1251 Conjugated linoleic acid (CLA) content of milk from cows on different ryegrass cultivars. V. R. Loyola*[1,4], J. J. Murphy[2], M. O'Donovan[2], R. Devery[3], M. D. S. Oliveira[4], and C. Stanton[1], [1] *Teagasc, Dairy Products Research Centre, Moorepark, Fermoy, Ireland,* [2] *Teagasc, Dairy Production Research Centre, Moorepark, Fermoy, Ireland,* [3] *Dublin City University, Ireland,* [4] *Universidade Estadual Paulista, UNESP, Jaboticabal, Brasil.*

Milk fat CLA arises from microbial biohydrogenation of dietary linoleic acid in the rumen and also by endogenous synthesis in mammary tissue by Δ9 desaturase activity on vaccenic acid. CLA has exhibited a number of health benefits /italicizein vitro and /italicizein vivo, including anticarcinogenic activity. Therefore, strategies for optimising the CLA and vaccenic acid content of milk fat may provide means of enhancing its nutritional and health promoting properties. In this study, the effects of ingestion of four ryegrass cultivars, consisting of two diploid, Spelga (S) and Portstewart (P), and two tetraploid, Napoleon (N) and Millennium (M), with different heading dates (intermediate and late) on milk fat CLA concentrations were investigated. Four herds of 20 cows each were blocked onto the four ryegrass cultivars in March and throughout the season were rotationally grazed /italicizead libitum at a stocking density of 4.2 cows per hectare. Milk fatty acid composition was analyzed at 2 times during the grazing season (July and September). The linoleic and α-linolenic acid content of the ryegrass varieties were similar. The /italicizecis-9, /italicize trans-11 CLA content of the milk fat averaged for the 2 sampling times was significantly lower ($P<0.01$) from cows grazing N (1.35 g/100g FAME) than from cows grazing either M (1.72) or P (1.71), while CLA from S (1.54 g/100g FAME) did not differ from any other cultivar. Vaccenic acid content was also lower on this cultivar ($P<0.05$). There was no difference in milk fat CLA between the two sampling times. The heading date effect was significant ($P<0.05$), with late heading cultivars resulting in higher CLA. There was no significant difference in the milk fat CLA between diploid and tetraploid cultivars. These data suggest that ryegrass variety may influence the CLA and vaccenic content of milk fat in a similar manner.

Key Words: CLA, Ryegrass Cultivars, Bovine Milk Fat

1252 *In vitro* ruminal biohydrogenation of n-3 fatty acid from two fish oils as influenced by inclusion levels. F. Dohme*[1], V. I. Fievez[2], K. Raes[2], and D. I. Demeyer[2], [1] *Swiss Federal Research Station for Animal Production,* [2] *Ghent University, Belgium.*

One major limitation in the incorporation rate of n-3 fatty acids into milk and body fat is their biohydrogenation by rumen micro-organisms. The aim of the study was to determine whether release rate from triacylglycerols (TG) and biohydrogenation of eicosapentaenoic (EPA) and docosahexaenoic acids (DHA) varied between two fish oils (FOa; FOb) differing in their levels of EPA and DHA (FOa: 18.7% EPA, 11.7% DHA; FOb: 5.8% EPA, 7.6% DHA) and supplied at six levels (12.5, 25, 50, 75, 100, 125 mg). Using the batch cultures technique, FOa and FOb were incubated for 24 or 48 h in 25 mL buffer-rumen fluid-mixture and 0.4 g of ground hay. TG and free fatty acids were separated by TLC and the fatty acid composition was determined by GLC. Release rate and biohydrogenation of EPA and DHA were expressed as the ratio of the incubated and unincubated samples. Linoleic acid (LA) from soy oil has shown to be highly biohydrogenated and therefore was used as a reference. Although EPA and DHA concentration was markedly higher in FOa, release rate from the oils did not differ. Regardless of the oils supplied, EPA and DHA release rate decreased with increasing level ($P < 0.001$) and increased with extended incubation time ($P < 0.001$). The rate of free LA was on average 90% and was not affected neither by incubation time nor by inclusion level. EPA and DHA from FOb were biohydrogenated at a greater extent than those of FOa ($P < 0.001$). Increasing oil supplementation caused a decreased biohydrogenation rate of EPA and DHA ($P < 0.001$). Compared to 24 h, incubation during 48 h enhanced the amount of EPA and DHA being biohydrogenated ($P < 0.001$). Biohydrogenation rate of LA was nearly complete and numerically higher than that observed for EPA and DHA from the fish oils. In conclusion, the release from TG of EPA and DHA and their biohydrogenation depended on the inclusion level. Furthermore, biohydrogenation rate was affected by the fatty acid composition of the supplied fish oils.

