Below you'll find short summaries highlighting publications impacting ruminant and other species nutrition in the US. Please feel free to reach out with any questions or if seeking specific follow-up information.

Effect of prepartum dietary cation-anion difference strategy and level of dietary calcium on postpartum blood calcium status and milk production of multiparous Holstein cows (Graef et al., 2025): This paper comparing full (-10 meq/100g) and partial (-2.5 meq/100g) acidification with high (1.5% Ca) or low (0.7% Ca) close-up diets is a must-read out of Overton and Kerwin's groups at Cornell. Roughly 10 cows were assigned to each combination of treatments and they were fed a unified post-partum diet after freshening. Regardless of DCAD approach, higher Ca cows ate more in the close-up and fresh periods. Fully acidified cows also ate 0.6% of their BW more than partially acidified cows in the post-partum period. Low calcium-fed cows also had more total (not different for ionized) Ca in their blood at 2 days post-freshening, regardless of DCAD approach. Fully acidified cows also excreted about 50% more Ca and 10% more Mg per day in the close-up period, while lower calcium-fed cows excreted ~15% more Ca in their urine. Lower calcium-fed cows also produced ~5% less energy corrected milk while partially acidified cows produced milk with higher MUNs. The authors propose that at least some of the Ca-attributed DMI may be due to Ca-mediated rumen motility – a topic at the Floridan Nutrition Symposium this spring.

Ruminal microbiota-derived inosine alleviates metabolic disorders in dairy cows supplemented with grape seed extract (Shao et al., 2025): This study investigated the effects of grape seed extract (GSE) supplementation on metabolic health in dairy cows during the transition period. GSE is rich in polyphenols, especially proanthocyanidins, which are a class of powerful antioxidants. Holstein cows received 15 g of GSE per day from 3 weeks before to 3 weeks after calving. Compared to unsupplemented controls, cows fed GSE had improved lactation performance and feed efficiency, along with reduced SCC. Blood biomarkers indicated better energy metabolism, with elevated serum glucose and lower levels of NEFAs, β-hydroxybutyric acid, and inflammatory markers. In the liver, GSE cows had reduced triglyceride accumulation and lower expression of lipogenic genes. Insulin signaling and gluconeogenic gene expression were also enhanced. In adipose tissue, GSE

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cows showed signs of suppressed lipolysis and reduced inflammation, suggesting improved insulin sensitivity and metabolic homeostasis. GSE also altered ruminal microbiota and fermentation profile, with increases in propionate producers. Ruminal and serum metabolomics revealed elevated levels of inosine, and inosine levels were positively correlated with improved energy markers and milk production, suggesting it played a functional role in alleviating negative energy balance. **Note that proanthocyanidins are one of the selected polyphenols in Elife, Impextraco's potent polyphenol-based antioxidant product distributed in the U.S. by Feedworks.**

The effects of induced hindgut acidosis in sheep on rumen fermentation and gut permeability (Linder et al., 2025): This study explored the effects of hindgut acidosis on rumen fermentation and gut permeability in sheep. Using a novel model with ruminally and cecally cannulated ewes, researchers directly infused starch into the cecum to induce *hindgut* acidosis. This decreased cecal and fecal pH, increased fecal VFA concentrations (fermenting the starch), and changed fecal consistency (more VFA driving osmalality). Interestingly, *rumen* conditions were also affected, with ewes experiencing lower rumen pH and higher rumen VFA levels despite identical diets delivered to the forestomachs. While in vivo markers of gut permeability varied widely among individuals, ex vivo assessments showed reduced cecal barrier integrity under acidotic conditions. These findings highlight that hindgut acidosis can not only disrupt local fermentation but also influence rumen function and gut health, demonstrating the need for further investigation into its role in systemic inflammation and links to disorders like liver abscesses.

