

W74 Partitioning of metabolizable energy by rainbow trout and Atlantic salmon using a multivariate approach: species and diet effects. P.A. Azevedo*, S. Leeson, C.Y. Cho, S. Birkett, and D.P. Bureau, *University of Guelph, Ontario, Canada.*

A study was conducted to investigate how the allocation of energy to growth and maintenance differs between rainbow trout and Atlantic salmon and how the diet affects energy allocation. Rainbow trout and Atlantic salmon were handfed to satiation four isoenergetic diets (DE = 20 MJ/kg) with different digestible protein/digestible energy ratios (DP/DE), i.e., 24, 22, 20, and 18 g/MJ, achieved through reduction of DP level (53 to 39%) and increase of lipid level (19 to 26%). Intake of metabolizable energy (ME), protein (PD), and lipid (LD) gain were determined. Data were analyzed by multivariate analysis of PD and LD on ME. Maintenance energy requirements (ME_m) and efficiency of ME utilization for PD (k_p) and LD (k_l) were estimated. The fraction of ME intake above maintenance for PD (X) was defined as linear function of body weight with slope (d) and intercept (c) estimated simultaneously with the above parameters. The ME_m did not differ (P > 0.05) be-

tween rainbow trout and Atlantic salmon (20 kJ/day/kg^{0.8}). On the other hand, K_p, c, and d were significantly different (P < 0.05) between the two species, independently of the diet. The ME intake above ME_m channeled towards PD (c) was higher in salmon than trout (57 vs. 55%; P < 0.05). The change in partitioning of ME toward PD due to the change in body weight was negative for trout (d = -0.18) while it was positive for salmon (d = 0.16). The values of d agreed well with the increase of LD/PD with body weight for trout and the decrease of LD/PD with body weight for salmon which may have been related to the maturation status of this fish and the associated loss of lipid observed with maturing salmon. The K_p was significantly higher for salmon compared to trout (0.52 ± 0.06 vs. 0.43 ± 0.06; P < 0.05) and independent of the diet while K_l was 0.81 ± 0.13 irrespective of species or diet. Lower cost of protein deposition for salmon compared to trout suggests differences in protein metabolism between these two species. Studies on protein turnover rates and metabolic utilization of nutrients for PD are required to gain insight on k_p differences between salmon and trout.

Key Words: Rainbow Trout, Atlantic Salmon, Energy Allocation

Nonruminant Nutrition: Sow & Gilt Nutrition

W75 Ideal protein to improve lactation performance of multiparous sows. F. Ji*¹, Y. G. Kim², and S. W. Kim¹, ¹Texas Tech University, Lubbock, ²CJ Corporation, Seoul, Korea.

The objective of this study was to validate the ideal dietary amino acid pattern in lactation diets to improve the performance of multiparous sows during lactation. Thirty two (20 second and 12 third parity Camborough-22) sows and their litters were used for this study. On d 109 of gestation, sows with a similar body weight were grouped and allotted to one of four dietary treatments representing: low protein (LC), low protein with ideal protein (LI), high protein (HC), and high protein with ideal protein (HI). Low protein diets contained 17.5% CP and high protein diets contained 19.5% CP. Ideal amino acid patterns among lysine, threonine, and valine were 100:63.0:78.1 (lys:thr:val) for the LI diet and 100:62.3:77.5 for the HI diet when it was calculated based on ileal digestible amounts. To match amino acid pattern to ideal ratios, crystalline amino acids were supplemented. Crude protein contents in the diets with ideal protein pattern were matched to the control diets by adjusting SBM content as crystalline amino acids were added. Weight and backfat thickness of sows as well as the weight of each piglet were measured at farrowing and weekly until weaning at d 21 of lactation. All sows had free access to feed and water during lactation. The body weight of sows after farrowing (224.5±4.5 kg) and litter size at farrowing (10.2±0.2 pigs) were the same (P=0.361 and 0.779, respectively) among the treatments. Voluntary feed intake of sows (5.63±0.22 kg/d) did not differ (P=0.911) among the treatments. Sows fed the low protein diets had greater (P<0.05) weight loss than sows fed the high protein diets. Sows fed the diets with ideal protein tended to have smaller (P=0.051) weight loss than sows fed the control diets. For the second parity sows, there were no differences in backfat loss, litter size at weaning and litter weight gain among the treatment. However, weight loss of the HI sows was smaller (P<0.05) than the LC sows. For the third parity sows, there were no differences in lactation performance among the treatments.