Key Words: Fish oil, n-3 fatty acids, Biohydrogenation

1253 Effects of DM of fat on duodenal flow a gated linoleic acid and tra M. L. Eastridge[1], J. L. Firkins[1] [1] *The Ohio State University, C Carbondale.*

Four ruminally and duodenally cannulated multiparous Holstein cows averaging 106 ± 17 DIM were used in a 4 x 4 Latin Square with the treatments as follows: control (CON) = diet with 2% fish oil (FO) and fed ad libitum; buffer addition (BUFF) = CON with 0.8% of DM as $NaHCO_3$; low DMI (LDMI) = dietary concentration of nutrients and FO increased from the CON and DMI was restricted to 80% of the CON; and soybean oil (SBO) = CON with 2% SBO instead of FO. The diet was a 36.3: 63.7 forage: concentrate ratio TMR with 32.1% NDF and 3.3% fatty acids. Periods were 18 d with the last 7 d for data collection and the first 4 d for determining the appropriate feed offered for the LDMI treatment. Duodenal conjugated linoleic acid (CLA) flows were 6.04, 3.73, 4.27, and 0.89 g/d, for CON, BUFF, LDMI, and SBO, respectively. *Trans*-$C_{18:1}$ flows were 147.7, 142.3, 76.0, and 27.8 g/d, respectively. In milk, CLA concentrations were 24.5, 17.9, 18.5, and 10.1 mg/g of FA, respectively; and *trans*-$C_{18:1}$ FA concentrations were 95.6, 99.5, 70.7, and 35.8 mg/g of FA, respectively. Feeding buffer at 0.8% of DM neither significantly increased ruminal pH nor decreased duodenal flows of *trans*-$C_{18:1}$ and CLA, although the duodenal fows were numerically lower than CON. Restriction of DMI decreased duodenal flow of *trans*-$C_{18:1}$ but did not significantly decrease duodenal flow of CLA from CON. However, both BUFF and LDMI tended to result in lower CLA concentration in milk fat than CON. Compared to SBO, FO was more effective in increasing duodenal flows of CLA and *trans*-$C_{18:1}$ and, thus, concentration of CLA in milk. Cows fed FO had higher duodenal flow and milk concentration of n-3 polyunsaturated fatty acids than the cows fed SBO. Estimated by subtracting duodenal CLA flow from milk CLA production and then dividing by milk CLA production, endogenous synthesis of CLA by Δ^9 desaturase activity, averaging across the treatments, accounted for at least 72.1% of the CLA secreted in milk. The contribution of endogenous CLA varied as the source of dietary fat changed, with SBO (86.4%) being much higher than the other treatments (averaging 67.3%).

Key Words: conjugated linoleic acid, *trans* fatty acid, milk fat

1254 Performance of lactating holstein cows fed catfish oil in summer. A.K.Amorocho* and C.R. Staples. Department of Animal Sciences, University of Florida, Gainesville. A . K . Amorocho* and C. R. Staples, *University of Florida, Gainesville, Florida.*

The objective was to evaluate the effect of dietary catfish oil on milk production and composition, dry matter intake, plasma glucose and urea, and pH of rumen fluid, urine, and feces of 12 multiparous Holstein cows (six ruminally fistulated and six nonfistulated) (average of 195 days in milk). The fatty acid profile of catfish oil was 19% palmitic, 47% oleic, and 14% linoleic. Catfish oil (0, 1.5, and 3% of dietary DM) was suspended in liquid molasses, mixed with grain, and fed as a TMR containing corn silage and alfalfa hay. Treatments were arranged in a 3 x 3 Latin square design replicated four times. Each period lasted 27 days, 14 days for adaptation to a new diet and 13 days for data collection. Milk production and dry matter intake was measure daily. Blood was collected on days 12 and 13. Urine and fecal samples were collected and measured for pH on days 8 and 9. Rumen fluid was collected hourly for 8 hours on day 1. Intake of dry matter increased linearly ($P < 0.05$) as intake of catfish oil increased (23.0, 24.4, and 25.4 kg/d). Production of milk was unchanged by the feeding of catfish oil (28.9, 28.9, and 29.4 kg/d). Concentrations of milk fat (3.57, 3.60, and 3.48%) and protein (3.21, 3.18, and 3.23%) were similar across the catfish oil diets. Concentrations of plasma glucose (57.2, 55.1, and 56.0 mg/100 ml) and urea nitrogen (11.6, 11.0, and 12.0 mg/100 ml) were not affected by dietary treatments. The pH of urine (8.05, 8.05, and 8.06) and feces (6.73, 6.67, and 6.67) were unchanged by feeding of increasing amounts of catfish oil. Average ruminal fluid pH decreased linearly ($P < 0.0001$) as intake of catfish oil increased (6.40, 6.20, and 6.15). The treatment by square interactions were not significant. Catfish oil was successfully mixed with liquid molasses and fed to lactating Holstein cows at up to 3% of dietary dry matter, stimulating dry matter intake.

Key Words: lipids, dairy cows, rumen fluid