start of Ovsynch determined cyclicity. Plasma NEFAs, BHBA, glucose, BUN, and frequency of CD did not differ between PO and SO cows. Cyclicity was not affected by diets (80%, n=1117). PR for 1st AI at 32d (37.4%, n=1055) and 60d (33.3%, n=1048) was not affected by diets, but PL was lesser (P<0.05) in FO (6.3%, n=190) vs. PO (13.6%, n=198). PR for 2nd AI was higher at 32d (P<0.05) and 60d (P<0.05) in FO (36.9% [n=295], 34.4% [n=293]) vs. PO (27% [n=309], 23.7% [n=303]), respectively; PL was not affected by diets (6.5%, n=185). Overall PR was 54.5% (n=1084) at 32d and higher (P<0.05) at 60d in the FO (52.8%, n=528) vs. PO (45.4%, n=541). Overall PL was lesser (P<0.05) in FO (6%, n=297) vs. PO (12%, n=279). Monthly MY was greater (P<0.02) in SO (41.9kg, n=532) vs. PO (41.2kg, n=534). Feeding differential CSFAs during transition and breeding periods can benefit fertility and milk production of dairy cows.

Key Words: Fatty Acids, Reproduction, Milk Yield

T223 Effects of rumen protected CLA supplemented to dairy cows in late pregnancy and early lactation on milk yield and some milk features. G. Bertoni*, E. Trevisi, M. G. Maianti, and A. Gubbiotti, *Istituto Di Zootecnica, Universita' Cattolica Del Sacro Cuore, Piacenza, Italy*.

Dairy cows in the transition period suffer for the negative energy balance (NEB), which causes some metabolic diseases, as well as lower fertility. Conjugated linoleic acid (CLA) is quoted to reduce milk fat content and therefore the energy output that could alleviate the NEB. Nevertheless, the great change of milk composition could have some consequences on the creaming activity and overall on the cheese making traits, both of great importance in Italy. To evaluate the effects of CLA on milk traits, 8 dry cows (kept in a tied barn) were divided in two homogeneous groups receiving 20 g/d of rumen protected CLA (equivalent to 100 g of Luta-CLA® 20P, BASF, Germany) or 100 g/d of a mixture of rumen protected fats. Supplementation began approximately 30 days before calving and lasted 28 days after it. Besides daily milk yield, morning milk samples were taken two times a week for the first 3 months of lactation. Milk yield was numerically lower (45 vs 47 kg/d at 28th DIM) in the CLA cows, but the main results during the first month of lactation are those regarding milk composition and its technological traits: CLA has reduced milk fat content (2.8 vs 3.6%, P<0.05 at 28th DIM) and its creaming activity (61 vs 68%, N.S., average of 3rd and 4th week). On the contrary, the milk protein content of CLA supplemented cows was slightly higher and the curd firmness was increased (26 vs 21 mm, N.S., average of 3rd and 4th week) despite a similar clotting time. It is worthwhile that one-two weeks after the end of CLA supplementation, the above differences disappeared. The overall results suggest that CLA feeding at the end of pregnancy and in first month of lactation can contribute to lower the milk energy output. Nevertheless, the reduction of milk fat content could impair the fat creaming activity, which is essential for some typical cheeses (i.e. parmesan), although the short period of CLA use could minimize the risk.

Key Words: Conjugated Linoleic Acid, Milk Traits, Transition Period

T224 Energy balance indexes and blood changes of dairy cows supplemented with rumen protected CLA in late pregnancy and early lactation. E. Trevisi*, A. Ferrari, F. Piccioli-Cappelli, and G. Bertoni, *Istituto Di Zootecnica, Universita' Cattolica Del Sacro Cuore, Piacenza, Italy*.

Transition dairy cows suffer for the negative energy balance (NEB) and for inflammatory-like conditions. Both can negatively affect DMI and incidence of metabolic diseases as well as fertility. Conjugated linoleic acid (CLA) is quoted to reduce milk fat content and hence the severity of NEB, but also to attenuate inflammatory phenomena. To evaluate the effects of CLA on DMI, BCS and metabolic profile in the transition period, 8 dry cows (kept in a tied barn) were divided in two homogeneous groups receiving 20 g/d of rumen protected CLA (equivalent to 100 g of Luta-CLA® 20P, BASF, Germany) or 100 g/d of a mixture of rumen protected fats (CTR). Supplementation began approximately 30 days before calving and lasted 28 days after it. Besides health status, daily DMI and milk yield, cows were checked weekly for body weight and BCS. Moreover, blood samples were taken two times a week when dry and for the first 90 days in milk (DIM), but daily 10 days before and after calving. The results suggest that a supplement of CLA improves the blood indexes of energy metabolism: glucose, NEFA and BHB (0.8 vs 1.6 mmol/l of CTR at 1-5 DIM; P<0.01). Moreover, it reduce the urea level, lower at 23-27 DIM (4.0 vs 5.2 mmol/l; P<0.1). The consequences of inflammatory conditions, that typically occur at calving time, appear also smaller after calving: e.g. CLA cows have showed higher levels of some negative acute phase proteins like lipoprotein as cholesterol (5.0 vs 4.3 mmol/l, P<0.05 at 20-30 DIM), albumin (36.3 vs 34.4 g/l, P<0.1 in the first 28 DIM) and thiol groups (less important reduction after calving). These changes agree with some other results: slightly lower rectal temperature around calving, higher DMI (19.3 vs 18.2 kg/d on average in first 28 DIM) and slightly lower reduction of body weight and BCS (0.29 vs 0.37 points). Thus CLA supplementation seems to improve some aspects of dairy cows transition: e.g. energy balance and inflammatory conditions.

