at 5.3% of dietary dry matter. Data presented here are based on milk samples (n=23) obtained on day 11 after the feeding of the sunflower oil supplemented diet was started. A subset of these cows which had the highest milk fat content of CLA (n=10) were sampled again on day 18. Concentration of *cis*-9, *trans*-11 CLA in milk fat on day 11 averaged 2.5% of total fatty acids and the individual cows ranged from 0.7 to 4.9%. Unexpectedly, over the next seven days in the high CLA subset, milk fat content of *cis*-9, *trans*-11 CLA decreased from an average of 3.49 to 1.95%. Decrease in milk fat *cis*-9, *trans*-11 CLA was associated with a decrease in milk fat content of *trans*-11 C18:1 and with an increase in *trans*-10 C18:1 suggesting a change in ruminal biohydrogenation. Variation in milk fat concentration of *cis*-9, *trans*-11 CLA in the entire data set was closely predicted by concentrations of *trans*-11 C18:1 in milk fat ($y = 0.40x + 0.46$; $R^2 = 0.8$). Similarly, variation in milk fat concentration of another CLA-isomer, tentatively identified as *trans*-10, *cis*-12 CLA, was predicted by concentrations of *trans*-10 C18:1 in milk fat ($y = 0.013x + 0.011$; $R^2 = 0.7$). Furthermore, variation in milk fat percentage was predicted by concentrations of *trans*-10, *cis*-12 CLA in milk fat ($y = -9.1x + 3.47$; $R^2 = 0.5$). These data support the role of *trans*-11 C18:1 as a precursor of milk fat *cis*-9, *trans*-11 CLA over a wide range of *trans*-11 C18:1 supply. Data also provide additional support for our previous work (Griinari et al. 1998. JDS. 81:1251) indicating an involvement of *trans*-10 C18:1 and *trans*-10, *cis*-12 CLA in milk fat depression.

Key Words: CLA, Milk fat depression, Biohydrogenation

4 Examination of the importance of Δ^9-desaturase and endogenous synthesis of CLA in lactating dairy cows. B. A. Corl*[1], S. H. Lacy[1], L. H. Baumgard[1], D. A. Dwyer[1], J. M. Griinari[2], B. S. Phillips[3], and D. E. Bauman[1], [1]*Cornell University, Ithaca, NY,* [2]*Valio Ltd., Helsinki, Finland,* [3]*New Crops Research Unit at the National Center for Agricultural Utilization Research, ARS, USDA.*

Conjugated linoleic acids (CLA) are geometric and positional isomers of linoleic acid which have been shown to have a number of positive health benefits in animal models. CLA is an intermediate in the biohydrogenation of linoleic acid by rumen bacteria and it was thought this was the sole source of CLA in ruminants. However, we challenged this idea and our recent studies demonstrated that endogenous synthesis of CLA occurs from trans-11 C18:1, another intermediate in rumen biohydrogenation, via the enzyme Δ^9-desaturase (Corl et. al., J. Dairy Sci. 81 (Suppl. 1):233). Our objective in this study was to examine the importance of Δ^9-desaturase and the extent of endogenous synthesis of CLA. To do this, we used sterculic acid, a nineteen carbon fatty acid with a cyclopropene ring structure located between carbons 9 and 10, which specifically inhibits Δ^9-desaturase. Sterculic acid was isolated from the seeds of *Sterculia foetida*. We found the seeds contained 23% oil by mass, and sterculic acid comprised 55% of the fatty acids in the oil. The sterculia oil was prepared as an emulsion in skim milk which was abomasally infused into high producing dairy cows. In the preliminary study, 3 cows (140 ± 53 DIM) were abomasally infused for 4 d with the emulsion (10 g/d sterculia oil). Infusion had no effect on dry matter intake or the yield of milk and milk fat. However, milk fat composition was altered. Consistent with an inhibition of Δ^9-desaturase, the ratio of stearate to oleate was increased by 181%. Furthermore, the infusion of sterculia oil reduced CLA by 40%. This represents a minimum estimate of the contribution of endogenous synthesis of CLA and studies are in progress to refine this estimate. Nevertheless, it is clear that endogenous synthesis of CLA is a major source of CLA in milk fat.

