

Priority IAC’s Smart Bacteria Cater to Rumen Microflora

by Paris Reidhead

Appreciating the role of rumen micro-flora becomes increasingly urgent as feed ingredient costs — particular soybeans — continue their upward trend.

Ag economists generally agree that purchased feeds make up the largest expenses on dairy farms. Thus, an affordable technology that truly improves feed-conversion efficiency ... as well as shoring up cow’s rumen health ... promises to improve profitability. An underlying concept in ruminant health: the cow’s owner isn’t feeding *her*... but rather feeding the many billions of microbes in the animal’s digestive tract, particularly in the rumen.

I call these gut micro-organisms the tiny fellows with the huge names. One company in particular has in recent years improved upon the science involved in harnessing, and in fact, orchestrating these microbes. That company is Priority IAC (International Animal Concepts). I was referred to Priority IAC and its president Richard Breunig by a long-term subscriber to *The Milkweed* who dairies in Central New York.

Priority IAC’s background

Breunig, a self-taught entrepreneur, founded Priority IAC, Inc. in 1998. Priority IAC is a farm-developed concept, family-owned company bringing this technology directly to producers. As a dairy producer managing the world-class Clover Mist Farms, Richard saw firsthand the impact of microbiology on animal health and has strived to bring this knowledge and power directly to producers. By understanding the function and interactions of the microorganisms, Priority’s scientists have fine-tuned the nutritional variables and environmental conditions, like pH, to improve their growth and ability to produce specific metabolites.

Quoting Breunig: “My time on the dairy provided profound learning. A mis-formulated feed created tremendous animal health issues. I was quite fortunate, when things were at their worst, Ken Schneider, a PhD rumen microbiologist, appeared stating there were ways to alter things with microbiology. This was my first exposure to microbiology, more than 25 years ago. Priority then brought in microbiologist Ken Schneider. Having Ken’s microbiology experience at Priority made sense because of what he was doing in fermentation.

“Fermentation tanks in the laboratories and the rumens in cows are all very similar — they are all little fermentors. The digestive tract of all animals is all about proper fermentation.”

According to Schneider, many things that take place in the laboratory fermentors actually parallel what occurs in a cow’s rumen. We see cows in the field, they produce manure and they make milk. He says, “The in-between part that was happening, that is the fermentation driven by microbiology. In the lab we can control conditions, but it is less controlled in the cow. Rumen fermentation can be thrown off by mold, poor feeds, the wrong feeds, changing feeds, too much of a good thing, etc. There are a lot of things that can impact that rumen fermentation. In the cow it is plus or minus, but you still have to stay within that window, for example pH balance.”

<https://www.priorityiac.com/science/smartbacteria>

Long-distance interview

On April 9, 2021 I researched, by phone, more of the Priority IAC story. Here ... in question and answer form ... are the high spots of our discussion.

Question: How can you use microbiology in nutrition?

Richard: Where there is life, something is eaten and something else is made. In the case of the rumen and microbiology, the microorganisms eat something, the feed that the cows are fed, and then they make something, volatile fatty acids (VFAs, the energy) and microbial protein (amino acids). Microorganisms are the life in the rumen and make nearly everything we are trying to accomplish by nutrition.

Ken: Without those microorganisms, cows wouldn’t be able to break down the feeds into the form they can absorb and perform on. In the laboratory we controlled everything: temperature, pH, oxygen conditions, the food and nutrients, and the microbes required — all of these things we could monitor and control very closely. There are a lot more variables on the farm and with the cows’ (rumen) fermentation. Her feed is different from moisture variations to fluctuations in the ingredients. We can control some of these variables by feeding our bacteria and

minerals because they bring consistency. What we are feeding the bacteria has a big impact on how they grow and what they produce. They break down the feeds into a form the cow can utilize.

Question: So, you are feeding these microorganisms?

Richard: Yes, we are looking at each bacterium as being an individual organism that requires research and understanding of what nutrition it needs to grow, and then how to optimize its growth.

Ken: Growth and producing their metabolite. In the laboratory we were growing a specific microorganism that produced the specific end product, for example an enzyme, antibiotic, or chemical.

Richard: So, everything is life. Bacteria is life. Life needs a food source to optimize its growth and then it makes something. It can make something good, very beneficial for the body, or it can make something very harmful.

Ken: How you feed them affects that. A great example is yeast. If you feed yeast too much sugar they will produce alcohol, whether you want them to or not. But if you feed the yeast at a low sugar level, you can get a different product and not alcohol. The same is true for other organisms.

Richard: Microbiology is first and then (comes) nutrition. In fermentation, it is understanding what is the individual input you are working with and determining what nutrition it needs for best performance. And those growth conditions can be optimized through supportive nutrition — Microbiology Nutrition. You took the environmental things into account and worked around them through their nutritional needs. Looking at the organism to figure out the environmental factors that inhibited or deterred life, then looking at the nutrition that would complement the growth of the organisms and overcome the challenges the organism would face.

Question: Why is pH important?

