327 Effect of pasteurization of potato slurry in corn or barley finishing diets for beef cattle. J. I. Szasz*[1], C. W. Hunt[1], O. A. Turgeon[2], and P. A. Szasz*[1], [1]*University of Idaho, Moscow,* [2]*Koers-Turgeon Consulting Service, Inc., Amarillo, TX.*

Pasteurization of vegetable byproducts, such as potato slurry (PS), may be necessary to prevent spread of pathogens and beef carcass blemishes. We hypothesized pasteurization would increase ruminal fermentablility of PS. Four ruminally cannulated crossbred beef steers were used in a 4 x 4 Latin square experiment with a 2 x 2 factorial arrangement of treatments to examine the main effects and interactions of PS pasteurization (54.4o C for 2 h) and grain type (GT; dry rolled barley or corn) on ruminal and total tract digestion. Diets contained 7% alfalfa hay and 14% PS (DM basis) and were fed ad libitum three times daily. Corn-containing diets had 71.7% corn while barley diets had 60% barley and 11.7% corn. Acid detergent insoluble ash was used as an internal digestibility marker. Steers fed barley diets had greater ($P < 0.05$) intake but lower ($P < 0.05$) total tract digestibility of DM, OM, and ADF than steers fed corn diets. Treatment differences were not observed for starch digestibility. Ruminal fluid pH was lower ($P < 0.05$) for pasteurized compared with non-pasteurized PS treatments, and was lower ($P < 0.05$) for corn compared with barley treatments at 0200 and 2100 sample times. Ruminal fluid pH was lower at 0200, 1400, 2100, and 2300 sample times for the corn plus pasteurized PS treatment compared with other treatments (sampling time x PS x GT interaction, $P < 0.05$). Minimum ruminal pH was lower ($P = 0.07$) for pasteurized than non-pasteurized PS diets. Maximum ruminal pH was greater ($P < 0.05$) for barley than corn diets. Steers consuming corn diets had less ($P = 0.06$) time with ruminal pH less than 6.0 than barley diets. Ruminal fluid ammonia concentration was greater ($P < 0.05$) for non-pasteurized than pasteurized PS treatments and for corn than barley treatments. Pasteurizing PS increased ruminal fermentation but was generally not interactive with GT. Also, the effect of pasteurization of PS on ruminal fermentation did not impact total tract digestion.

Key Words: Feedlot, Byproduct, Fermentation

328 Replacing corn or barley with potato processing by-product in beef finishing diets improves feed conversion efficiency and alters carcass fat distribution. J. Duynisveld*[1], E. Charmley[1], I. Mandell[2], and J. Aalhus[3], [1]*Agriculture and Agri-Food Canada, Nappan, NS, Canada,* [2]*University of Guelph, Guelph, ON, Canada,* [3]*Agriculture and Agri-Food Canada, Lacombe, AB, Canada.*

The effects of replacing corn or barley in beef finishing diets with potato processing by-product (PPB) on beef cattle performance, feed conversion efficiency, carcass traits and meat quality were examined using 100 cross-bred British x exotic steers. The PPB comprised steamed potato peel and cull potatoes, cull French fries and potato starch. Ten pens of 10 steers each were assigned to one of five concentrate-grass silage diets comprised on a dry matter (DM) basis of 80% concentrate and 20 % silage. The five concentrates comprised either, all barley, all corn, equal parts barley and PPB (DM basis), equal parts corn and PPB (DM basis) or all PPB. Cattle were supplemented with 500 IU d^{-1} alpha-tocopherol. Results were analyzed using mixed models procedure, examining linear and quadratic responses when PPB was substituted in barley- or corn-based concentrates. Linear declines ($P<0.05$) in dry matter intake (kg and % body weight basis) were present when PPB was substituted into either corn or barley-based concentrates. The replacement of corn with PPB did not affect ($P>0.05$) average daily gain (ADG; 1.4 kg d^{-1}), but there was a negative quadratic effect ($P<0.05$) on ADG when PPB replaced barley. The replacement of corn or barley with PPB improved ($P<0.05$) feed conversion efficiency, with a linear effect ($P<0.05$) on feed efficiency as corn was replaced with PPB. In both barley- and corn-based diets, PPB substitution improved feed conversion efficiency ($P<0.05$). Marbling scores tended to decline linearly ($P<0.10$) with increased PPB in both corn and barley groups. Back fat thickness increased ($P<0.10$) in corn-fed cattle with PPB substitution. In barley-based diets back fat thickness was unaffected but there were quadratic effects of PPB on dissected lean muscle and intermuscular fat, suggesting that inclusion of 50% PPB resulted in fatter carcasses