Key Words: Lactation, Multiparous sows, Ideal protein

W76 Utilization of seaweed (*Macrocystis pyrifera*) meal in wheat-based diets for lactating sows. J. Baeza¹, M. Cervantes*², J. L. Figueroa¹, E. Chi¹, M. Cuca¹, and N. Torrentera², ¹Ganadería, Colegio de Postgraduados, Montesillos, Mexico, ²ICA, Universidad Autónoma de Baja California, Mexicali, BC, Mexico.

There is interest in alternative ingredients to enhance productive performance of animals without damage to the environment. Therefore, an experiment was conducted to evaluate the addition of seaweed (*Macrocystis pyrifera*) to wheat-based diets for lactating sows on milk production and composition, daily litter gain, and wean to first oestrous interval of sows. Thirty two multiparous sows (Landrace x Duroc x Yorkshire) were fed four diets with eight replicates. Treatments were: T1) wheat-soybean meal, basal diet; T2) T1+1.5% seaweed; T3) T1+3.0% seaweed; and T4) T1+4.5% seaweed. Litters were standardized to eight piglets

and milk production was estimated at 6, 13, 20, and 27 d by the double-weight method; milk protein concentration was determined at 13 and 27 d. Piglet weights at weaning and daily weight gain, sows milk production, and number of weaned piglets for treatments 1 to 4 were: 7.30, 7.22, 7.21, 7.01 kg; 201, 196, 196, 186 g/d; 5.98, 5.35, 5.75, 6.13 kg/d; 7.86, 7.71, 7.38, 7.87, respectively. Seaweed addition did not affect the analyzed variables. A linear effect was observed (P < 0.05) between productive variables (litter daily gain, milk production, sows feed intake) and days on lactation. The peak of milk production was observed between the third and fourth weeks of lactation. The litter weight gain and feed intake were highest in the fourth week. These results suggest that seaweed addition to lactating sow diets does not affect productive and reproductive performance of lactating sows and their litters.

Key Words: Sows, Lactation, Seaweed

W77 The importance of dietary selenium on antioxidant status and hormonal profile in post-pubertal gilts. M.-É. Fortier*¹, H. Quesnel², A. Giguère³, J.-F. Bilodeau¹, J.-P. Laforest¹, and J. J. Matte³, ¹Université Laval, Quebec, Canada, ²Institut de la Recherche Agronomique, St. Gilles, France, ³Agriculture and Agri-Food Canada, Lennoxville, Quebec, Canada.

This project aimed to determine the effect of selenium (Se) as inorganic Na-selenite (MSe) or organic Se-yeast (OSe) on antioxidant status and hormonal profile, after puberty and in early gestation of gilts. Forty-nine gilts were allocated to one of the 3 feeding treatments at first estrus: control (C: basal diet (Se=0.2 ppm) without added Se) (n=16), MSe (C+0.3 ppm Se) (n=16) and OSe (C+0.3 ppm Se) (n=17). Treatments started at the day after the first pubertal estrus and lasted up to 30 d post-AI (AI at the fourth estrus). Blood was collected from all gilts on the day after each estrus and on d 30 post-AI. Blood was also collected daily from d -4 until d +4 of the third onset of estrus (d 0) in 8 C, 9 MSe and 8 OSe canulated gilts. Blood Se was lower (P<0.01) in C than in Se groups and higher in OSe than in MSe (P<0.01) (C:249±6, MSe:273±6 and OSe:316±8 µg/L on d 30 post-AI). Blood Se-GSH-Px tended to be lower (P<0.06) in C than in Se groups starting at third estrus and was higher (P<0.01) in MSe than in OSe starting at AI (C:2078±74, MSe:2594±84 and OSe:2392±105 mU/mg hemoglobin on d 30 post-AI). Plasma T3, a Se-related hormone, was not altered by treatments (P>0.12) prior to AI but, during gestation, T3 decreased markedly (P<0.03), values for MSe being lower (P<0.02) than for OSe on d 30 of gestation (C:90±2, MSe:79±5 and OSe:94±3 ng/100mL). In canulated gilts, plasma FSH was lower (P<0.04) for MSe than for C on d +2 and d +3. On d +4, FSH (C:0.88±0.12, MSe:0.94±0.19 and OSe:1.27±0.20 ng/mL) and T3 (C:88±12, MSe:75±7 and OSe:97±16 ng/100mL) values became higher (FSH, P<0.05) or tended to be higher (T3, P<0.07) for OSe than MSe. There was no treatment effect (P>0.10) on the profile of LH or E2 during the third estrus. In summary, the Se status response to dietary Se was not reflected on Se-GSH-Px which responded to Se supplements but, in a different way, to the type of Se supplements. Taking into account the role of T3 in FSH synthesis, the FSH and T3 effects after estrus merit

further investigation as well as the T3 response to OSe vs MSe during gestation.

