Changing Role of Poultry Nutritionist in a Changing Industry

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Introduction

Reflecting back on 30 years of working in the poultry industry as a nutritionist I have come to realize that the biggest changes that have occurred have mostly been due to the improvements in (1) the ability to measure and (2) the industries response to changes in consumer's relationships with their food sources and how they relate to them.

I think most of us would agree that our jobs 30 years ago seemed to be much simpler to perform. We obviously had many of the same tasks that we still perform today, however we never had to deal with as many challenges as nutritionist are confronted with today. Early nutritionist were feeding ingredients that we don't use today because they were trying to cover imbalances that they didn't have ingredients for such as some of the vitamins. There was also some dogma already in place about the use of certain ingredients, you had to include some form of milk, and for much of the year cod liver oil.

When I look back on some of the formulations from early days of the industry as well as the husbandry practices, housing and processing techniques I guess it probably looked the same to those who came before us. I remember a friend of mine's father telling me how the first laying hens he raised were fed using green chopped grass and skinned rabbits hanging from the walls! Pretty simple diet but it worked and he was able to sell enough eggs to buy a calf and eventually made enough money to go to Cornell to study Poultry Science and became one of the first extension poultry men in Arkansas.

At that time the University told poultry farmers that they could not grow more than a 500 broilers in a house, it was not possible, the birds would all die. The next year showed that they could grow 1,000 and so forth until we reached the housing densities that we still see today. If those folks could see some of the houses in use around the world today, with up to a million birds under one roof, I wonder how they would reconcile it.

What Changed?

One of the biggest changes we have seen that affects most but certainly not all nutritionist in the industry today is the pressure from the consumer to raise broilers without using any antimicrobial products (antibiotic growth promoters, AGP's). This change in how the industry is supposed to raise their birds has probably resulted in the most rapid change in how we feed and manage broilers since the discovery of the vitamins. I will discuss several of the products and thought processes that have had to change to try and achieve this while maintaining performance that is close to historical levels.

AGP removal

In 1986 Sweden banned the use of antibiotics for growth promotion in animal agriculture. In 2006 the European Union (EU) banned all antibiotics from use as growth promoters. The banning of these antibiotic compounds in the EU has had major repercussions around the world. Countries which ship poultry products to the EU have to raise their birds under the same conditions if they hope to meet the import restrictions. In the United States (US) many retail companies, and consumer groups, have chosen to put pressure on the industry to operate in the same manner as the EU in this regard. What we now see is a range of use from companies who have pulled out all growth promoters to others who still (legally) utilize growth promoting antibiotics as they always have. Nutritionist, whose job is to design and implement feeding programs within the scope of the companies directives have found that often these programs have changed rapidly and require them to make wholesale changes to how they are feeding their birds. Quite often within one company there is multiple systems in use at the same time, so that one complex may be using AGP's while another is not.

This topic is one that is generally discussed at every meeting attended by nutritionist and veterinarians worldwide. The most common approach that we hear today is that companies are searching for all natural products that alone or in conjunction with other products provide a response in the flock which is similar to that experienced with antibiotics. One of the main issues with this approach is that we still do not have a concrete explanation for how antibiotics themselves allow for increased growth of poultry and other meat producing animals. There are several theories of how these AGP's operate of which here are the most frequently suggested: (1) Reduction in the amount of ammonia produced in the gut, (2) reduction in certain bacterial populations, freeing up the energy they would consume, (3) reduction in GI tract infections reduces the release of catabolic hormones due to cytokine release, (4) reducing mainly gram positive bacteria, keeping their numbers low and predominantly in the lower intestine.

So what has come of this attempt to produce non-antibiotic growth promotion? Most of the products being evaluated today fit into one of several different classes of compounds; (1) Essential oils, (2) Phytogenic compounds, (3) Organic acids, (4) Prebiotics, (5) Probiotics. There are sufficient research trials to propose that all of these have functional properties which improve the growth of poultry under the right conditions. However, I have not seen a single compound which is capable of giving the same consistent positive results that we were used to seeing with the AGP's. To be perfectly open, I have to admit that I once was shown the entire catalog of trials that a drug company had run over the years with their particular compound. With almost 200 trials in total, it was clear that there was a 2 pt. FCR advantage when looking at all of the trials, however, in some trials there was no response or even a slight negative response, while in others the positive effect on FCR was almost 10 pts. So when we evaluate these alternative products we need to keep an open mind and look for the overall conditions that may or may not have allowed a particular product to respond as expected.

Nutritionist have been searching for these replacement products so that their companies can try to maintain their previous level of performance and still bring the right product to the processing plant every day. However, as we can see by the list of possible ways that antibiotics function it is doubtful that we are going to find a naturally occurring product that can fit all or even a couple of these activities. Therefore a lot of activity is being expended by companies around the world to find, test and market products which they feel will contribute to the goal of antibiotic replacement.

Nutritionist will spend considerable time, resources, and efforts to evaluate these products, companies, claims, etc. This is probably one of the most time consuming activities which modern nutritionist are working on. Time will tell if we are able to find the "magic bullet" that everyone is searching for, but there is no doubt that certain of these natural products will be found that do have positive effects on the growth and performance and even the health of poultry worldwide. But we also have to realize that the removal of AGP's is going to force us to do things with management that we may not have done before. There has to be a concentrated effort from many different departments within a company to get the kind of end result that we are searching for. This means that the hatchery, breeder department, broiler department, live haul and processing all need to be talking more than ever and adjusting to the feedback that they receive. We may have to develop tools which allow us to monitor the bird's health in ways that we have never done before. We need to know immediately when there is a change in the health of the flock so that we don't have to rely on an antibiotic because we waited too long to make a correction.