Key Words: Beef, Potato, Carcass

329 Corn milling byproducts and alfalfa levels in cattle finishing diets. P. L Loza*, K. J Vander Pol, G. E Erickson, R. A Stock, and T. J Klopfenstein, *University of Nebraska, Lincoln.*

ABSTRACT: An experiment was performed with the objective of evaluating the performance of beef steers on diets consisting of increasing levels of corn milling by-products (BP) (50% wet corn gluten feed, 50%wet distillers grains; DM basis) and different alfalfa hay levels. 280 yearling steers (370 kg BW) were blocked (3 blocks) by weight, stratified within block and assigned to 35 pens (8 steers/pen). Pens were assigned randomly to one of seven treatments (5 pens total/treatment) in a 3 x 2 plus 1 experimental design. Treatments consisted of a control diet (0%BP, 7.5% alfalfa) and three BP levels at 25%, 50% and 75% diet DM, in combination with two levels of alfalfa. Alfalfa level was kept constant at 7.5% of DM or formulated for equal eNDF of control, i.e., 7.5, 5.0, 2.5, and 0% alfalfa for the 0, 25, 50, and 75% BP, respectively. Steers were fed for an average of 113 d and harvested at a commercial abattoir. Interactions were only observed between BP and Alfalfa level ($P<0.05$) for marbling and YG. Quadratic responses ($P<0.05$) to the BP level (0, 25, 50, and 75%BP, respectively) were observed for DMI (11.1, 12.0, 11.7, and 10.6 kg DM/d), ADG (1.81, 2.10, 2.07, and 1.77 kg/d), and G:F (0.162, 0.177, 0.176, and 0.167). Improved feedlot performance was observed at the 25 and 50% BP levels, without significant ($P<0.05$) differences between 25 and 50% BP inclusion. These results suggest that the BP utilization in feedlot diets up to 50% will enhance production performance.

Key Words: Cattle Feeding, Distillers Grains, Maize Byproducts

330 Effect of corn bran and steep inclusion in finishing diets on performance and nitrogen balance of open dirt feedlots. K. M. Sayer*, G. E. Erickson, T. J. Klopfenstein, C. N. Macken, and K. J. Vander Pol, *University of Nebraska, Lincoln.*

Two experiments using calves fed 167 d from November to April (WINTER) and yearlings fed 126 d from May to September (SUMMER) were fed to evaluate the effects of decreasing digestibility of a finishing diet by replacing dry rolled corn (DRC) with corn bran and steep, on performance and nitrogen (N) balance in open feedlots. Cattle were stratified by weight and assigned randomly to one of four treatments. Dietary treatments for both trials included Control (CON), 30% Corn Bran (30/0), 30%Corn Bran/15%Steep (30/15), and 45% Corn Bran/15% Steep (45/15) with byproducts replacing DRC in the diet (DM basis). WINTER calves were implanted with Synovex-S and re-implanted with Revalor-S, and SUMMER yearlings were implanted with Revalor-S on d 21. Pens were cleaned four times in WINTER and three times during SUMMER, across all treatments. WINTER cattle on CON tended to eat less than cattle on byproduct diets (10.5 kg/d vs. 11.1kg/d, $P = 0.06$), however no differences in final weight (600kg) or feed efficiency (0.157) were detected ($P > 0.05$). SUMMER cattle were also not different in final weight (604 kg, $P > 0.05$) however, CON yearlings had lower DMI then those on the byproduct diets (10.9 kg/d vs. 11.6 kg/d, $P<0.01$) and cattle on 30/0 were less efficient than other treatments (0.135 vs. 0.144, $P = 0.05$). WINTER percent N losses from the pen floor surface were 63.9%, 50.7%, 51.9%, and 35.8% for CON, 30/0, 30/15, and 45/15, respectively, ($P = 0.01$). SUMMER percent N loss of total N excreted was not different ($P > 0.05$) across treatments (averaging 60.1%) however, more N was removed in the manure from byproduct pens than CON pens (13.3kg N/hd vs. 10.1kg N/hd, $P = 0.01$). Adding steep with bran negates any negative impacts on animal performance while still reducing N losses from feedlot pens and increasing manure N removal. Byproduct diets may prove valuable in increasing N removed in manure and lowering percent N lost from the pen floor surface.