Key Words: Selenium, Post-Puberty, Gilts

W78 The effect of mannan oligosaccharides on reproductive performance in sows. P. Medel*¹, C. Piñero², A. Kocher³, F. Baucells¹, and M. I. Gracia¹, ¹*Imasde Agropecuaria, S.L., Spain*, ²*PigChamp Pro Europa, Spain*, ³*Alltech Inc, Ireland*.

This study was conducted to determine the effect of including mannan oligosaccharides (MOS, Bio-Mos[®]) in diets fed to gestating and lactating sows on their productivity. A total of 80 gestating sows (Landrace × Large White), selected two weeks before the expected farrowing, were randomly allotted to one of two treatment groups taking into account their parity number. The two treatments were as follows: 1) basal diet (control), 2) basal diet with a source of MOS at 2 g/kg in gestation and 1 g/kg in lactating diets. Diets were formulated to contain 18.5% CP and 2.4 Mcal NE/kg. During lactation, all sows were allowed ad libitum access to their treatment diets. Feeding the experimental diets began two weeks before farrowing and continued until weaning of piglets. Sow BW was measured at 107 d of gestation and at weaning. Backfat depth was measured using ultra sound 24 h and 14 d after farrowing, and at weaning. ADFI was recorded daily. Pigs were weighed 24 h after birth and at weaning. Number of piglets born alive, pre-wean mortality and ADG were recorded. Sow weight change, backfat depth change, and ADFI did not differ between treatments (P>0.05). Also, the number of pigs born (11.2 vs 11.9) and pre-wean mortality (1.00 vs 0.88) did not differ between control and MOS supplemented sows (P>0.05). However, piglet birth (1.54 vs 1.70 kg) and weaning weights (6.52 vs 7.12 kg) were 0.16 and 0.60 kg heavier, respectively (P<0.05) for MOS supplemented sows when compared to control sows. These data suggest that MOS supplementation of sow diets during the end of gestation and lactation increases both piglet birth and weaning weights.

Key Words: Mannan Oligosaccharides, Birth and Weaning Weight, Lactating Sows

W80 The Effect of Distillers Dried Grains with Solubles as the Protein Source in a Creep Feed. P. Lancaster, J. Williams*, J. Corners, L. Thompson, D. McNamara, and M. Ellersieck, *University of Missouri, Columbia*.

A study was conducted to evaluate the effect of Corn Distillers dried grains with solubles (D) vs. soybean meal (S) as a protein source in a creep feed over 2 years. In yr 1 and 2, thirty-six steer calves (avg. 159.9 kg + 26.9 in yr 1; 184 kg + 12.7 in yr 2) were used to compare the effects of D and S on the performance of calves to traditionally weaned (C) calves prior to (68 d) and after weaning (112 d). Steers were randomly allotted by age to 6 endophyte-free tall fescue pastures in yr 1 and blocked by age within sire and randomly assigned to 3 of the same pastures in yr 2. The dietary supplements consisted of a cracked corn / soyhull mix with the protein source and were formulated to contain 14.2 % CP and 1.39 Mcal/kg of NEg. In both years, steers were placed in open drylots upon weaning and adjusted to a receiving diet of cracked corn, soyhulls, and fescue hay with D and S treatments continued, while the C treatment received S as the protein source. After 112 d, steers were placed on a common urea based finishing diet. In yr 1 and 2, creep-fed calves had greater (P < .01) ADG than non-creep-fed calves during pasture phase (1.03 vs. 0.72 and 1.03 vs. .88 kg/d for year 1 and 2, respectively). In yr 1, the feed / extra gain was similar among treatments, while cost / kg of extra gain for D was lower (P < .05) than S (0.88vs.1.89, respectively). Weaning weight was greater (P < .05) for creep-fed than non-creep-fed calves (231.0 vs. 206.6 kg, respectively). There was a trend for creep-fed steers to have a greater (P = .09) ADG than non-creep-fed steers during the feedlot phase (1.66 vs. 1.57 kg/d, respectively). Creep-fed steers had greater (P < .05) final and hot carcass weights than non-creep-fed steers (537.2 vs. 496.7 and 329.2 vs. 300.0 kg for final and carcass weights, respectively). In yr 2,

