $16.1 \pm 0.61$  mgH<sub>2</sub>O<sub>2</sub>/100 mL;  $p = 0.04$ ) concentrations at 4 DFD in HF vs CTR, suggested a reduced inflammatory response in HF after dry-off. Nevertheless, after calving, HF cows had lesser albumin ( $34.4$  vs  $36.6 \pm 0.54$  g/L at 14 DFC;  $p < 0.01$ ) and paraoxonase ( $85.6$  vs  $103.5 \pm 5.58$  U/mL at 14 DFC;  $p = 0.03$ ), higher globulin ( $40.7$  vs  $36.2 \pm 1.57$  g/L at 7 DFC;  $p = 0.05$ ), haptoglobin ( $0.35$  vs  $0.11 \pm 0.08$  g/L at 14 DFC;  $p = 0.03$ ), bilirubin ( $6.37$  vs  $4.38 \pm 0.51$   $\mu$ mol/L at 7 DFC;  $p < 0.01$ ), GOT ( $170$  vs  $109 \pm 14.2$  U/L at 7 DFC;  $p < 0.01$ ), and myeloperoxidase ( $483$  vs  $417 \pm 19.2$  at 7 DFC;  $p = 0.02$ ), highlighting an exacerbated systemic inflammatory response. These results agreed with the lower milk yield observed in those cows and previously reported, indicating that severe nutrient restriction at dry-off might worsen the adaptation to ensuing lactation. Further research is needed to decipher the mechanism underlying this carryover effect.

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**O501**

## Assessing the motivation of Leghorn hens to access outdoor space and pasture resources

Diletta Chiattelli<sup>a</sup>, Marco Birolo<sup>b</sup>, Alice Cartoni Mancinelli<sup>a</sup>, Laura Menchetti<sup>c</sup> and Cesare Castellini<sup>a</sup>

<sup>a</sup>*Department of Agricultural, Food and Environmental Sciences, University of Perugia, Perugia, Italy*

<sup>b</sup>*University of Padova (DAFNAE), Legnaro, Italy*

<sup>c</sup>*University of Camerino (Medicina Veterinaria), Camerino, Italy*

The choice of suitable genotype, especially in free range poultry production, is crucial because it is strictly linked to the use of outdoor space.

Accordingly, the aim of the present study was to evaluate the motivation of chickens to use outdoor pasture in comparison to feed. The feed, for all animals, represents a primary need ensuring nutrition of the organism; thus, feed could be considered a control test to compare the hen motivation towards different resources.

To this purpose, 9 white Leghorns hens at 38 weeks of age (1.6 kg body weight) were housed in a pen equipped with a shelter (inside 10 hens/m<sup>2</sup>, outdoor 10 m<sup>2</sup>/hen). To reach the outdoor area, hens had to pay a cost by pushing through a one-way transparent weighted door. The door weight was 150 g and increased 100 g every 2 days. Each animal was identified by a ring provided with a chip. A monitoring system (ChickenGate), consisting in an antenna placed near the pushing door was used to record the animals which reach the resource.

Results showed that for both the resources (pasture and feed) hens reduced the visit number as a consequence of the gradually increase of door weight. In particular, the maximum weight pushed by hens to reach the pasture was 650 g whereas 450 g for feed. However, independently from the resources, animals showed a great individual variability.

Surprisingly, between the feed and grass resources, animals have a tendency to choose the grass. In fact, hens were available to pay a highest cost to access to the outdoor area and use the pasture resource.

However, it is important to consider that hens, at equal weight, have performed higher number of visits to feed resource in comparison to pasture. This difference is probably due to the time of grazing and exploration of the outdoor area, as well as comfort activities such as sand baths, that require more time than the pecking the feed.

This study showed that, despite the biological-physiological need for animals is the achievement of the feed, the motivation of the animals is stronger oriented to the pasture resource.

This trend is probably justified by the fact that the grass resource provides a multitude of activities (feeds, kinetic and comfort behaviours) compared to the feed intake and it is surely affected by the breed used. It is widely known that the interest in outdoor is affected by the genetic strain; accordingly, the assessment of motivation could be useful also for differentiating genetic strain.