The following is a partial list and discussion of products and concepts which have forced poultry nutritionist to spend more and more time looking for acceptable products to fill niches which did not exist just a few years earlier. The process which a nutritionist uses to evaluate, test, screen and finally adopt has been discussed at earlier conferences here at Arkansas. One only has to think through this process to see that this can be time consuming, confusing and often times frustrating. These are the types of challenges which a nutritionist must prioritize to be able to use his time more wisely for the company.

Enzymes

One of the first products which was soon a staple ingredient worldwide was the enzyme phytase. I had the pleasure to work under the direction of Dr. Talmadge Nelson at the University of Arkansas. Dr. Nelson was one of the first people to understand the future need for this enzyme while working as a nutritionist for International Mineral Company (IMC). He conducted research trials using a very low yield phytase which showed that the concept was valid. After he moved to the University of Arkansas some of his graduate students continued this program looking at natural available sources of phytase in ingredients such as wheat. Based on this work Dr. Nelson actually proposed using the term "available Calcium" in papers written in 1985!

In 1988 BASF introduced a commercial viable product to the industry worldwide. Of course the early adapters were those regions of the world where legislation was forcing the use, such as Holland in the EU, and the Eastern Shore in the US. By the late 1990's the use of phytase introduced a lot of us to a new concept – Sustainability. Several companies were touting their use of phytase to show how sustainable they were as a company. The use of the phytase resulted in decreased use of tons of phosphates in the feed and subsequently applied to agriculture areas.

Based on the success of this enzyme, many other enzymes were introduced to the poultry industry within a short period of time. Most of these early enzyme products were enzymes developed to work in industrial applications such as laundry detergents. As these companies focused on feed ingredients the source of the enzymes were improved as well as their application methodologies. Today's products are the most effective that we have seen with new companies entering this market every year. There is still quite a bit of controversy and discussion on the proper application rates, proper substrates and how to best apply these products.

NIR Technology

Another significant change which I feel has been beneficial to our modern industry is the adaptation by many companies of the use of Near Infrared (NIR) Spectroscopy as a method of ascertaining the quality and compliance of feed ingredients as well as other compounds used in animal feeds. This technology has now been around the industry since the early 1980's. Due to the quick test time, this equipment allows feed mills to test incoming ingredients rapidly. Some mills use the results to segregate ingredients into bins based on their nutrient content.

New refinements in this technology is currently being installed in feed mills which will allow for real time formulation based on the actual test results. I have observed this being used in "real-time" at a commercial broiler feed mill with great success. The NIR results were changing the diets based on what was coming into the major scales for each batch of feed. If the company had waited for a nutritionist to make these changes there is the possibility that diets are either under- or over-formulated for quite a long period of time.

I remember spending up to 2 days a month doing nothing but moving data from printed laboratory sheets to a spreadsheet so that I could look at the variation and movement of the different nutrients that we were measuring. We tracked these trends and at times we made our best guess of where the protein level, for example, was going. If we guessed wrong, then it might be a week or more before we got the wet chemistry results to tell us that the results had in fact gone in a different direction.

Feed Milling

The process of feed milling is probably changed more in the past few years than it did in the first 50 years of the poultry industry. As we move into the era of "feed is food" we are probably

going to see more changes coming. Poultry nutritionist are generally not trained in feed milling during their graduate program, however after moving into an industry position they are often expected to not only work with the feed mill but are quite often put in charge of the milling operations. The milling of feed, and in particularly the production of pellets and crumbles is one of the operations that the nutritionist will spend many hours working on and getting plenty of feedback on. With new standards of cleanliness expected in finished feed, new equipment has been developed to help reduce the risk of contamination by bacteria which can be spread throughout the operation and even cause problems in the processing plant. There are many feed mills in the US and other regions of the world where conditioning time is less than 30-45 seconds. On the other end of the spectrum we see the use of hygienizer equipment which can give conditioning times as long as 5 or 6 minutes. Dr. Joe Moritz, West Virginia University, has started to gather information from his studies into the possible negative nutritional effects of increased conditioning time as well as additions of fat, either in the mixer or post pellet. We have known for many years that there is a benefit to be had by pelleting feed and feeding it to broiler chickens (McKinney, L., and R.G. Teeter, 2004), however we may have to balance the benefit with any negative effects resulting from long term exposure to high temperature and moisture. This is an area that has not been investigated properly but could have a serious negative impact on our feeding programs. I have asked the equipment companies about the effect their equipment may have on nutritional status of the feed and last time I checked they are not looking into this, so nutritionist are going to have to work on this and come up with ways to compensate for any loss of nutrients.

Fighting Dogma

Like all professions, our nutrition profession comes with a lot of dogmatic thinking. Some of it we learned from our professors or mentors or from our colleagues in the industry. Some of these are common sense and will probably keep being used for many more years. Occasionally someone challenges the accepted and comes away with a new understanding. A good example is sodium levels in broiler feeds. In the US we tend to have higher sodium levels than most of the world. Many people are convinced that without these levels the bird performance will be significantly reduced. However, in the EU and other countries around the world they use much lower levels than we use with very good live performance. I have generally reduced the levels that I use and have not noticed a reduction in performance. I think we can all help the industry to move ahead by challenging dogma whenever we come across it.

In closing I would ask each of you who are working in the industry to think back over the relationships within your companies and how you are helping to make those a positive force for change. I believe that due to our training in the sciences and statistics that we can help the other disciplines in our companies work better together and produce results that are outstanding. To do this we have to work together with the veterinary, feed milling, hatchery, and live production teams and help to share our experience so that the company benefits. As

the role of nutritionist continue to change, and it will, we can help to promote good practices that will see everyone in the company benefit.

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