

and direct-fed microbials. These models typically address ruminal fermentation, and they yield useful results that, unfortunately, often differ from those observed for growth performance. Models have been developed to study both the adaptation of cattle to grain-based diets as well as the effects of management considerations on acidosis in cattle previously adapted to grain-based diets. Although these models have provided valuable information related to ruminal acidosis, many of the models have been inadequate for detecting responses to treatment due to inadequate replication (required to overcome the variable responses being studied), low feed intakes by the experimental cattle (which can limit the expression of acidosis), and the feeding of cattle individually (which reduces experimental variation but limits extrapolation of the

data to industry conditions). Treatment responses to a wide range of management and nutritional modulations are often explained on the basis of acidosis prevention (or stimulation), whether or not direct evidence of acidosis is available. Optimal model systems for assessing impacts of various management and nutritional strategies on ruminal acidosis will require technologies that allow feed intake patterns, ruminal conditions, and animal health and performance to be measured simultaneously in a large number of cattle managed under conditions similar to commercial feedyards. Data generated under these conditions could provide valuable insight into the true extent to which acidosis impacts cattle performance.

Key Words: Acidosis, Cattle, Rumen

Ruminant Nutrition: Non-fibrous Carbohydrate & By-Product Feedstuffs

216 Influence of endosperm vitreousness and kernel moisture at harvest on site and extent of digestion of high moisture corn by steers. J. Szasz*¹, C. Hunt¹, P. Szasz¹, R. Weber², F. Owens², and W. Kezar², ¹University of Idaho, Moscow, ²Pioneer Hi-Bred International, Johnston, IA.

Six ruminally and duodenally cannulated steers (mean BW 450 kg) were used in a 6 x 6 Latin square to evaluate the impact of kernel vitreousness and moisture on intake and digestibility of high moisture corn. Arranged in a 2 x 3 factorial, diets included a floury (FLO) and a vitreous (VIT) endosperm hybrid harvested at DRY, MID, and WET kernel moistures (28.1, 31.2, and 35.7%). High moisture corn was dry-rolled and allowed to ensile for at least 45 d. Diet DM consisted of 88% high moisture corn, 6% chopped alfalfa hay, 2.0% corn gluten meal, 0.75% urea, and 3.0% supplement. Geometric mean diameter was less ($P = 0.06$) for VIT than FLO and increased ($P < 0.05$) linearly with kernel moisture content. Surface area was greater ($P < 0.05$) for VIT versus FLO particles. In situ rapidly degraded starch (a fraction) and effective starch degradability (assuming 5%/h fractional passage rate) increased linearly ($P < 0.01$) with kernel moisture. An interaction ($P < 0.05$) was observed between kernel vitreousness and moisture for in situ rapidly degraded starch and effective starch degradability, both being greater ($P < 0.05$) for VIT-DRY than FLO-DRY. Intake and ruminal disappearance of DM, OM, and starch were not influenced by vitreousness or moisture. Ruminal starch digestion, averaging 90.9%, was not impacted by dietary treatment. Digestion of starch entering the small intestine, averaging 91.0%, was greater ($P < 0.05$) for VIT than FLO corn. Averaged across moisture levels, total tract starch digestibility was greater ($P < 0.003$) for VIT than FLO. Compared with FLO kernels, VIT kernels were more brittle and shattered more readily when rolled, particularly when DRY. The increased surface area of smaller particles may be responsible for the improved starch utilization. For processed high moisture corn, total tract starch digestibility was greater for the vitreous than the floury endosperm corn.

Key Words: Starch, Processing, Particle size

217 Influence of endosperm vitreousness, moisture at harvest, and microbial inoculant on chemical composition, available starch and ruminal dry matter disappearance of ensiled high moisture corn. J. Szasz*¹, C. Hunt¹, P. Szasz¹, R. Weber², F. Owens², and W. Kezar², ¹University of Idaho, Moscow, ²Pioneer Hi-Bred International, Johnston, IA.

