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Book of Abstracts

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the most important metabolites associated with carcass and performance traits in the investigated pigs was obtained using PLS methods, in addition to a new statistical validation approach based on permutations. Selected metabolites from the groups Acylcarnitines, Amino Acids, Biogenic Amines, Glycerophospholipids, Sphingolipids and Sugars, might represent new potential molecular markers useful to predict end phenotypes. The molecular dissection of complex traits will help to understand the fine biological pathways affecting complex traits.

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Milk and plasma IgG levels in primiparous and multiparous cows, during the first week of lactation

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Bovines are born agammaglobulinemic and achieve immune protection by transport of colostral immunoglobulins into the bloodstream through intestinal epithelium. This transfer depends on initial permeability of intestinal mucosa and transcytotic mechanisms mediated by receptors. Despite immunoglobulin transfer ceases within 48 hours after birth, receptors persist into adulthood. In bovine colostrum/milk the predominant immunoglobulin is IgG (subclasses IgG1 + IgG2), which mainly derives from maternal blood. During the first week of age, interaction between ingested IgGs and intestinal receptors stimulates intestinal mucosa thickness and villi length of the newborn. During the first week of lactation, colostrum/milk and blood IgGs were analysed in 7 primiparous and 7 multiparous Fresian dairy cows, in order to identify factors affecting their level. All cows were fed a total mixed ration *ad libitum*. On day 0, 1, 3 and 7 of lactation, milk yield and composition were determined and colostrum/milk and blood samples were tested for IgG1 and IgG2 by ELISA. Data were analysed by the PROC MIXED RM method of SAS. Colostrum/milk yield ranged between 11.5 and 34.7 L/d, without differences between primiparous and multiparous cows, throughout the study period, but protein and casein were higher ($P<0.05$) in colostrum/milk of multiparous ones, from day 1 to 7. By contrast, on parturition day, fat (95.4 vs. 58.8 g/L, SE=9.35, $P<0.01$) and urea (0.81 vs. 0.65 g/L, SE=0.04, $P<0.05$) were higher in colostrum of primiparous cows. In both groups, maximum levels of IgGs were observed at parturition. Total IgG was twice higher in colostrum of primiparous cows (2.47 vs. 1.26 g/L, SE=0.30, $P<0.05$), but this difference was entirely due to IgG2 (1.20 vs. 0.37 g/L, SE=0.15, $P<0.01$), whereas colostrum IgG1 did not differ between groups. In both groups, colostrum/milk IgG1 correlated ($P<0.05$) negatively with milk yield and positively with milk protein. In primiparous cows, colostrum/milk IgG2 correlated ($P<0.01$) negatively with milk yield and positively with milk urea. Maximum levels of blood IgGs were observed at partu-

rition, without differences between groups. Results suggest that milk yield, protein and urea, parity and distance from parturition are all factors affecting the level of IgG in colostrum and milk. Results suggest that IgG1 and IgG2 are transferred from maternal blood into milk through different processes and the efficiency of IgG2 transfer seems to decrease with parity.

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Effect of cocoa husks diet on lipid metabolism and liver composition in fattening pigs during the hot season

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Cocoa husks are byproducts from chocolate production, characterized by high contents of proteins, lipids, dietary fibre and antioxidants, polyphenols in particular. The present study evaluated the effect of cocoa husks feeding on lipid metabolism and liver composition in finishing pigs. Eight castrated male Duroc x Large White pigs (135 ± 4.06 kg, mean ± SE) were randomly assigned to one of two groups: CTRL, fed a conventional pelleted diet based on cereals, and COCOA, fed a diet obtained by substitution of 10% of the conventional diet with coarsely-ground cocoa husks. The experimental diets were isoproteic and isoenergetic, but EE (4.53 vs. 3.60 % DM), NDF (14.2 vs. 12.8 % DM), ADF (7.19 vs. 5.03 % DM), ADL (2.22 vs. 1.21 % DM) and total polyphenols (15.4 vs. 8.18 g/kg DM) were higher in COCOA than CTRL diet. The trial was conducted during the hot season ($T = 27.1 \pm 2.49$ °C; $U_r = 65.0 \pm 4.65$ %) and lasted 6 weeks, after which blood samples were taken before the first meal of the day, and analyzed for lipid parameters. Pigs were then sent to the slaughter house, where body and liver weights were recorded and liver samples were collected and analyzed for composition. Obtained data were analyzed by one-way ANOVA. Consumption of cocoa husks for 6 weeks reduced ($P<0.01$) by 10 % DM and energy intake, but had no effect on body and carcass weights and hot dressing percentage. Cocoa husks diet increased plasmatic level of HDL cholesterol (38.5 vs. 25.9 mg/dL, SE=5.34, $P<0.05$), without affecting total and LDL cholesterol. In humans, increased HDL cholesterol is associated with reduced risk of cardiovascular diseases. The intake of polyphenols has been shown to increase plasma HDL cholesterol in both humans and animals, but the mechanism by which polyphenols stimulate HDL cholesterol synthesis by the liver remains unclear. Cocoa husks feeding did not affect liver cholesterol, but reduced liver weight (1634 vs. 1833 g, SE=88.5, $P<0.05$) and liver content of soluble protein (66.7 vs. 84.8 mg/g, SE=4.43, $P<0.01$), DNA (3.20 vs. 4.74 mg/g, SE=0.34, $P=0.01$) and glycogen (24.6 vs. 88.4 mg/g, SE=10.7, $P=0.01$). By contrast, cocoa husks increased liver ether extract (15.1 vs. 11.8 mg/g, SE=1.13, $P=0.05$). Previous studies showed that liver weight