Ken: If the pH isn’t right, that cow’s rumen/digestive tract isn’t going to be right. And, that was exactly true of what is happening in the laboratory fermentor. If we are growing bacteria, pH is something we have to monitor very closely. If the pH gets off track a little bit, it will slow down fermentation. If it is too far out of line, the bacteria will lyse and die, resulting in a failed fermentation. The fermentation will explode and stop. No bacteria, failed fermentation. The same thing can happen in the rumen. If the pH isn’t correct, digestion is going to be affected. Intakes will drop, cows will go off feed, production will decline, manure will go off track. There will be signs that something is not right. In the laboratory I knew exactly if the pH was off track as the fermentation tank would have foamed out due to cell lysis and death. The cells would have released all their proteins and cell contents, causing the solution to foam and spill out.

Richard: The same thing happens with the cow, you can tell when the pH is off track as the manure becomes inconsistent and variable. Different organisms have different pH ranges where they grow best. Growth will slow and they will eventually die if the pH gets too high. The same is true on the other side, if the pH gets too low. And if it is really off track you see bloody gut and other digestive disorders. Just like in the laboratory, when the fermentation pH is off track and foams out due to cells dying. Generally, rumen pH should be in the 5.6 – 6.2 range. When a dairy has a constant battle with sub-acute rumen acidosis and/or digestive inefficiencies, this is due to incorrect pH, the fermentation cannot be maintained because the pH drops too low and the environment becomes too acidic. Not only is sub-acute rumen acidosis (caused by) inconsistent fermentation, but the acidic environment damages the rumen by killing off the bacteria, burning papillae, even leading to scarring and lack of nutrient absorption.

Question: How can microbiology do this? What are the right organisms?

Ken: That is where the P-One Program™ and the Smartbacteria have a role — They were selected for their ability to metabolize and transport energy efficiently. So the rumen pH is maintained in the proper range. We have identified what is important: stabilizing and maintaining pH, keeping the rumen (that’s the fermentor) stable with the pH where it is supposed to be. Priority has the organisms that do that. We have identified these individuals, who digest the feeds properly. The rumen contains naturally occurring microorganisms, but what the P-One Program™ is doing is supplying the correct strains and enough of them to handle the big loads of fermentable carbohydrates and fermentable fibers that the cows are being



P-One™ delivers Smartbacteria to stabilize rumen pH. Priority IAC’s Microbiology Nutrition delivers a nutrient dense ration that is a high NFC carbohydrate-based diet that starts with high quality forage. This allows producers to minimize purchased protein and other costly ration additions.

fed today. Rumen fermentation is microbiology and nutrition.

Ken: If you take all the microorganisms out of the cow she will die because nothing would be digested. When you feed a cow, everything she gets has to be broken down into a form she can use and absorb (VFAs and microbial protein). The feeds cannot be used as is, they have to be broken down and you need these bacteria to do that — It really is the first ingredient to get that cow what she needs. To get her the nutrients into a form she can absorb. So then it is about finding the right, specific microbes that are going to do specific tasks. Then we test and research and figure out how good they are at doing that task.

Richard: Mainstream nutrition has gotten so far off track. Computer programs spit out rations. If the program says the ration works, but the cow says it doesn’t, “nutrition” says the cow is wrong! Your cows are your study, their performance is your proof. I believe we’ve lost the basis of nutrition; microbiology has to come first, then nutrition. This is where Microbiology Nutrition comes from! We need to know who we are working with in the rumen, just like in the fermentor at the lab. Then we need to know what nutrition is needed to support life and bacteria growth. Cows’ microbiomes are so uniquely different, but yet eating the same diet with expectations of the same results. (Mainstream) microbiology would say that this isn’t possible. Everyone needs their own nutrition. The first ingredient, that is the P-One Program™, puts the workers (Smartbacteria) there to make the fermentors (rumens) similar so to be fed and respond similarly to the same ration.

Ken: On the P-One Program™ we can use the best feeds possible because we have the right bacteria there to handle these really good forages. We have the right strains metabolizing the sugars and transporting them into energy the cow can use, VFAs. Bacteria grow, reproduce, and then they die. They get recycled in the rumen and provide protein in the best form, as amino protein. We are feeding the bacteria, which then feed the cow. Producers are coming to us looking for answers and help. I think producers should know what is happening, what they are feeding, why they are feeding it. It gives the power back to the producer. They will be able to react quicker to identify and fix challenges.

Priority Producer Testimonial

Hilltop Haven Dairy Farm in Moravia, New York is the long-time subscriber to *The Milkweed*. The owner referred me to Priority One IAC, and its president Richard Breunig. (Hilltop Haven is now a dealer for Priority IAC products and can be reached at 315-730-6044.)

Hilltop Haven Dairy Farm has been feeding the Priority One P-One™ supplement to its eighty dairy cows for just over one year. The owner gives great credit to this enzyme- and yeast-fortified blend of lactic acid- and propionic acid-forming bacteria.

With Priority One P-One™, the farm’s somatic cell count has dropped consistently to less than 80,000. The rolling herd average on 2X milking is approximately 20,000 lbs. of milk per cow, and

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MUNs are almost always in the 6-10 range. (Breunig stresses that MUNs exceeding ten tend to indicate that protein in the cow's diet is being wasted.)

Very importantly, because of Priority One's P-One™ enhancement of dietary protein metabolism, daily soybean meal feeding rates have been successfully reduced from five pounds per head to two pounds – a 60% decline.

A 25-lb. bag of Priority One P-One™ retails for \$168. With a feeding rate of 0.05# per milk cow per day, daily cost per head is about 34 cents — roughly the current cost of a pound of soybean meal. Many dairy producers are closely tracking soybean oil meal costs.