Samples from two corn hybrids, one floury (FLO) and one vitreous (VIT) endosperm type, were harvested at DRY, MID, and WET

kernel moistures (28.1, 31.2, and 35.7 percent moisture, respectively). Samples of rolled high moisture corn from each endosperm by kernel moisture subclass were ensiled in triplicate, with or without a bacterial inoculant (Pioneer ® brand 1189), in polyethylene packets which were then vacuum packed, heat sealed, and stored for a minimum of 210 days. Compared to FLO, fermented VIT tended ($P = 0.10$) to have a lower pH but greater available (enzyme digested) starch, CP, NDF, and ash. Within DRY, protein solubility was greater ($P < 0.05$) for VIT than FLO. Ash content and 24-h in situ DM disappearance increased linearly ($P < 0.05$) with kernel moisture. Microbial inoculation tended ($P < 0.10$) to reduce pH, ash content, and available starch. Within FLO, microbial inoculant reduced ($P < 0.05$) concentration of CP. Microbial inoculant reduced ($P < 0.05$) ammonia N concentration for FLO-DRY, FLO-MID, and VIT-MID compared to non-inoculated high moisture corn. Microbial inoculant increased ($P < 0.05$) 24-h in situ DM disappearance for VIT corn harvested and ensiled DRY. For inoculated DRY corn, 24-h in situ DM disappearance was greater ($P < 0.05$) for VIT than FLO. In a companion study, VIT had smaller particle size than FLO, particularly for DRY treatments. Accordingly, the greater starch availability and soluble CP for VIT compared to FLO may have been due partly to smaller particle size and greater surface area. The beneficial response from the microbial inoculant for DRY-VIT also may be a result of application of the inoculant to smaller particle size corn characteristic of DRY-VIT compared with DRY-FLO.

Key Words: Processing, Particle size, In situ

218 Effects of feeding steam-rolled corn in lieu of dry-rolled corn on the odor of finishing beef steer manure. S. L. Archibeque*¹, D. N. Miller², D. B. Parker³, H. C. Freetly¹, and C. L. Ferrell¹, ¹USDA, ARS, U.S. Meat Animal Research Center, Clay Center, NE, ²USDA, ARS, Soil and Water Conservation Research Unit, Lincoln, NE, ³West Texas A&M University, Canyon.

Fecal starch is the major source of odorous compounds produced in the manure of steers fed typical finishing diets. We hypothesized that feeding steam-rolled corn (SR) in lieu of dry-rolled corn (DR) in finishing diets would increase starch digestibility and thus reduce odor production from manure. Eight steers (318 ± 15 kg) were used in a nutrient balance trial with a crossover design and fed either a DR- or SR-based finishing diet. Feces collected during the first day of each balance trial were analyzed for volatile organic compound emission and olfactometry by a trained sensory panel. There was no difference ($P = 0.96$) in starch intake between steers fed DR (4,293 g/d) or SR (4,283 g/d) diets, but fecal starch of steers fed SR (253 g/d) was lower ($P < 0.01$) than that of steers fed DR (490 g/d). Although N intake was

greater ($P < 0.01$) in steers fed DR (137 g/d) than those fed SR (110 g/d), there was no difference ($P = 0.99$) in retained N. Although starch concentrations of feces collected during the balance trial were different ($P < 0.01$), there was no difference ($P = 0.40$) in fecal starch concentration used for odor detection. There was no difference in odor intensity ($P = 0.28$), hedonic tone ($P = 0.29$), or total ionizable current (a measure of total organic volatilization, $P = 0.24$) of fresh feces from steers fed DR or SR. However, fecal odor of steers fed SR tended ($P = 0.09$) to have a higher panel detection threshold and a greater ($P = 0.03$) volatilization of branched chain VFA than that of steers fed DR. Total ionizable current was correlated to both odor intensity ($r = 0.56$, $P = 0.02$) and hedonic tone ($r = -0.52$, $P = 0.04$). Differences between the fecal starch concentrations during the balance trial and the odor assessment may have contributed to the lack of difference in odor detection.