Key Words: CLA, desaturase

5 Interactive effects between fat source and modified tall oil on growth performance and carcass characteristics of finishing pigs. J. C. Woodworth*, R. D. Goodband, J. A. Unruh, J. L. Nelssen, M. D. Tokach, A. T. Waylan, and P. R. O'Quinn, *Kansas State University, Manhattan.*

One hundred, forty-four pigs (initially 41 kg BW) were used to determine the interactive effects between fat source and modified tall oil (MTO) on growth performance and carcass characteristics. Pigs were blocked by ancestry and initial weight and randomly allotted to one of the twelve treatments arranged in a 2 X 2 X 3 factorial with main effects of sex (barrows (B) or gilts (G)), MTO (0 or .5% of the diet), and fat source (no added fat (NF), 6% choice white grease (CWG), or 6% poultry fat (PF)). Corn-soybean meal diets were fed from 41 to 66 (1.1% lysine) and 66 to 113 (.75% lysine) kg. Overall, B had greater ($P < .0001$) ADG and ADFI compared to G. Modified tall oil had no effect ($P < .16$) on ADG, ADFI, or G/F. Pigs fed diets containing PF had decreased ($P < .01$) ADFI and increased G/F compared to pigs fed diets containing NF or CWG with pigs fed CWG having intermediate response. A fat source X sex interaction was observed for G/F, with G fed NF having lower ($P < .05$) G/F than B; however, G fed PF had higher G/F than B. When pigs reached 113 kg, one pig per pen was slaughtered to measure carcass characteristics. Gilts were leaner, had increased LMA, lean %, and pH and had firmer bellies compared to B ($P < .04$). Belly firmness was improved ($P < .06$) by MTO. Pigs fed PF had increased ($P < .002$) average backfat thickness compared to pigs fed NF. Pigs fed CWG had firmer ($P < .008$) loins compared to pigs fed PF, and decreased ($P < .04$) longissimus drip loss compared to pigs fed NF or PF. Pigs fed NF or CWG had firmer bellies than those fed PF ($P < .05$). Instrumental color of the longissimus muscle and fat was not affected by MTO or fat source ($P < .40$). In conclusion, regardless of fat source, MTO improved belly firmness. Added fat decreased ADFI and increased G/F. Pigs fed PF had the highest G/F, but the fattest carcasses and softest loins and bellies.

Key Words: Pigs, Fat, Modified Tall Oil

6 Conjugated linoleic acid (CLA): A ruminant fatty acid with beneficial effects on human health. M. A. McGuire*[1] and M. K. McGuire[2], [1]*University of Idaho, Moscow,* [2]*Washington State University, Pullman.*

Diet has a significant impact on human health. Although the human diet contains components which may promote cancer, it also contains components with a potential to prevent cancer. Research shows that ruminant fat contains an anticarcinogenic compound called rumenic acid (RA). This fatty acid is produced when dietary linoleic acid is isomerized by rumen bacteria during biohydrogenation and is one form of a family of fatty acids collectively called CLA. Although commercial sources of CLA contain other forms of CLA, ruminant fat contains primarily RA. Classic models of tumorigenesis in rodents have demonstrated that CLAs inhibit the growth of a variety of tumors. All studies demonstrate that CLA can be an effective inhibitor of tumor growth at concentrations in the diet less than 1%. The feeding of CLA during only the period of rapid mammary gland development, offers protection for life from mammary cancer. Further, protection from mammary cancer by CLA is independent of the amount or type (saturated or unsaturated) of fat in the diet. Moreover, RA and milk fat rich in RA can act to inhibit mammary tumor growth similar to results when commercial sources of CLA are fed, suggesting that RA is the anticarcinogenic CLA. Humans appear to produce little CLA in their bodies and thus, diet is probably the primary source. We have shown that CLA intake influences CLA content of blood and breast milk. This may be significant, since diets rich in dairy products and beef could supply humans with the level of CLA necessary for protection from cancer. Other evidence suggests that CLA can influence atherosclerosis, growth, immune function and diabetes; reinforcing the important role of ruminant fat in establishing optimal human health. Together, these relatively recent findings concerning the health benefits of CLA (and specifically RA) suggest that ruminant fats remain a significant part of the human diet. One way to accomplish this without increasing energy intake is the use of butter, instead of margarine or other non-dairy substitutes.

Key Words: Conjugated Linoleic Acid, Rumenic Acid, Health

7 Effects of modified tall oil on body composition and serum and tissue levels of α-tocopherol, cholesterol, and phospholipids in ovariectomized rats. P. R. O'Quinn*, S. I. Koo, S. K. Noh, J. L. Nelssen, R. D. Goodband, and M. D. Tokach, *Kansas State University, Manhattan.*

Adult ovariectomized rats (a model for post-menopausal women) were assigned (n = 13/group) by BW (initially 256.8 g) to either a standard AIN-93G diet containing 8% α-tocopherol (αTP)-stripped soybean oil or the same diet containing 1% modified tall oil (MTO) at the expense of soybean oil. Diets were matched in fatty acid profile except for the isomers of conjugated linoleic acid found in MTO. Rats were pair fed (90% of *ad-libitum* intake) twice daily for the duration of the 6 wk trial. By 3 wk, rats fed MTO had reduced ($P < .05$) BW; this trend continued for the duration of the trial. Rats fed MTO had higher ($P = .05$) non-protein respiratory quotient (RQ) and lower ($P = .05$) heat production