Key Words: Conjugated Linoleic Acid, Blood Indexes, Transition Period

T225 Effect of different levels of fish oil and canola oil on milk production and composition of high producing Holstein dairy cows in early lactation. T. Vafa*, A. Naserian, A. Heravi Moussavi, M. Danesh Mesgaran, and R. Valizadeh, *Ferdowsi University of Mashhad, Mashhad, Khorasan Razavi, Iran*.

The aim of this study was to evaluate the effect of different levels of canola oil or/and fish oil supplementation on dry matter intake (DMI), and milk production and composition in early lactating Holstein dairy cows. Eight multiparous early lactation Holstein cows (42±12 DIM, 40±6 kg daily milk yield) were fed a total mixed ration supplemented with either 0% oil (Control), 2% canola oil (CO), 2% fish oil (FO), or 1% canola oil + 1% fish oil (CoFo), according to a double 4 × 4 Latin square design. Each period lasted 3 wk; experimental analyses were restricted to the last week of each period. Diets were formulated to be isonitrogenous using NRC 2001. Cows were housed in tie stalls and fed the TMR two times a day to allow 5 to 10% orts (as-fed basis). Cows were milked 3 times per day and yields were recorded. Milk samples were collected from each milking on 1 d per wk and composited for analysis of fat, protein, and lactose. Data were analyzed as a replicated 4 × 4 Latin square using the GLM procedure of SAS (2001). The model included effects caused by diet, period, and cow. Least squares means are reported throughout, and significance was declared at P < 0.05. Diet had no effect on DMI (24.92, 25.60, 23.70, and 25.84 ± 0.79 kg/d; for control,

CO, FO, and CoFo, respectively). Milk production was similar among the groups (34.41, 34.15, 32.93, and 34.55 ± 0.84 kg/d, respectively). Milk fat content (2.87, 2.70, 2.45, and 2.89 ± 0.21%, respectively), milk protein content (2.88, 2.86,2.92, and 2.89 ± 0.07%, respectively), and milk lactose content were all similar among the diets. The results of this study demonstrated that the canola oil or/and fish oil supplementation in the diet of early lactation cows had no apparent effect on the DMI, and milk production and composition.

Key Words: Dairy Cow, Canola Oil, Fish Oil

T226 Effects of degree of unsaturation of supplemental dietary fat on ruminal fermentation, nitrogen metabolism, and urea nitrogen recycling in dairy cows. T. Mutsvangwa*, G. N. Gozho, and D. Kiran, *University of Saskatchewan*, *Saskatoon, Saskatchewan, Canada*.

The objective of this study was to evaluate the effects of degree of unsaturation of supplemental dietary fat on ruminal fermentation, nitrogen metabolism, and urea-N recycling. Four Holstein cows (693 kg BW; 92 DIM) with ruminal cannulae were used in a 4 x 4 Latin square design with 21-d periods. Dietary treatments contained 0% supplemental fat (control), 3.52% canola oil, 3.52% tallow, and 1.76% canola oil + 1.76% tallow. Diets were offered twice per day as TMR made up of 55% forage and 45% barley-based concentrate. Nitrogen balance was measured from d 16 to d 20, with concurrent measurements of urea-N kinetics using a single dose intra-jugular infusion of [$^{15}N^{15}N$]-urea on d 16. Dry matter intake, milk yield and milk composition were not affected by fat supplementation; however, milk fat content tended to be lower ($P = 0.10$) for cows fed canola oil. Ruminal protozoa were 2.63 x 10^5, 2.75 x 10^5, 3.72 x 10^5, and 2.82 x 10^5 counts/ml for control, canola oil, tallow, and canola + tallow mixture, respectively. Protozoal counts were higher ($P = 0.03$) in cows receiving supplemental tallow compared to those fed the control diet. Ruminal pH, and concentrations of NH_3-N, and individual and total VFA were not affected by source of supplemental fat. Urea-N production (189.9, 178.4, 182.8, 182.3 g/d), and urea-N entering the GIT (185.3, 174.6, 180.0 177.8 g/d) were similar for the control, canola oil, tallow, and canola + tallow diets, respectively. Fractional urea-N transfers were unaffected by treatment. Results show that the source of supplemental fat did not affect protozoa counts or change ruminal fermentation patterns and, consequently, had no impact on urea-N recycling.