Key Words: Odor, Beef cattle, Starch

219 Evaluation of dried distillers grains plus solubles compared to soybean hulls as a feedstuff for heifers during the last trimester of gestation. C. L. Engel*, H. H. Patterson, and G. A. Perry, *South Dakota State University, Brookings.*

Research has shown supplementation with undegradable intake protein (UIP) or fat during the first gestation can improve subsequent reproduction of young cows. Dried distillers grains plus solubles (DDGS) contain significant amounts of UIP and fat, and may be a good source of protein and energy for gestating heifers. The objective of this experiment was to evaluate the effects of DDGS or soybean hulls (SBH) on heifer and calf performance when incorporated into limit fed late gestation diets. Ninety-five crossbred, primiparous heifers were blocked by previous development, stratified by expected calving date (April 05), BW (507 ± 0.55 kg), BCS (5.91 ± 0.04), and randomly allotted to DDGS or SBH. Treatments consisted of 4.0 kg ground grass hay, 0.3 kg supplement, and either 3.3 kg SBH or 3.0 kg DDGS. Diets were formulated to meet nutrient requirements under thermo-neutral conditions at d 240 of gestation. Both diets were similar in NEM (11.8 Mcal/d) and were adequate in CP and degradable intake protein. Diets were fed from about d 190 of gestation until parturition. BW and BCS were measured at start of dietary treatments and just prior to parturition. Both DDGS and SBH heifers had positive BW gains, but DDGS heifers had a greater ($P < 0.01$) ADG compared to SBH heifers (0.84 ± 0.03 and 0.69 ± 0.03 kg, respectively). However, BCS was similar ($P = 0.29$) for DDGS (5.96 ± 0.07) and SBH (5.84 ± 0.07) just prior to parturition. Treatment had no effect on calving ease ($P = 1.0$) or calf vigor ($P = 0.46$). In addition, there were no differences between calves of DDGS and SBH treated heifers in birth weights ($P = 0.43$), weaning weights ($P = 0.66$), or ADG ($P = 0.89$) from birth to weaning. There was a tendency ($P = 0.11$) for more DDGS heifers to become pregnant during the breeding season compared to SBH heifers (92% vs 80%; respectively). In summary, heifers fed DDGS during late gestation had higher ADG compared to heifers fed SBH; with no effect on BCS or calf performance.

Key Words: DDGS, Soybean hulls, Gestation

220 Starch and digestible fiber supplementation to orchardgrass hay based programmed gain heifer diets. R. L. Mills*¹, J. C. Waller¹, J. Dowlen¹, and C. J. Richards², ¹*The University of Tennessee, Knoxville*, ²*Oklahoma State University, Stillwater.*

A 56-day randomized block design using twenty-four individually fed Angus heifers (293 ± 9 kg) in each of two years was conducted

to assess supplements containing varying combinations of fibrous and starch based energy feedstuffs. Heifers were limit fed to meet their metabolizable energy requirement (NRC, 2000) to achieve a programmed gain of 0.55 kg /d. Dietary treatments consisted of an orchardgrass hay control (CON) or orchardgrass hay plus supplement with the hay providing 60% and the supplement providing 40% of the daily energy requirement. Supplements, on a metabolizable energy basis, consisted of corn (C), soybean hulls (SH), 75% soybean hulls with 25% corn (75:25), 50% soybean hulls with 50% corn (50:50), and 25% soybean hulls with 75% corn (25:75). Heifers were fed once daily and orts were collected daily prior to feeding. Heifers were weighed on d 0, 1, 28, 55, and 56. Initial and final weights were an average of the two beginning and ending weights, respectively. Data were analyzed using the MIXED procedure in SAS with contrasts of CON versus supplemented (SUPP) and linear and quadratic effects of soybean hull inclusion. There were differences among treatments in total ADG and weight gain ($P = 0.01$). Among supplemented heifers, there was a linear increase with greater SH inclusion in the supplement ($P < 0.01$) with SH (0.47 kg/d and 26.14 kg, respectively) having the greatest gain and corn (0.27 kg/d and 15.08 kg, respectively) having the least gain. Total feed:gain efficiency results showed 75:25 (11.7:1) to be more efficient than the other supplements and corn to be least efficient (20.08:1; $P < 0.01$). When providing supplements to limit-fed, high-quality hay diets, minimizing the amount of the starch in the supplements increases animal performance and the efficiency of the diet.

