The objectives of this study were to assess (1) the effect of diet dilution with
grass-meal and (2) the effect of supplemental antioxidant on pig performance. Pigs (n = 1080) from Duroc (D) or Landrace (L) boars mated to crossbred sows were weaned (mean 26 d; 8.2kg), into same-breed, single-sex groups of 15 (n = 72). At 21 days post-weaning, pigs were allocated to random to the following treatments: (1) High density diets (HD) to slaughter, (2) Diets with grass-meal (GM) to slaughter, (3) Diets with GM to 50% followed by HD, (4) Diets with GM to 80% followed by HD. (5) Diets with GM to 80% followed by a vitamin E enriched (200 mg alpha-tocopherol/kg diet) diet with 50g/kg of 00-rapeseed oil, (6) As 5 with tea extract instead of alpha-tocopherol. Pigs were slaughtered at approximately 105kg liveweight. Interaction effects were not significant. Males were more efficient than females (G:F: 0.41 v. 0.38; P < 0.01) but had similar growth rates. Pigs from L boars grew at the same rate (707 v. 694g/d; NS) but more efficiently (G:F:0.39 v. 0.38; P < 0.01) from weaning to slaughter and had leaner carcasses than pigs from Duroc sires (596 v. 592 g/kg; P < 0.01). Feeding GM depressed pig performance (growth rate and G:F). Growth rates from wean-
ing to slaughter were 730, 675, 710, 686, 698 and 704g/d; P < 0.05 for treat-
ments 1 to 6 respectively while G:F values were 0.41, 0.36, 0.40, 0.37, 0.38 and
0.39; P < 0.01. Supplementation of the diet in the final stages of finishing with
vitamin E or tea extract had little effect on pig performance.

Key Words: Grass Meal, Fiber, Antioxidant

A study was conducted to evaluate the impacts of feeding full-fat extruded low-
phytate (LP) soybeans on performance and P excretions from growing swine. Ninety-six crossbred barrows (initial BW = 18 kg, end BW = 70 kg) were allo-
cated to 24 pens and fed one of four treatment diets: normal phytate soybeans
without supplemental phytase (NP-np), normal phytase soybeans plus 500 FTU
kg-1 phytase (Ronozyme P (CT) 2500; DSM Nutritional Products; Basel, Swit-
zerland; NP-p), LP soybeans (USDA-ARS line CX1834-1) without supplemen-
tal phytase (LP-np) and LP soybeans plus phytase (LP-p). Four feeding phases
occurred that were 2, 3, and 2 wk in duration. All diets within a feeding phase
were formulated to be isocaloric, isonitrogenous and similar in non-phytate phos-
phorus content; allowing P content to vary. Non-phytin P content was 0.45, 0.36,
0.32 and 0.32% for phase 1-4, respectively. Pigs were randomly assigned to
treatments at the start of each feeding phase. Individual pig weights and pen
feeder samples were collected and feed disappearance recorded weekly. No phy-
tase inclusion nor soybean source effects were observed for pen ADG, ADFI and
F:G. Apparent digestibility of DM and OM were not different among treatment
groups. Apparent digestibility of P was greater when pigs were offered diets
containing the LP soybeans (49.1% vs. 42.3%; P<0.0001) and less when diets
included phytase (44.1% vs. 47.3%; P<0.0001). Total P (TP) and water-soluble
P (WSP) excreted were affected by diet (TP: 19.7, 18.1, 16.7, 13.9 g kg-1; P<
0.0001 and WSP: 10.9, 10.2, 8.9, 8.2 g kg-1; P<0.0001 for NP-np, NP-p, LP-
np, and LP-p diets, respectively). Inclusion of phytase decreased TP and WSP excreted (P<0.0001) as did use of LP soybeans (P<0.0001). Diet effects on the frac-
tion of excreted TP that was WSP were observed (P<0.0001) however, source
of soybeans did not result in a significant difference (57%; P>0.10). However,
inclusion of exogenous phytase in diets did increase the proportion of TP that
was excreted as WSP (59% vs. 55%; P>0.0001 for diets with and without phytase,
respectively). The findings suggest that there is a viable need for LP soybeans to
minimize farm environmental impact.

Key Words: Swine, Low-Phytate, Phosphorus

530 Evaluation of low-phytate soybeans on swine performance and

531 Sexual behaviors in boars treated with an inhibitor of prostaglan-
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Previous work from our laboratory demonstrated that a single i.m. injection of
PG (Lutalyse; Pfizer Inc., New York, NY) acutely enhanced sexual behaviors in
boars via some undetermined mechanism. The objective of this experiment was
to test the hypothesis that an acute, endogenous increase in PG synthesis and re-
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to test the hypothesis that an acute, endogenous increase in PG synthesis and re-
sents.
534 Dairy nutritionist survey on forage carbohydrate analysis: Implications for methodology application. L. Chase*, M. Raeth-Knight, J. Linn, and W. Mahanna, Cornell University, Ithaca, NY; University of Minnesota, St. Paul; Pioneer Hi-Bred International, Des Moines, IA.