Feeding a clay mineral-based feed additive improves performance, eating behavior and liver health by feedlot beef cattle fed a high-concentrate diet (Gouvêa et al., 2025): This study evaluated the effects of supplementing feedlot Nellore cattle with a clay mineral-based feed additive (CMFA) containing: purified bentonite, *Ascophyllum nodosum* and *Silybum marianum* extracts. Bulls (n=48) were fed either a control diet or one with CMFA (1.5 g/kg DM) for 96 days. Cattle receiving the additive blend had higher final BW, ADG, and hot carcass weight compared to controls. Feeding behavior shifted toward fewer, shorter meals with a faster intake. CMFA-fed cattle showed lower serum aspartate aminotransferase concentrations and

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fewer liver lesions, including less inflammation, necrosis, bile stasis, and duct hyperplasia, indicating improved liver integrity. Notably, the mycotoxin contamination levels observed in this study were considerably lower than those reported in the literature as potentially concerning for liver function, so the hepatoprotective benefits may be due to the *Ascophyllum nodosum* and *Silybum marianum* extracts in the blended product rather than direct mycotoxin removal.

Live Presentations:

Midwest Boar Stud Managers Conference: This meeting last month featured several excellent presentations and insights on boar semen quality. Dr. Karl Kerns (Iowa State University) presented on advances in understanding sperm quality, reviewing factors that influence fertility. Dr. Amy Desaulniers (University of Nebraska) covered three interconnected concepts beginning with the role of Sertoli cells, which are critical for sperm development, and emphasized how colostrum-derived mitogens and proteins within the first 24-48 hours of life can influence their activity. Using a Zn Green-1 label, her team demonstrated that 64% of the labeled particles were associated with Sertoli cell development. Second, Desaulniers presented evidence that in utero heat stress in boars reduces total sperm production, highlighting the long-term reproductive impacts of environmental stressors. Finally, she addressed the effects of atrazine in water sources, showing that exposure led to reduced thyroid hormone levels, decreased body weight, and altered reproductive hormones. Together, these findings showcase the complex interplay between early-life nutrition, environmental stress, and contaminants on long-term boar fertility.

From the Archives:
With the shifting interest in carbon credits within some U.S. markets, it can be easy to lose sight of some of the value of Agolin, the essential oil product marketed by Feedworks. However, now is a good time to pull out the 2019 paper (Ecoso et al.) in Applied Animal Science reporting improved feed efficiency and ECM after cows were on the product for 4 weeks. These cows show a clear improvement in ECM while on Agolin and over time we've come to realize that the essential oil blend is modifying our rumen microbial population to drive more fermentation towards propionate rather than

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acetate/butyrate. This shift leads to the decreased methane production we've talked so much about but also adds value to the bottom line for dairy producers in the current milk market.

Other notes:

1. Don't miss Feedworks' own Dr. Marlin Hoogland talk all things oxidative stress in swine production during his recent interview with Global Ag Media CEO Sarah Mikesell. He outlines how it can have a hidden cost on performance, eroding feed efficiency, growth, and reproduction. This is especially prevalent at weaning, late gestation/lactation, and late grow-finish, and when heat or PRRS pressure is high. He emphasizes the importance of antioxidant-focused nutrition (e.g., using polyphenol blends like Elife) **t**o support endogenous defenses and help regenerate vitamin E during these windows of stress.
2. Researchers at the University of Arkansas were recently highlighted by Feedstuffs magazine for their work in evaluating Ca bioavailability using a novel and more rapid analytical approach. This is a nice read that brings forth the risk of both too low and too high of calcium bioavailability. Consistent bioavailability (think Calmin and Celtimin) represent a great opportunity to fine-tune poultry diets.
3. Taylor et al. (2025) conducted a comprehensive economic analysis of the costs associated with liver abscesses in U.S. beef feedlot cattle, estimating that the total annual economic impact is $256 million. The largest losses stemmed from reduced ADG and decreased dressing percentage before trimming, with additional losses due to the condemnation of livers and offal and processing delays. Their economic model showed regional differences in liver abscess prevalence, with beef-dairy crossbred cattle in the Western U.S. experiencing the highest economic losses. The analysis hypothesized that the removal of antimicrobial tylosin could nearly double the prevalence of liver abscesses and associated losses.
4. Wicaksono et al. (2025) evaluated the economic and biological impact of 7 common reproductive disorders in dairy cows: dystocia, retained placenta, acute metritis, clinical endometritis, anovulation, cystic ovarian disease, and sub-estrus., using a dynamic, individual cow-based simulation model to mimic a 200-cow herd over a year. They found that reproductive disorders impose a substantial burden on herd

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productivity and profitability, with acute metritis having one of the highest economic impacts due to its downstream effects on fertility and the need for treatment. In contrast, disorders like dystocia were less impactful on a per-case basis but still relevant due to their role in triggering other conditions. The simulation also demonstrated the value of targeting early postpartum health issues. One way to do so is by investing in nutritional strategies that promote reproductive resilience to help mitigate the risk of multiple disorders occurring in succession.