Key Words: Cattle, Programmed gains, Soybean hulls

221 The effect of sample grinding on gas production profiles and end-products formation in expander processed barley and peas. A Azarfar*, A. F. B. van der Poel, and S Tamminga, *Wageningen University, Wageningen, The Netherlands.*

Grinding is a technological process widely applied in the feed manufacturing industry. It is also a prerequisite to obtain representative samples, necessary for laboratory procedures like for instance gas production analysis, an in vitro technique used to determine the degradative behaviour of feeds. Grinding feed samples prior to laboratory analyses is normally through a 1 mm screen. When feeds are subjected to technological processes other than grinding, like for instance extrusion, grinding afterwards may disturb the effect of processing, both in practice and when laboratory techniques are applied to study the effect of processing. Therefore, this study aimed to establish the possible effects of different types of the grinding and sample preparation on the degradative behaviour of expander processed barley and peas. In a 2×6 factorial arrangement of treatments with three replicates, samples of expander processed barley and peas were subjected to 6 different types of sample preparation (intact sample, slurry sample, samples stepwise ground over a 6 and 3 mm sieve, samples stepwise ground over a 6 and 1 mm sieve, samples ground over a 3 mm sieve and samples ground over a 1 mm sieve). Pattern of gas production in these samples were studied over a period of 72 hours incubation using an automated in vitro gas production system. The results showed that in raw and expanded peas stepwise grinding leads to a faster degradation. In expander processed barley, however, the difference in the degradation pattern due to the different grinding methods was small.

Key Words: Sample preparation, Gas production, Expander processing

222 Effects of corn germ on digestibility of hay and corn.

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New technologies in dry milling corn yield a corn germ (germ) fraction consisting of 91.3% DM, 15.3% CP, and 18% crude fat. Two experiments were conducted to evaluate effects of germ on dry matter disappearance (DMD) of forage and grain. In Exp. 1, 48 h IVDMD were conducted on diet substrates oat hay, corn and a blend diet (90% corn 10% oat hay). Two fermentation runs were conducted using these 3 diets. Germ additions to the blend diet replaced only corn. Run 1 evaluated germ inclusions of 0, 10, 20, and 30%. Run 2 evaluated germ inclusions of 0, 7, 14, 21, 28, and 42%. The oil layer was not removed with the liquid phase at the conclusion of in vitro fermentations. Combining Run 1 and 2 produced a quadratic response for IVDMD of oat hay ($P < 0.01$; $DMD = 49.5 - 0.31(\text{run}) - 0.37(\text{germ}) + 0.006(\text{germ})^2$; $R^2 = 0.60$). Depression of forage DMD was maximized at a germ inclusion of 31.4%. There was no response for IVDMD of corn suggesting corn and germ had equal digestibility. A linear decrease of IVDMD in the blend diet was detected ($P < 0.05$; $DMD = 77.6 - 2.47(\text{run}) - 0.07(\text{germ})$; $R^2 = 0.80$). In Exp. 2, 24 crossbred lambs ($BW = 41 \pm 2.6$ kg) were used in a randomized complete block design experiment (block=breed). Lambs were fed 1 of 4 isonitrogenous (12.3% CP) diets as a complete pellet. A basal diet of 10% beet pulp, 79% corn, and 8.5% soybean meal (SBM) was fed as the control. Germ was added to diets at levels of 10, 20, and 30%, replacing corn and SBM. Total fecal collections were performed for 6 d following a 21 d adaptation period. One lamb was removed from the 20% germ treatment ($n = 5$). The addition of germ caused a linear decrease in DMD ($P < 0.0001$; $DMD = 88.5 - 0.23(\text{germ})$; $r^2 = 0.70$). Based on these results, the addition of germ will cause a linear decrease the DMD of a concentrate diet and a quadratic decrease in the DMD of a roughage diet.