Key Words: Dairy Cow, Urea Kinetics, Nitrogen Metabolism

T227 Influence of dietary fats on hepatic gene expression in transition dairy goats. A. Agazzi[1], G. Invernizzi*[1], A. Campagnoli[1], M. Ferroni[1], A. Galmozzi[2], M. Crestani[2], and G. Savoini[1], [1]*Department of Veterinary Science and Technology for Food Safety*, *Milan, Italy*, [2]*Department of Pharmacological Sciences*, *Milan, Italy*.

The aim of the study was to evaluate the dietary fats influence on hepatic gene expression in transition dairy goats. Eighteen second parity alpine goats from wk 2 before to wk 3 after kidding were assigned to 1 of 3 dietary treatments: C (n=6) basal diet, FO (n=6) basal diet plus 47g/d of protected fish oil, PO (n=6) basal diet plus 47g/d of hydrogenated palm oil. Feed consumption, live body weight (BW), milk yield and composition were assessed weekly. Blood samples were collected on 15, 7, and 2d before, and 2, 7, 15, and 21d after kidding for ALAT, ASAT, NEFA, glucose, BHBA, and cholesterol content. Bioptic samples were obtained 7d before and 21d after kidding and analyzed for mRNA content of peroxisome proliferator-activated receptor-α (PPARα), carnitine palmitoyltransferase I (CPT1), long chain acyl-CoA synthetase (ACSL), very-long-chain acyl-CoA dehydrogenase (ACADVL), acetyl-CoA carboxylase (ACC1) and malonyl-CoA decarboxylase (MCD) by real time Q-PCR. Data were analyzed by a mixed procedure of SAS. No effects were observed on BW, plasma metabolites and milk composition. Milk yield was increased in PO vs. C (3.65kg/d, 2.42kg/d; P<0.05). Higher expression of CPT1 and ACADVL were detected in C vs. PO goats before kidding (P<0.05), while on day 21 PO increased PPARα expression as compared to C (P<0.05), and increased ACSL values as compared to C and FO animals (P<0.01). Hepatic gene expression in an intra-group analysis evidenced decreased values in C from pre to post kidding for ACADVL and ACSL (P<0.05), while ACSL was significantly decreased after kidding in FO subjects (P<0.05). No variations were evidenced in PO animals from dry period to lactation. Correlation analysis evidenced a negative feedback of PPARα on cholesterol plasma content by 42% (P=0.03). Results suggest different mechanism of action of dietary saturated and unsaturated fatty acids in transition goat on hepatic gene expression.

Key Words: Goat, Nutrigenomics, Liver

T228 Reproductive performance of cows fed rolled flaxseed on two commercial dairies. N. R. Bork*[1], G. P. Lardy[1], J. W. Schroeder[1], K. A. Vonnahme[1], P. M. Fricke[3], K. B. Koch[2], M. L. Bauer[1], and K. G. Odde[1], [1]*North Dakota State University*, *Fargo*, [2]*Northern Crops Institute*, *Fargo, ND, USA*, [3]*University of Wisconsin*, *Madison*.

The objective of this field trial was to study the effects of supplementing early lactation dairy cows with rolled flaxseed on reproduction. We hypothesized that fatty acids in flaxseed, namely C18:3n-3, may improve reproductive performance of dairy cows. Conducted on 2 commercial dairies with cows naive to flaxseed, treatments consisted of either their existing early lactation ration (CON; n = 252) or a similar ration, equal in protein, energy and fat, re-formulated with rolled flaxseed (FLX; n = 339; 0.85 kg DM/d). Cows were assigned randomly to treatment upon leaving the fresh pen (approximately 10 d postpartum) within parity (primiparous, P or multiparous, M; P-CON, M-CON, P-FLX, M-FLX). Statistical analysis for conception rate data included all cows in the study, and was performed using a mixed model. Cow was the experimental unit and data were analyzed as a split plot with pen being the whole plot error term (random term was treatment by parity by farm). Statistical analysis for other reproductive parameters including all pregnant cows was performed with a categorical model using logistical regression. First and second-service analysis included 1422 AI services. First-service conception rates did not differ (P = 0.27) among treatments (P-CON = 46.8 ± 4.0%; M-CON = 34.3 ± 3.1%; P-FLX = 41.1 ± 3.1%; M-FLX = 30.0 ± 2.8%). Treatment did not interact (P ≥ 0.27) with season of the year, breeding method (AI at estrus vs. Ovsynch and timed AI), or farm. Analysis of services per conception for pregnant cows (CON = 1.92 ± 0.12; FLX = 1.95 ± 0.12; P = 0.87), days to first insemination (CON = 76.6 ± 0.8; FLX = 73.9 ± 0.7; P = 0.11), and days open (CON = 113.5 ± 3.7; FLX = 109.9 ± 3.2; P = 0.53) included 591 cows and did not differ between treatments. We conclude that feeding 0.85 kg/d (DM basis) of flaxseed during early lactation does not affect reproductive performance of dairy cows.

Key Words: Flaxseed, Reproduction, Dairy Cows