W79 The influence of feed intake during mid-gestation on performance of pregnant sows and progeny growth: a preliminary study. A. Cerisuelo¹, R. Sala¹, J. Coma², D. Carrión*³, J. Gasa¹, and M. Baucells¹, ¹*Universitat Autònoma de Barcelona, Spain*, ²*Agrocesa, S.A., Spain*, ³*PIC España, S.A., Spain*.

The effect of increased feed intake during mid-gestation (secondary fiber hyperplasia period) on sow performance and progeny growth was studied. A total of 101 pregnant sows of different parity were assigned to two dietary treatments: Control, C (n=48) were fed at a level routinely used on commercial farms (3.16 kg d⁻¹) and Experimental, E (n=53) received 1.75 times C from d 50-85 of gestation. Body weight was recorded at d 45 of gestation, at 48 ± 24h post-partum and at weaning. Backfat thickness at P2 was determined on d 45, 84 and 110 of gestation and on d 18 of lactation. Increases in P2 from d 45-80 of gestation were higher (P<0.05) in E sows. Moreover body weight losses in lactation period were lower in E sows (P<0.10), while decreases in P2 were similar between treatments. Average piglet weight when weaned at about d 23 was not affected by treatment (P>0.05). Castrated males (n=460) were used for a post-weaning study. Animals were divided by treatment (C vs E) into five weight groups each and daily gains were recorded for six weeks postweaning. Growth rate of E group was greater than that of the C group being statistical significant from day 30 post-weaning (Table 1). The greatest differences in growth rate were observed in the lightest groups of pigs. Results suggest that increasing sow feed intake during mid-gestation may improve postnatal growth rate of piglets. More studies are needed in order to check the long term influence in sow performance.

Body weight throughout the weaning period.

Days post-weaning	Body weight, kg		Treatment dif., g/pig	P-value
	Control	Exp.		
0	6.5	6.5	0	NS
14	7.8	8.0	-189	0.12
22	9.9	10.2	-253	0.11
30	13.5	14.1	-580	0.015
42	19.9	20.6	-722	0.014

Key Words: Sow Performance, Growth, Maternal Nutrition

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DMI, feed / extra gain, and cost / kg of extra gain were similar but total feed costs were lower (P < .01) for D than S during the pasture phase (13.88vs.18.31, respectively). Final performance and carcass data for yr 2 will be presented later. In conclusion, protein source had no effect on ADG, however DDGS reduced feed costs.

Key Words: DDGS, Creep Feeding, Rumen Undegradable Protein

W81 Effects of sire marbling EPD and creep feeding on feedlot performance and carcass characteristics of Hereford calves. J. E. Rossi*¹, T. D. Pringle², and J. K. Bertrand², ¹*University of Georgia, Tifton*, ²*University of Georgia, Athens*.

Five-month old nursing Hereford calves (forty-six heifers and forty-one steers; initial BW = 166.6 ± 4.4 kg) were used to determine the effects of sire marbling EPD and creep feeding on feedlot performance and carcass characteristics. Treatments were arranged in a 2 × 2 factorial with factors being sire marbling EPD (high +2.8 or low -2.3) and creep or no creep feeding. Cows and calves were allotted to 8 fescue/bermudagrass mixed pastures with 2 pastures per treatment. Heifers and steers were evenly allotted among pastures within each sire marbling group. Calves were creep fed a 50:50 mixture of ground corn and corn gluten feed for 90 days. All calves were then commingled into a single group and pre-conditioned for 45 days prior to finishing on a 90% concentrate diet. Heifers were fed 169 days and steers were fed 183 days. Calves that were creep fed consumed 2.45 kg (DM basis) of creep feed per day. Daily gains during the creep feeding period were greater (P < 0.01) for calves that were creep fed (1.26 kg/d) versus not creep fed (0.95 kg/d). Daily gains during the creep feeding period were not affected (P = 0.37) by sire marbling EPD. Feedlot ADG was not affected (P > 0.38) by creep feeding or sire marbling EPD. Carcass marbling scores were 10% greater (p =