A survey of field dairy nutritionists was conducted to assess their current use of carbohydrate analysis in feed programming. This survey was specific to NDFD (NDF digestibility), starch and sugar analyses. The information in this abstract is based on about 200 returned surveys. NDFD analysis was never used by 14% of the respondents. Occasional use of NDFD was reported by 52% of respondents and routine use by 53%. Corn silage and haycrop silages were the primary forages analyzed for NDFD (>90% of survey responses). Analytical methods used to obtain NDFD values were wet chemistry (26%), NIR (14%) or both (54%); however, preferences of analytical method for NDFD were wet chemistry (50%), NIR (16%) or no preference (34%). The analytical time points used to determine NDFD were 24 hours (29%), 30 hours (40%) and 48 hours (36%). Respondents indicated a preference for 24 hours (49%) followed by 30 hours (39%) and 48 hours (12%). The most common uses of NDFD results were to make crop feeding decisions (50%), to adjust fiber digestion rates in models (49%) and to compare against similar forages in previous years (46%). The use of a certified lab was indicated as important by 85% of the respondents. The use of either NFC or NSC in ration formulation was indicated by 91% of the respondents. Over half of the respondents (54%) indicated that an NFC (or NSC) value was as good as individual starch or sugar values for ration formulation. Over half of the respondents (54%); however, preferences of analytical method for NDFD were wet chemistry (50%), NIR (16%) or no preference (34%). The analytical time points used to determine NDFD were 24 hours (29%), 30 hours (40%) and 48 hours (36%). Respondents indicated a preference for 24 hours (49%) followed by 30 hours (39%) and 48 hours (12%). The most common uses of NDFD results were to make crop feeding decisions (50%), to adjust fiber digestion rates in models (49%) and to compare against similar forages in previous years (46%). The use of a certified lab was indicated as important by 85% of the respondents. The use of either NFC or NSC in ration formulation was indicated by 91% of the respondents. Over half of the respondents (54%) indicated that an NFC (or NSC) value was as good as individual starch or sugar values for ration formulation. The results of this survey have significant implications for forage testing labs. There is a strong preference that forage labs be certified. There are also preferences for the use of wet chemistry methods to obtain NDFD values. This will require forage labs to obtain better standardization of NDFD analytical procedures and measurement time points. These results also indicate that additional education is needed regarding the applicability of NIR for NDFD analysis.

Key Words: NDFD, Forage Analysis, NIR

535 Starches and sugars: conceptual and analytical challenges. M. B. Hall*, U. S. Dairy Forage Research Center, USDA-ARS, Madison, WI.

For use in diet formulation, partitioning of carbohydrates should reflect differences in digestion and fermentation characteristics and effects on animal performance. Indices of digestibility would be useful. Partitioning of NFC has been problematic in terms of designating fractions based upon nutritional characteritics, and selecting analytical methods to separate them. The relative dearth of information on digestion characteristics of various NFC and their interactions in diets means that fractions will not soon be perfectly established. Starch and sugars are fractions for which there is some consensus. Native starch is an α-(1-4)-linked glucan with α-(1-6) linked branch points. In feedstuffs, it can be analyzed by specific enzymatic hydrolysis and detection of glucose, or by polarimetry, though sugars can interfere with both analyses. Key challenges with starch analysis include reliability of estimates (varies by lab and method) and description of digestibility; the latter is greatly affected by processing and source. “Sugars” are an ill-defined fraction. They may include mono-, di-, and oligosaccharides (80% ethanol- and water-soluble) and water-soluble polysaccharides such as fructans. The nutritional equivalence of fructans, sucrose, glucose, and fructose has not been well explored. Resolution is needed as to which carbohydrates comprise sugars before a definitive analytical method can be chosen. Another challenge when dealing with carbohydrates that vary greatly in molecular weight is the basis on which to express them to reflect their value to animal and microbes. The greater the degree of polymerization, the greater the proportional content of hexose after accounting for water incorporated for hydrolysis. For example, 1 kg of glucose (monosaccharide) = 1 kg of hexose, whereas 1 kg of sucrose (disaccharide) or starch (polysaccharide) yield 1.05 and 1.11 kg of hexoses released upon hydrolysis, respectively. Expressing carbohydrates on a hexose basis would seem to be more reflective of equivalence than is current practice. Improved methods and nutritionally relevant definitions will improve the utility of these carbohydrate fractions in ruminant nutrition.

Key Words: Sugar, Starch, Analysis

536 Applying starch and sugar analyses in dairy nutrition. S. Emanuele*, Land O’ Lakes Inc., Caledonia, NY.

The objective is to review why and how starch and sugar analyses are used in routine dairy ration formulation. If one balances dairy diets based on crude protein, NDF and NEI concentration, it is not necessary to analyze feeds for starch and sugar. It has become necessary to utilize these analyses because of the adoption of a metabolizable energy and protein system for balancing dairy diets. Published research indicates that the metabolizable energy and protein yield of a specific diet is influenced by the fermentation of carbohydrates. When feeds are analyzed for starch and sugar we observe the following: 1. Starch and sugar content of corn silage are highly variable and influenced by variety, grow-