Key Words: Corn germ, Digestibility, Sheep

223 Corn Germ from ethanol production as an energy supplement

for lactating dairy cows. M. M. Abdelqader*¹, A. R. Hippen¹, D. J. Schingoethe¹, K. K. Kalscheur¹, K. Karges², and M. L. Gibson², ¹South Dakota State University, Brookings, ²Dakota Gold Research Association, Sioux Falls, SD.

Sixteen multiparous cows (12 Holstein and 4 Brown Swiss, 132 ± 36 days in milk) were used in a replicated 4×4 Latin square design with a 4-week periods to determine the effects of feeding corn germ on dairy cow performance. Diets were formulated with increasing concentrations of corn germ at 0, 7, 14, and 21% of the diet DM. All diets contained 55:45 forage to concentrate ratio, where forage was 60% corn silage and 40% alfalfa hay. Diets were formulated to be similar in CP (17.2%), NDF (30.8%), and ADF (19.2%). Dietary fat increased from 4.6% in the control diet to 8.3% at the highest inclusion rate of corn germ. The addition of corn germ had no effect ($P > 0.05$) on DMI (27.8, 28.4, 27.5, and 26.8 kg/d). Feeding increasing concentrations of corn germ caused yields of milk (36.8, 37.8, 38.3, and 36.7 kg/d) and energy-corrected milk (38.7, 40.4, 40.4, and 37.4 kg/d) to respond in a quadratic fashion ($P < 0.05$). Milk fat concentrations (3.73, 3.81, 3.77, and 3.53%) and yields (1.36, 1.45, 1.44, and 1.28 kg/d), also responded in a quadratic fashion ($P < 0.05$) to increased concentrations of corn germ in the diets. Furthermore, milk fat yield decreased ($P < 0.05$) when cows were fed the 21% corn germ diet compared with other dietary treatments. Milk protein content decreased linearly (3.44, 3.35, 3.33, and 3.33%; $P < 0.05$) as the concentration of corn germ increased in the diet; however, milk protein yield (1.26, 1.28, 1.27, and 1.23 kg/d) was not affected ($P > 0.05$). Dietary treatments

had no effect on feed efficiency, which averaged 1.44 kg ECM/kg DMI. Inclusion of corn germ at 7% and 14% of dietary dry matter resulted in increased milk and fat yields, however, inclusion of corn germ at 21% of diet DM decreased concentration and yield of milk fat. Germ removed from corn grain prior to ethanol production provides an alternative source of fat for energy in lactating dairy cows.

Key Words: Corn germ, Fat, Dairy cows

224 Effect of fatty acid treatment of different particle size of rolled corn and barley on dry matter digestion in rumen studied in-situ. G. Bustamante*^{1,2} and I. B. Mandell², ¹Universidad Autonoma de Ciudad Juarez, Ciudad Juarez, Chihuahua, Mexico, ²University of Guelph, Guelph, Ontario, Canada.

The objective was to evaluate the protection conferred to particles of cereals from ruminal degradation by covering them with Fatty Acids. Dry Matter disappearance (DM) was used to indicate the level of ruminal degradation. A $2 \times 3 \times 3$ was used, two grains:(G), three particle sizes (PS):small (s), medium(m) and large(l) and three levels of Fatty Acids:(FA) inclusions: 0%, 20% and 40%. Saturated FA was used. The average diameter of different particles was: (s)=0.85 mm, (m)=2.0 mm and (l)=2.81 mm. Nylon Bags, with 5 gr of sample were incubated 0, 4, 8, 12, 24 and 48 hr in rumen. After removal, bags were washed and freeze dried. DM disappearance with time was modeled using Marquardt-Levenberg algorithm to minimize the least squares and compared by orthogonal contrasts. Interactions (Tables 1,2 and 3) were found between G x PS and G x FA ($P < 0.05$). In Table 4, can be observed a tendency to reduce the rate of degradation by adding FA to different PS of both grains ($P > 0.05$).