5. In a study on medium chain fatty acid (MCFA) supplementation to piglets (Torres et al., 2025), 100 weaned pigs were fed diets containing 0, 0.2, 0.5, 1.0, or 1.5% MCFA (replacing soybean oil) for 21 days postweaning, followed by a common diet until day 35. Dietary MCFA supplementation improved BW, ADG, and feed intake, with optimal benefits observed between 0.5-1.0% inclusion. Digestible energy, dry matter, and crude protein increased linearly with higher MCFA levels, while plasma β-hydroxybutyrate and free FA concentrations were reduced, suggesting improved energy status. Overall, authors concluded that supplementing MCFAs up to 1.0% in nursery pig diets enhances postweaning growth, nutrient utilization, energy balance, and gut health, with benefits carrying over to later nursery phase.
6. Ruda et al. (2025) explored how Holstein Friesian (HF) and German Simmental (SI) breeds differ in their metabolic response to the energy demands of early lactation. Blood chemistry was sampled 42 days prepartum and 21 days postpartum, and targeted metabolomics profiles were compared. Holstein cows produced more milk but lost more body weight, with higher levels of oxidative stress markers; they also retained higher levels of leucine and isoleucine, whereas SI cows showed a decline, suggesting less muscle protein mobilization in SI cattle. Elevated BCAAs in HF cows were linked with markers of lower insulin sensitivity, implying metabolic inefficiency and possible prolonged insulin resistance. These findings suggest that HF cows prioritize milk yield at the cost of greater oxidative stress, body protein and fat mobilization.
7. Romão et al. (2025) investigated whether diluting a commercial electrolyte concentrate (EC) in milk is as effective as the traditional oral electrolyte solution (OES, EC diluted in water) for rehydrating diarrheal calves. Newborn Jersey calves (n=24) were induced with osmotic

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diarrhea and dehydration, then randomly assigned to receive EC either mixed into their milk (milk group, MG) or diluted in water and offered between milk feedings (water group, WG). Both treatments successfully corrected dehydration, hyponatremia, and mild strong ion acidosis. Although rehydration occurred slightly faster with OES, electrolyte-enriched milk stimulated higher voluntary water intake, leading to equivalent overall outcomes. Calves in both groups regained body weight, showed normalization of electrolyte and acid-base status, and returned to healthy clinical scores.

8. Hidalgo et al. (2025) demonstrated that intrauterine infusion of the omega-3 fatty acid docosahexaenoic acid (DHA) may beneficially modulate the uterine environment in cows with subclinical endometritis by shifting metabolic pathways and reducing pro-inflammatory signals. While the small sample size of 7 cows in this study limits any firm conclusions, it provides a basis for larger trials to assess DHA's potential as a non-antibiotic therapeutic strategy for improving uterine health and reproductive outcomes in dairy cattle.
9. A recent paper in the Journal of Dairy Science illustrates why we need to dig beyond the abstract when reading scientific research. At first glance, Vinyard et al. (2025) appear to have an omega-3 FA source for feeding in ruminant diets that doesn't suppress digestibility. However, this would be difficult to ascertain without tightening control of the experimental diets used where there are fluctuations in RDP sources as omega-3 dose is linearly increased. More work needs to be done with this product in the hope that extruded flaxseed can be used to enrich omega-3 FA composition without negative effects on the rumen.
10. Water quality is often something we pay less attention to because we are "stuck" with what we already have. However, Casper and Acharya (2025) have a nice, simple study illustrating the simple effects of changing water source (or treatment) on rumen fermentation. Total VFA in this study was greatest in the municipal water source whereas groundwater and treated groundwater both also increased fermentative activity compared to distilled water. Microbes likely benefit from some level of mineral in the water but total dissolved solids will still influence animal consumption.

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