ilc resources

MINERAL Writes

Second QUARTER 2011

In this issue:

ILC Resources Announces New President/CEO

ILC Resources' former President, Carl Lamberti, announced plans in 2010 to retire after the year 2011. His 47-year career began with Iowa Limestone Company in 1964 when the company's sales of limestone products totaled just 36,000 tons! Carl has witnessed manifold growth during his long ILC career. For the past 8 years, Carl has piloted ILC Resources as President, continuing long traditions of excellence in leading this company's dedication to quality products and service to animal agriculture. Carl will remain well-connected with ILC.

With Carl's announced intentions, the board of directors launched an executive search for a successor to follow and build upon the visionary leadership that has defined ILC Resources' success over the past nine decades. After a wide-ranging search among industry leaders, ***Mr. Frank Goode*** was named the new President/CEO. Formerly Vice President for Land O'Lakes Feed (Shoreview, MN), Frank joined ILC Resources in early May of this year.

Frank grew up on a grain and cattle farm in Western Canada. After graduating from the University of Alberta, he gained experience in several different industries including animal feed, animal pharmaceuticals, and human pharmaceuticals.

For the past two decades, Frank was with Land O' Lakes Inc., working in various capacities including general management, marketing, sales, pricing, and other leadership positions within Land O' Lakes Purina Feed and its various subsidiaries.

Frank looks forward to meeting with customers and industry involvement. "Providing leadership in our marketplace is both a company and personal goal as our industry continues to evolve."

This priority engages well with ILC's mission: "to be committed to providing the highest quality products and to striving for continuous improvement. We are dedicated to consistently exceeding our customers' expectations of service and quality at every opportunity."

Frank Goode
President/CEO

Carl Lamberti

CALCIUM

Feed-grade calcium products are available in a wide variety of particle sizes, from liquid suspendable products to large particle products for laying hen diets.

DICALCIUM PHOSPHATE

Both 18.5% and 21% phosphorus products are available.

SODIUM BENTONITE

Bentonite products are available in a wide variety of particle sizes suitable for any purpose.

POTASSIUM

ILC Resources has both potassium chloride (KCl) and potassium magnesium sulfate (K/Mg/S) available.

All products are available in both bag and bulk.

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Soft Bones in Young Laying Hens

Occasionally ILC Resources has been made aware of the issue within the poultry feeding industry of soft bones in young laying hens. Our suspicion is this isn't an isolated issue and that *soft bone* concerns are wider spread in young laying hens than we realize. Bone development and regeneration along with eggshell formation heavily involve *calcium* (Ca). That certainly is a given, but is this issue as simple as investigating dietary calcium sources and concentrations to determine either dietary adequacy or insufficiency? If an imbalance exists, all we should have to do is reformulate the diet. Or is this issue more complicated?

To begin with, we supply sources of calcium for hen diets throughout the Midwest and beyond. Calcium requirements of the laying hen for both bone formation and eggshell production call for dietary inclusion of two particle sizes of calcium carbonate ($CaCO_3$). Aside from other dietary ingredients' slight contributions of Ca, $CaCO_3$ should be present in the feed in both small granular particles and in large particulate form too. Highly soluble small granular $CaCO_3$ will furnish a readily available source of ionized Ca (Ca^{++}) to be absorbed in the small intestines to meet biological needs of the bird, mostly depositing in the bones for skeletal development and maintenance. Large particulate $CaCO_3$ deposits in the gizzard and is slowly solublized furnishing Ca^{++} throughout the day, mostly meeting the needs for eggshell production. Perhaps this description is overly simplified, but essentially any investigation of dietary adequacy must target these two particle size Ca sources. Do both chemical and physical properties of our calcium carbonate ($CaCO_3$) products fit general criteria for proper supplying of elemental calcium (Ca^{++}) to meet needs for both bone formation & rebuilding, plus eggshell formation?