Table 1. Fractions a, b and c of dry matter disappearance for interaction grain x particle size after ruminal incubation of corn and barley

Interaction	Fraction	Corn			Barley			Std. Error
		Particle Size			Particle Size			
		Small	Medium	Large	Small	Medium	Large	
G x PS	a	9.52	6.73	8.23	17.60	11.22	9.20	1.12
	b	88.27	90.73	88.60	61.31	65.70	66.58	1.39
	c	0.025	0.017	0.021	0.214	0.134	0.096	0.007
		Fatty Acid Concentration (%)						
		0 (%)	20 (%)	40 (%)	0 (%)	20 (%)	40 (%)	
G x FA	a	14.57	6.37	3.54	20.21	11.13	6.69	1.15
	b	82.12	89.03	96.45	70.51	69.63	53.44	1.420
	c	0.03	0.02	0.008	0.14	0.13	0.16	0.021

Fractions: a, soluble fraction; b, potentially digestible; and c, rate of degradation (h^{-1})

Key Words: Rumen, Digestion, Dry matter

225 Evaluating in vitro cell wall polysaccharide digestibility of high-fiber byproduct feeds and forages. J. Wakker*¹, H. G. Jung^{1,2}, and J. G. Linn¹, ¹University of Minnesota, St. Paul, ²USDA-Agricultural Research Service, St. Paul, MN.

The objective of this experiment was to examine the repeatability of in vitro cell wall polysaccharide digestibility (IVCWPD) analysis across time using 10 byproduct feeds and 12 forages. Ruminal contents were collected on a biweekly basis, over a 6-wk period, from a single lactating Holstein cow maintained on a total mixed ration. For every collection, feedstuffs were incubated in duplicate for 48 h at 39°C using

the Ankom Daisy Oven system. The Uppsala dietary fiber method was used to analyze feeds and residues for cell wall polysaccharide constituents (neutral sugars and uronic acids). Week of rumen fluid collection significantly ($P < 0.05$) affected IVCWPD across feeds, with collection 3 having lower IVCWPD values than collections 1 and 2. Ranking of forages, but not byproduct feeds, by IVCWPD was affected ($P < 0.05$) by collection week. Average IVCWPD for whole cottonseed and wheat middlings were 33 and 56%, respectively, while the other 8 byproduct feeds ranged from 73-92%. For two corn silage samples (conventional and BMR), IVCWPD results from collections 1 and 2 were greater ($P < 0.05$) than for collection 3. Comparing the conventional and BMR corn silages, IVCWPD was different for collection 2 (72 vs. 64%), but not different for collections 1 (74 & 67%) and 3 (57 & 57%). For an alfalfa haylage sample, IVCWPD was greater ($P < 0.05$) for collection 2 than collection 3 (74 vs. 67%), with collection 1 being intermediate. Rankings of 3 alfalfa samples (1 haylage, 2 hays) for IVCWPD changed among rumen collections. The IVCWPD of the haylage was greater ($P < 0.05$) than of hay 2 for collection 1 (72 vs. 63%), greater than hays 1 and 2 for collection 2 (74 vs. 66 & 65%), but similar to hays 1 and 2 for collection 3 (67 vs. 63 & 62%). Repetitive rumen fluid collections under standardized conditions resulted in different IVCWPD values for forages but not byproduct feeds.

Key Words: In vitro cell wall polysaccharide digestibility, Forages, Byproduct feeds

226 Influence of bovine somatotropin and varying levels of enzose on nutrients intake, digestibility, milk yield and its composition in mid-lactating Nili-Ravi buffaloes. M. Nisa*, A. Sufyan, M. Sarwar, and M. A. Shahzad, *University of Agriculture, Faisalabad, Pakistan.*