decreases in pigs exposed to high/discomforting temperatures, in order to reduce endogenous heat production. For the same purpose, animals decrease protein synthesis and store energy in the form of fats, because protein synthesis is energetically expensive and largely contributes to total heat production, whereas fat deposition is a more efficient and less thermogenic process. This leads to a shift toward the use of carbohydrates as energy substrate and a consequent reduction in glycogen storage in the liver. Results suggest that, during the hot season, cocoa husks diet may foster liver metabolism, in order to promote animal coping with environmental conditions. This hypothesis is supported by the fact that COCOA pigs needed less feeding to reach similar body and carcass weight of the CTRL ones.

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Use of prolactin as an indicator of stress in purebred and crossbred cattle in a farm of Yucatán (Mexico)

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The aim of this study was to evaluate the adaptability to the tropical climate of purebred and crossbred cattle reared in a ranch near Tizimín, Yucatán, Mexico, through the prolactin (PRL) serum levels comparison. The PRL has a well-documented role in milk production, and plays a role in stress correction, immune system and thermo-regulation. The trial involved 11 calves: six females and five males, three Brahman (B), three Chianina reared in America (CNA), three crossbred Chianina Italiana (CNI)xCNA and two crossbred Marchigiana (MRI)xCNA. Serum blood samples were collected twice a day at 6.00 am and at 1.00 pm, in the four Yucatán typical seasons: February (dry season start), May (dry season end), September (rainy season height), November (between rainy and dry season). In total, 22 samples for four seasons were collected. The hour collection choice was determined by relevant ambient temperature (AT) and relative humidity (RH) difference at 6.00 am (AT 21.9 °C; RH 81.5 %) and at 1.00 pm (AT 33.5 °C; 45.1 %). In February, at the trial start, the average age of these animals was 87.0 days, and at the end (November) 348 days. The PRL serum was determined in Italy by radioimmunoassay in the DIMEVET laboratory in Bologna. Data were analysed by a one-way general linear model considering, as factors, sex, breed, month, collection hour, and their interactions. Differences between means were tested with the Tukey test. Correlation between PRL, AT, RH and age were calculated. A

PRL level significant difference between sexes ($P<0.0001$), breeds ($P<0.017$) and months ($P<0.002$) was found, but not between collection hours. Interactions sex x breed ($P<0.022$), sex x month ($P<0.009$) and breed x month ($P<0.028$) resulted significant. As expected, females showed a double PRL level than males (54.2 ng/mL vs. 20.5 ng/mL). Concerning breeds, CNA showed the highest PRL level (58.1 ng/mL) and MRI x CNA the lowest (16.7 ng/mL). The highest PRL level was found in May (99.2 ng/mL) and the lowest in November (20.2 ng/mL). No significant correlations between PRL and the other parameters (AT, RH and age) were found. In conclusion, the highly stressing conditions of May, at the dry season end, determined a significant PRL increase in both sexes. No clear genotype influence was found in this trial, probably due to the low subject number. Higher serum PRL in cattle suggests its use as a stress indicator in tropical climate.

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Administration of conjugated linoleic acid in late dry period and early lactation: effects on blood, rumination and productive performance of primiparous and pluriparous dairy cows

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The study investigated the effects of the conjugated linoleic acid (CLA) supplementation in dry period and early lactation on blood (metabolic and inflammatory markers), rumination time and productive performance of primiparous (PR) and multiparous (MU) transition dairy cows. Fifty nine Holstein cows ($n=17$ PR and $n=42$ MU) were assigned to control (CTR) or treated group (TRT). TRT cows (9 PR and 20 MU) received a daily supplement containing lipid-encapsulated CLA (Lutrell® pure, BASF, Ludwigshafen, Germany). The integration of CLA was of 20 g/d from -20 to 0 days from parturition (DFP) and 40 g/d from 1 to 7 DFP. The CTR cows (8 PR and 22 MU) received the same amount of placebo (hydrogenated vegetable fats). Blood samples were collected at -20, -3, 1, 3, 7 and 28 DFP for the analysis of the metabolic profile. The body condition score (BCS) was measured after each blood sampling, rumination time (SCR Europe, Podenzano, PC, Italy) and milk yield were recorded daily. Data were evaluated by ANOVA using the MIXED procedure (SAS Inst.). No effect of CLA supplementation were observed for milk yield and rumination time for both PR and MU, while in MU the drop of BCS from -3 to 28 DFP showed a lower value ($P<0.1$) in TRT. The reduced body lipid mobilization in MU-TRT group is confirmed by lower blood concentrations of β -hydroxybutyrate at 3 DFP ($P<0.1$) and non-esterified fatty acid at