Key Words: Maize Byproducts, Nitrogen, Nutrient Management

331 Timing of flax supplementation for finishing cattle. E. J. Good*, J. S. Drouillard, T. J. Kessen, E. R. Loe, M. J. Sulpizio, M. A. Greenquist, S. P. Montgomery, J. J. Sindt, B. E. Depenbusch, and K. A. Hachmeister, *Kansas State University, Manhattan.*

An experiment was conducted with finishing beef heifers (n=80; 365 kg initial BW) to determine the optimal time and duration for supplementation of ground flaxseed (0 or 5% of DM). Treatment periods included:

0% flax fed for 109 d (AllControl), 5% flax fed for 109 d (AllFlax), 5% flax fed for 60 d followed by 0% flax fed for 49 d (FlaxEarly), and 0% flax fed for 60 d followed by 5% flax fed for 49 d (FlaxLate). At the end of the finishing period, hot carcass weight, USDA yield and quality grades, marbling score, subcutaneous fat thickness, longissimus muscle area, and percentage of kidney, pelvic and heart fat (KPH), were determined for each animal. Retail display life, 2-thiobarbituric acid reactive substances (TBARS), fatty acid composition, tissue vitamin E concentration, and sensory attributes of longissimus steaks also were evaluated. FlaxEarly increased ADG ($P< 0.05$) compared with AllFlax or FlaxLate, but neither DMI nor gain:feed were affected. Feeding FlaxEarly increased fat over the 12th rib ($P<0.05$), but there were no differences in KPH, USDA quality grade, or TBARS among any of the treatments. A trained sensory panel evaluated myofibrillar tenderness, juiciness, flavor intensity, connective tissue amount, overall tenderness and off-flavor intensity of steaks, but detected no differences among treatments. Moreover, there were no differences among treatments with respect to Warner-Bratzler sheer force, retail display life, or tissue vitamin E concentrations of longissimus steaks. Feeding flax increased ($P<0.05$) levels of α-linolenic acid in the longissimus dorsi both pre- and post cooking, as well as in plasma. The α-linolenic acid content of plasma from cattle fed FlaxEarly returned to levels similar to those of AllControl cattle in response to removal of flax from the diet after 60 d. Feeding ground flaxseed resulted in no negative effects on meat quality, and may be most beneficial during the early finishing phase.

Key Words: Flaxseed, Meat Quality, α-Linolenic Acid

332 Effects of forage level and corn processing method in beef finishing diets containing wet corn gluten feed on finishing steer performance.

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ABSTRACT: Sixty steer calves (398 kg BW) were individually fed for 101 d to evaluate two corn processing methods with two different levels of alfalfa (ALF) in finishing diets containing 25% wet corn gluten feed (DM basis). Steers were stratified by initial BW and assigned randomly to one of the four treatments in a 2 x 2 factorial design. Factors included corn processing as dry rolled (DRC) or reconstituted high-moisture corn (HMC), and ALF level of 0 or 7% of diet DM. No corn processing by ALF level interactions were observed ($P>0.05$), thus only main effects are discussed. Steers fed HMC had lower ($P<0.01$) DMI, lower ($P<0.01$) ADG, but similar gain efficiency (ADG:DMI) as steers fed DRC. Alfalfa level did not affect ADG. A trend ($P=0.14$) for an interaction between corn processing and alfalfa level was observed for ADG:DMI. The addition of ALF tended to decrease efficiency in the DRC diet, but ALF appeared to be beneficial in HMC diets, although not significant. In finishing diets containing wet corn gluten feed, the value of inclusion of forage such as alfalfa, may depend on corn processing method.

	DRC		HMC			<u/>	P Values	
	0% ALF	7% ALF	0% ALF	7% ALF	SEM	Corn* ALF	Corn	ALF
DMI	10.4	11.1	9.0	9.6	0.2	0.75	<0.01	0.01
ADG	1.71	1.68	1.36	1.47	0.05	0.31	<0.01	0.57
ADG:DMI	0.164	0.152	0.150	0.155	0.004	0.14	0.60	0.35

Key Words: Alfalfa, Maize Byproducts, Maize Processing

333 Using a dynamic ruminant model to understand the differences in performance of cattle fed rations based on barley and/or a potato processing-by-product.

