

Straight to the bottom line

By: Steve Martin

“My evolving Love-Hate relationship with the Shaker Box” Part II

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In my column last month, I discussed some thoughts on how the Penn State Shaker Box has impacted the art and science of feeding cows over the last couple of decades. In particular, I described my resistance to using the box as it seemed to allow for much shorter particle length diets to be considered safe compared to what my early years of feeding cows had taught me. As I progressed in my career and moved from typical western type, high alfalfa hay based rations to more corn silage based rations, I began to see the value of the shaker box. I learned that as long as the box was being used on high corn silage diets, it did a great job in helping to be sure we had safe diets in front of the cows. I knew though, that the high quality western alfalfa hay diets needed to be longer.

In general, I had learned that shorter particle length diets were ok and safe for the cows as long as the fiber levels in that diet were higher than average. Conversely, the high quality alfalfa hay based diets tended to be lower in analyzable fiber and thus needed to be longer to keep the cow healthy. The principle at work here is that there are at least two main ways that the rumen can remain in a healthy state as it relates to the roughage/fiber levels in the diet. The goal is that the rumen needs to build a mat or raft of forage that floats on the top of the rumen contents. This forage mat is needed to maintain a healthy status of normal muscular contractions. These contractions move the ingested feed around, back up the esophagus to be re-chewed and then eventually out of orifice in the bottom of the rumen. The first way to accomplish this healthy status is to feed very long particles of roughage that require time to be reduced in particle size by chewing and re-chewing. The long forage particles scratch the rumen wall quite well and stimulate significant movement in the rumen. This process results in a healthy functioning rumen. It simply takes time going through this process before these particles are small enough to exit the rumen.

The second way is to have short particles that are much higher in fiber. As an example, compare the fiber in 200 RFV alfalfa hay to that of a corn stalk contained in even high quality corn silage. The stalk has significantly more fiber than the alfalfa hay. Forage particles with higher fiber, though they may be shorter in length, remain in the top of the rumen in the forage mat. These higher fiber particles tend to be less dense helping them to stay in the mat. As well, all forages become buoyant in the rumen contents due to methane production occurring as a result of the microbial process digesting the fiber. The gas bubbles become trapped inside the particle and keep it buoyant and in the raft. The higher fiber of these often shorter silage type stalks requires more time in the rumen to be fermented and remain in the raft for more hours.

So, what do these two principles have to do with the shaker box? We have now learned to use the shaker box along with the fiber levels in the diet to decide if the diet is healthy or not. In short, the higher fiber diets often based on corn silage can be shorter and still be safe. The lower forage fiber diets will need to be longer to be successful. By using the tool of the shaker box, we can actually dial in to what the correct percentage per shelf needs to be to accomplish our goal of profitable milk production and good cow health.

When it is all said and done, the Penn State Shaker Box has proven itself to be a helpful step in formulating successful dairy diets. To take that tool to the next level, it is necessary to join this information with the fiber levels in the diet to be sure that what the box is telling us is truly best for the cow. These cows after all, were created to convert low quality roughages to meat and milk. It was our idea to feed them things like corn, soybean meal and cottonseed. So, we need to do all we can to keep the cows healthy while we ask them to produce a significant volume of milk.