**O576**

## Melatonin administration in heat stressed ewes: redox and immunity status of their offspring

Maria Giovanna Ciliberti<sup>a</sup>, I. Valasi<sup>b</sup>, E. Bouroutzika<sup>b</sup>, S. Makri<sup>c</sup>, D. Kouretas<sup>c</sup>, M. Albenzio<sup>a</sup>, A. Della Malva<sup>a</sup>, M. Di Corcia<sup>a</sup>, A. Santillo<sup>a</sup>, R. Marino<sup>a</sup>, A. Sevi<sup>a</sup> and M. Caroprese<sup>a</sup>

<sup>a</sup>Department of Agriculture, Food, Natural Resources, and Engineering (DAFNE), University of Foggia, Foggia, Italy

<sup>b</sup>Faculty of Veterinary Science, University of Thessaly, Karditsa, Greece

<sup>c</sup>Department of Biochemistry and Biotechnology, University of Thessaly, Larissa, Greece

Scientific evidence demonstrates that a stimulus or insult [i.e. heat stress (HS)] applied pre- or post-natal growth results in permanent alterations on animal health and wellbeing of the offspring. The melatonin (MEL) is a small indoleamine with antioxidant, free radical scavenger, and an anti-inflammatory effect. The aim of the present study is the evaluation of the effect of MEL administration on the redox status (total antioxidant capacity-TAC, glutathione-GSH, and lipid peroxidation-TBARS), cytokines' profile (interleukin-(IL)-1 $\beta$ , IL-6, IL-10, and IFN- $\gamma$ ), and Immunoglobulin (IgG) production in the ewes' blood and colostrum samples, and in the blood of lambs. Pregnant ewes ( $n = 31$ ) were exposed to HS (Temperature Humidity Index =27, severe HS) for the first 100 days of pregnancy and allocated into two groups, the MEL group, subjected to MEL implant 16 days before mating, and the control group (CON, no melatonin implant). A total of 37 newborn lambs were divided according to MEL and CON group of mothers. Blood samples from ewes were collected at lambing (L0), 24 (L1) and 48 (L2) h later, from lambs at birth (L0), 24 (L1) and 48 (L2) h later, and then 5 (L5), 10 (L10) and 40 (L40) days after birth. Colostrum was collected at L0, L1 and L2. The free radical scavenging activity of DPPH was used to determine the TAC, the GSH and TBARS concentration were assayed using commercial kits, and cytokines were determined by ELISA. Results on redox status demonstrated that TAC values were different between the two lambs' groups at L0 and

L1. The GSH level was higher in MEL lambs compared to CON at L0. On average, TBARS levels were lower at L0 in MEL lambs compared to CON ( $p = 0.049$ ). In ewes, IFN- $\gamma$  level was affected by treatment ( $p = 0.006$ ) and time of sampling ( $p < 0.0001$ ), registering on average a lower concentration in MEL than in CON. Moreover, the highest level of IL-6 in MEL ewes on L1 ( $p < 0.05$ ) was registered, concomitantly to an increase of IL-10 level in MEL lambs in comparison to CON lambs on L2 ( $p < 0.05$ ). In colostrum sample, the CON group had higher level of IFN- $\gamma$  secretion than MEL ( $p = 0.013$ ) with increased levels of IL-10 at L1 in comparison with L0 ( $p < 0.05$ ). On average, CON lambs registered a higher level of IgG than MEL lambs, with an increased level from L0 to L2 ( $p = 0.04$ ). Present study demonstrated that MEL could be used in HS ewes to cope with the crucial first days of their offspring showing antioxidant and immunomodulatory effects.

**O165**

## Substitution of pollen source with commercial protein diet in honey bees nutrition: effects on survival rate and health

Francesca Coppola<sup>a</sup>, Simona Sagona<sup>b</sup>, Antonio Nanetti<sup>c</sup>, Elena Tafi<sup>c</sup> and Antonio Felicioli<sup>a</sup>

<sup>a</sup>Department of Veterinary Science, Pisa University, Pisa, Italy

<sup>b</sup>Department of Pharmacy, Pisa University, Pisa, Italy

<sup>c</sup>Research Centre for Agriculture and Environment, Bologna, Italy

Administration of protein-supplemented artificial diets in period of low food availability is a common practice in beekeeping. However, no data are yet available on protein artificial diet effects on honey bees health. In this study, effects of administration of commercial protein diets on bees survival rate, social (i.e. glucose oxidase activity, GOX) and individual (i.e. phenoloxidase activity, PO) innate immune systems were preliminary investigated. Protein diets effects were tested on two honey bee imago ages to assess whether protein diet could compensate for lack of pollen sources in newly emerged bees and improve the health of foragers. Bees were fed three commercial diets: beet sucrose candy diet without protein (control) and enriched with 1.7% and 7.7% of protein, respectively.

In newly emerged bees, administration of high-protein diet determined a higher mortality compared to bees fed control and low-protein diet. High-protein diet also stimulated GOX production at 10th day of feeding, determining a reduction of PO activity. After 20 days of feeding, GOX activity significantly decreased in all diet group to level like T0 except in the control group. PO activity in newly emerged bees did not show significant differences among diet groups at 10th day of feeding while resulted significantly lower in bees feed high-protein