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To assess the efficacy of barley Vs potato processing by-product, cattle were fed a background ration containing 31% barley and 60% silage for 85 days, and were finished for 79 days on a ration containing 18% forage and one of five combinations of rolled barley and potato (table). The observed feed conversion ratio (FCR) show a small but significant difference in favour of potato, however, the observed average intake and body weight (BW) gain decreased with increasing dietary content of potato. To understand these differences a mechanistic, dynamic ruminant model (AusBeef, supported by CSIRO) with a voluntary intake sub-model, was used to simulate the experiment. The different time trends in the periodic observations of body weight (BW) gain and intake in treatments 1 to 5 could only be explained by including an adaptation time when potato was introduced into the ration. An adaptation time proportional to the amount of potato in the finishing ration resulted in predictions that accounted for 95% and 75% of the observed variance in DM intake and FCR, respectively (table). The adaptation time in treatment 5 could be removed by replacing barley with potato in the background ration, in which case simulations (for 80% potato) predict an average BW gain of 1.86 kg/d, an average intake of 10.10 kg/d, and an FCR of 5.43. It is concluded that cattle should perform 10% better on potato by-product compared to barley (treatment 1).

Treatment	1	2	3	4	5	
Potato/barley (%DM)	0/80	20/60	40/40	60/20	80/0	SE
DM intake (kg/d)						
observed	10.56^{a}	10.77^{ab}	9.98^{b}	9.13^{c}	8.16^{d}	.31
predicted	10.82	10.68	9.80	9.47	8.70	
BW gain (kg/d)						
observed	1.67^{b}	1.69^{b}	1.86^{a}	1.52^{c}	1.57^{bc}	.058
predicted	1.80	1.85	1.80	1.72	1.66	
Feed/gain (FCR)						
observed	6.30^{a}	6.39^{a}	5.37^{b}	6.03^{a}	5.20^{b}	.18
predicted	6.02	5.76	5.44	5.51	5.25	

a,b,c,d Values in same row with different letter differ ($P<0.05$)

Key Words: Cattle, Potato, Adaptation

334 Digestion of pasture in response to fumarate in continuous culture.

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This experiment tested the hypothesis that addition of an organic acid (fumarate) would increase energy capture from a pasture diet during ruminal fermentation. Pasture was fermented with 0, 10, 20, or 30 mM of fumarate constantly infused into four dual-flow continuous culture fermenters. Samples of digesta and gas emissions were collected during the last 3 d of four, 9-day experimental periods, according to a 4 x 4 Latin square design. Digestion characteristics responded linearly ($P<0.05$) as fumarate increased from 0 to 30 mM. Concentrations of propionate and total volatile fatty acids increased by 74% and 19%, respectively as fumarate increased from 0 to 30 mM. Increasing fumarate reduced the ratio of acetate:propionate (2.4 v.s. 1.5) and reduced ($P=0.057$) methane production by 38%. These results were consistent with fumarate acting as an electron-accepting intermediary in the succinate-propionate pathway. Although 30 mM fumarate increased ruminal pH by 0.16 units compared to 0 mM fumarate (pH 6.23), the digestibility of neutral detergent fibre and acid detergent fibre was not changed. Concentration of lactate was low (0.12 ± 0.03 mM) and was not affected by fumarate supplementation. Fumarate did not influence nitrogen digestion, but true dry matter and organic matter digestibilities were reduced by 3.9 and 3.2 percentage units, respectively at 30 mM fumarate. The increased concentration of propionate appears to be a direct response to additional substrate (fumarate), rather than by an indirect improvement in lactate utilisation or fibre digestibility. The addition of fumarate increased energy capture from a pasture diet by improving the supply of glucogenic compounds and reducing losses to methane emissions.

Key Words: Fumarate, Pasture, Methane

335 Effect of gossypol from cottonseed meal consumption on performance of fallow does (*Dama dama*).

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The objectives of this study were to determine the effects of gossypol ingestion on reproductive function and productivity of female fallow deer (*Dama dama*) by measuring endocrine function, pregnancy rates, and BW of does and fawns. A group of multiparous fallow does were randomly allocated by BW into three treatments and placed on separate 0.809 ha Coastal bermuda grass pastures. Two bucks, fitted with marking harnesses, were housed with each doe group for the duration of the experiment. The treatments varied the amount of free gossypol (FG) in the diet. Animals were fed daily from 6/16/03 until 11/20/03.