The study was conducted to investigate the effect of bovine somatotropin hormone (bST), with varying levels of enzose (corn dextrose, by product of corn products Industry) in the ration, on nutrients intake, digestibilities, nitrogen balance, milk yield and its composition in mid lactating *Nili-Ravi* buffaloes ($n=12$). Three rations were formulated to replace 0, 20 or 40% concentrate with enzose of equivalent energy and offered to buffaloes administered 0 or 250 mg bST, biweekly, for a period of 100 days in a 2 x 3 factorial arrangement and means were compared by using Duncan's Multiple Range test. The bST administration increased ($P<0.05$) DM, CP, NDF and ADF intakes, N retention and N excretion in the milk. The NDF and ADF digestibilities, daily milk yield and milk fat% were also increased by bST administration. Addition of 40% enzose in the ration decreased ($P<0.05$) DM, CP, NDF and ADF intakes, NDF and ADF digestibilities and daily milk yield. Overall N balance was not affected either by bST administration or enzose addition in the ration. Enzose interacted ($P<0.05$) with bST for milk yield and milk ash contents. The bST administration in buffaloes increased milk production by 30%. Up to 20% concentrates can be replaced with enzose in the ration. Replacement of 40% concentrate with enzose in the ration can adversely affect nutrients intake, their digestibilities and milk yield in lactating buffaloes.

Key Words: Mid lactating buffaloes, Bovine somatotrophin, Enzose

ADSA – SAD Undergraduate Competition: Dairy Foods

227 Effect of pasteurization on the survival of *Mycobacterium avium paratuberculosis*. A. Bush*, *University of Kentucky, Lexington.*

The goal of milk pasteurization is to provide consumers with a safe, shelf-stable product, while preserving milk's unique organoleptic properties. Pasteurization is applied primarily for safety, but also greatly reduces the number of spoilage microorganisms and slows degradative enzymatic activity in milk products. Some recent studies suggest *Mycobacterium avium paratuberculosis* (MAP) may be capable of surviving current milk pasteurization standards (72°C for 15 sec). MAP is the causative agent of Johne's disease in cattle. Johne's is a chronic, incurable bowel condition that leads to weight loss, decreased milk production, and eventual death. Humans do not contract Johne's disease, but can develop Crohn's disease, which some scientists suspect may involve MAP organisms. Those that suffer from Crohn's disease commonly experience abdominal pain, diarrhea, fever, and weight loss. MAP is difficult to study because of the lack of a common selective lab media, a long incubation period, and because of the waxy cell wall that makes differential staining tedious. Various studies have been performed with MAP in the United States, as well as Europe, but have produced conflicting results. If MAP is proven to survive pasteurization and to be involved with Crohn's disease, then revisions will need to be made in the FDA processing standards for fluid milk.

Key Words: Pasteurization, *Mycobacterium*, Crohn's

228 Dairy foods and reduced risk of colon cancer. A. Greenbaum*, *Louisiana State University, Baton Rouge.*

The American Cancer Society estimated that there will be 146,940 cases of colon cancer in the United States in 2006 and 56,730 deaths.

Colon cancer is thought to be caused by genetic predisposition and dietary factors. Low fat dairy foods might have a protective role against colon cancer. Several components in dairy foods namely, calcium, vitamin D, conjugated linoleic acid (CLA), sphingolipids, butyric acid, bacterial cultures (in cultured dairy products), protein and vitamin A may protect against colon cancer. Several studies indicate that increasing calcium intake reduces colonic epithelial cell hyperproliferation or normalizes the distribution of proliferating cells within colorectal crypts in individuals at risk for colon cancer. Mechanisms on how calcium directly induces cell death of colonic epithelial cells have been proposed. Vitamin D increased calcium absorption and reduces the risk of developing colon cancer. Three to four servings of low fat dairy foods daily along with a well planned high fiber diet and exercise can go a long way in preventing the onset of colon cancer.

Key Words: Cancer, Health, Dairy

229 Probiotic dairy products: A healthy choice. R. Kilgore*, *Pennsylvania State University, University Park.*

During the early 1900s, Eli Metchnikoff, a Russian biologist, first advocated the benefits provided by yogurt with *Lactobacillus* bacteria. He linked those positive effects to the longevity of Bulgarian peasants. Since then, a significant amount research has been conducted to determine the exact effects of probiotics. These are living microorganisms that when consumed in sufficient numbers can provide health benefits beyond basic nutrition. According to studies by the California Dairy Research Foundation, proven positive effects of probiotic products include improving immune function, minimizing symptoms