The soybean meal group (SBMG; n = 17) was supplemented daily with 362 g of soybean meal (SBM)/animal. The low cottonseed meal group (CSML; n = 17) was supplemented with a mixture including 181 g of SBM and 227 g cottonseed meal (CSM; 0.09 % FG). The high cottonseed meal group (CSMH; n = 16) was supplemented with 454 g CSM/animal. The daily intake of FG/animal for SBMG, CSML, and CSMH was 0.0, 0.20, and 0.41 g, respectively. Beginning 8/14/03, BW, BCS, and serum blood samples were collected weekly, until 11/20/03. Ultrasonography, for pregnancy detection, was performed for all does on 11/20/03 and 12/15/03. The SBMG (-49.83±4.08 g/animal/d) lost less (P<.01) BW than CSML (-73.84±4.08 g/animal/d) or CSMH (-77.01±4.08 g/animal/d). Average daily BW loss did not differ (P>.1) between CSML and CSMH. Body condition score (5.36±0.09), pregnancy rates (100%), and time between weaning and conception did not differ (P>.1) among treatments. Doe serum progesterone concentrations were reduced (P<.05) in CSMH relative to SBMG and CSML. Among lactating does, BW and BCS at weaning was correlated (P<.01, R= -0.50 and P<.05, R= -0.41, respectively) with time between weaning and conception. Despite reductions in BW gains and serum progesterone concentrations, consumption of CSM (8.1 mg FG/kg BW; 0.41 g FG/animal/d) did not affect reproductive performance of fallow deer.

336 Soybean hulls for finishing meat goats. M. H. Poore*, J. A. Moore, A. T. Maye, and J.-M. Luginbuhl, *North Carolina State University*.

Soyhulls (SH) have been used at high levels in goat diets, but feeding method has not been studied. Twenty-four wethers, at least 75% Boer (21 kg), were allotted to 4 treatments (trt). All trt used orchardgrass hay (10.5 % CP and 65.9% NDF). Treatment 1 (hay) was 100% hay, trt 2 (HFcorn) was 33% hay and 67% hand-fed corn/SBM mix (12.5% CP and 11.0% NDF), trt 3 (HFSH) was 33% hay and 67% hand-fed SH (12.3% CP and 64.2% NDF), and trt 4 (FCSH) was hay at 0.75% of live wt with free choice SH. One goat on HFcorn was removed due to low intake. All goats were started slowly on concentrate (conc) with ad lib hay. Initially, loose SH were fed, but after the first wk most goats were refusing their SH, so they were changed on d 12 to a pelleted source which was acceptable to all goats. Once all goats began consuming their conc at 33% of diet DM, they were fed 50% conc for 3 d and then 67% conc for 3 d. Following that, trt 4 received SH free choice and hay intake was restricted. All goats were on final diets by d 28. Ruminal samples were taken by rumenocentesis 4 h after feeding on d 84, and goats were harvested on d 85. Contrasts determined were hay vs. the other 3 trt (C1), HFcorn vs. HFSH (C2), and HFSH vs. FCSH (C3). Due to differences in dressing %, final live wt was adjusted using carcass wt and the average dressing % for all trt to calculate ADG. The study showed that all conc trt outperformed hay, that HFcorn was similar to HFSH, and that there was little difference between HFSH and FCSH. Therefore, SH are a viable feed for finishing goats, and can be fed free-choice.

Item	Hay	HFcorn	HFSH	FCSH	SEM	C1*	C2*	C3*
DMI, g/d	557	685	764	709	25.5	.01	.05	.13
Carcass wt, kg	9.3	14.6	14.5	14.3	.44	.01	.88	.76
Loineye, sq cm	11.0	14.6	15.1	17.1	.81	.01	.28	.24
KPH, %	1.55	3.60	2.66	2.72	.34	.01	.08	.90
Dressing %	40.5	51.0	50.4	53.2	.85	.01	.65	.03
Adj ADG, g/d	-19.6	100.7	103.7	92.8	9.17	.01	.82	.40
Gain:feed	-.036	.145	.135	.130	.011	.01	.57	.77
Ruminal pH	6.37	5.94	6.08	6.23	.090	.01	.28	.24
Ruminal A:P	3.52	1.85	3.83	4.49	.210	.99	.01	.01

*P value for contrast

Key Words: Meat Goats, Soybean Hulls, Carcass

Ruminant Nutrition: Dairy - Protein & Amino Acids

337 Effects of parity and levels of protein on production response and n-balance in holsteins. S. A. Flis* and M. A. Wattiaux, *University of Wisconsin-Madison*.

Eight Holstein cows (4 primiparous and 4 multiparous) were used in a replicated 4x4 Latin Square to determine milk production response and N balance when diets had no excess of RUP or RDP (C), 10% RUP excess (U), 10% excess RDP (D), or 10% excess of both RUP and RDP (UD) according to NRC 2001. Solvent soybean meal and soyPLUSTM made up 6.6 and 5.1, 6.1 and 7.5, 11.8 and 1.2, or 11.3 and 4.1% for the C, U, D, and UD diets, respectively. Diets were fed as a TMR with 25% alfalfa silage, 25% corn silage (DM basis) and corn grain as the primary source of dietary starch. During each 21day period, milk yield and DMI were recorded daily, and in the last 3 days of each period fecal and urinary N (UN) excretion were determined from total collection. Dietary CP averaged 17, 18, 17.6, and 18.7% for the C, U, D, and UD diet, respectively. DMI, milk and protein yield were lower in primiparous than in multiparous cows (P < 0.05). N intake (NI) was 535 and 782 g/d for primiparous and multiparous cows, respectively (P < 0.01). Total milk N (TMN g/d), fecal N and UN were lower for primiparous than for multiparous cows (P < 0.01), but N balance did not differ with parity (P = 0.2). Highest DMI and NI were in diets with excess RUP (see Table). Milk yield was lower on diets with excess RDP (D and UD) (P < 0.05). Fecal N, UN, and N balance (data not shown) were higher in diets with excess RUP. N balance was positive for all treatments. Through the trial little change in BW was observed. Results indicated that greater efficiency of N utilization on farm could be obtained by balancing rations for first and later lactation cows separately.

	Treatment					P-Value		
	C	U	D	UD	SEM	D*	U**	UxD
DMI kg/d	22.7	24.4	21.1	23.6	0.9	0.07	<.01	0.57
NI g/d	618	707	596	712	24	0.62	<.01	0.46
Milk kg/d	38.8	40.6	37.4	38.6	1.2	0.04	0.06	0.71
Fat kg/d	1.28	1.42	1.35	1.22	0.08	0.25	0.89	0.02
%Fat	3.32	3.52	3.65	3.24	0.17	0.80	0.37	0.02
Prot kg/d	1.00	1.07	1.00	0.99	0.05	0.18	0.30	0.20
%Prot	2.59	2.66	2.68	2.61	0.11	0.76	0.97	0.14
TMN g/d	175	189	169	181	8.31	0.21	0.06	0.92
Fecal N g/d	209	232	190	208	10	<.01	<.01	0.68
UN g/d	194	213	202	223	7.35	0.26	0.02	0.88

*P-value for D and UD vs. U and C
**P-value for U and UD vs. D and C

Key Words: Nitrogen, N-Balance

338 Site of digestion in dairy cows fed different sources and amounts of crude protein. I. R. Ipharraguerre*[1], J. H. Clark[1], and D. E. Freeman[2], [1]*Department of Animal Sciences, University of Illinois, Urbana,* [2]*Department of Veterinary Clinical Medicine, University of Illinois, Urbana*.

Six multiparous Holstein cows cannulated in the rumen and duodenum that averaged 70 DIM were used in a 6x6 Latin square design with a 2x3 factorial arrangement of treatments. Two sources of CP (soybean meal (SBM) and a mixture of SBM and a commercial blend of high rumen-undergradable (RUP) CP sources) and three contents of dietary CP (about 14, 16, and 18%) were combined into six dietary treatments. Each source of CP supplied about 50% of the CP mixture used to formulate the high RUP diets. On DM basis, diets contained 25% corn silage, 20% alfalfa silage, 10% cottonseed, 26.7 to 37% corn grain, and 4 to 13.5% CP supplement. Diets were fed twice daily for ad libitum intake. Intakes of DM, OM, and NDF, and OM truly digested in the rumen were unaffected by treatments (P >.05; mean = 23.2, 21.7, 6.8, and 8.9 kg/d, respectively). As dietary CP increased from 14 to 18%, starch intake (8.0, 7.1, and 6.7 kg/d) and apparent ruminal (3.4, 2.8,