Past research and experience dictates that large particle $CaCO_3$ in the diet needs to be in the range of minimum 1000 microns to 5000 microns to be deposited in the gizzard for slow solublization releasing Ca^{++} for eggshell formation. This also provides an additional source of available Ca^{++} for replacing lost Ca from bone mobilization. Smaller particle $CaCO_3$ (1000 microns to 100 microns or less) in the diet does not deposit in the gizzard but reacts with stomach acid and is solublized into Ca^{++} as it passes into the small intestines for absorption to meet biological needs of the bird, mostly depositing in the bones. Small particle Ca supplementation in layer diets typically comes from one of a couple sources. One of these is certainly small granular $CaCO_3$ (e.g. ILC's Unical-S – average particle size about 200 microns). Due to excess spent eggshells in "breaker operations" many integrators choose to dry and feed back ground eggshells. Ground eggshells run around 36-36.5% Ca which equates to approximately 94% of the actual eggshell's matrix following complete drying and destruction of organic matter residue. When dietary formulations are adjusted accordingly, either source will furnish Ca^{++} to help meet the bird's requirements. This paragraph establishes a brief review of two key sources of calcium supplementation from *calcium carbonate*. Other dietary sources are possible too, such as meat & bone meal to name one.

The first focus of our investigation regards the large particulate fraction of $CaCO_3$ supplementation. Presumably, if actual particles exceeded any range of effective utilization, perhaps insufficient Ca^{++} was presented to hens to effectively meet requirements. Review

of data, however, seemed to satisfy this requirement as any differences observed in composite sample testing of large particulate (ILC's Shell & Bone Builder) remained within effective ranges both for particle size profiling and for acid solubility rates. Next, we examined small granular $CaCO_3$ (ILC's Unical-S) for its effective particle size profile and acid solubility range. Its consistency in both parameters is remarkably close. Finally, regarding any sources of $CaCO_3$ from ground eggshells, defining both particle size and subsequent acid solubility values is more difficult. From requested *in vitro* acid solubility testing we've performed on submitted ground eggshell samples, results have varied among samples based on location and processing methods, which reflected variation in particle size profiles. These phenomena suggest further exploration is needed to determine more accurate predictability of eggshells for dietary use. In other words, ground eggshells are not all alike.

Calcium sources aside, what other parameters should be explored as solutions are sought to this dilemma of soft bones? Judging ourselves to be outside critically pertinent areas of expertise, we contacted several recognized poultry scientists simply to ask their ***opinions*** of what might be explored. Those we contacted seemed to acknowledge the issue of soft bones in poultry as being a rather nebulous and complicated one, leading to more questions than ready answers. However, the respondents did offer some helpful suggestions for areas of investigation.

We directed our inquiry into "What other factors should be examined? Obviously, Vitamin D plays an important role, certainly? We're not discouraging a further look at dietary calcium and our supplemental $CaCO_3$, but our doubts suggest there must be more at play here. Any ideas? Thanks for your opinions in advance." We targeted our query to three university poultry scientists and to a current industry nutritionist formerly involved in university poultry research. We received the following responses.

<u>Responses</u> - -

1. Dr Craig Coon, Poultry Scientist, University of Arkansas (Fayetteville, AR):

"I would be surprised if this has anything to do with your limestone. I would be more suspicious of underfeeding P and possibly Ca coming into lay. Were they relying on a Phytase (maybe not enough phytate substrate or got a low quality batch of phytase) during the transition to lay and got behind as they started laying? You can feed any kind of calcium and available P in the beginning but quantity at the right time is important. I would make sure the calcium and P is in the diet early enough to not get behind on bones when they start laying. Most people feed 2 to 3 times requirement of Vitamin D so probably not an issue. I think it would help knowing what they did before lighting and right after (pre-lay) prior to actual egg production. When did they feed layer calcium levels? The key may be they did not develop the young hen's medullary bone and got behind. Each egg the hen lays puts them behind and they will have a shortage of bone ash going into peak." Best Regards, Craig

2. Dr. Sheila E. Purdum (formerly Scheideler), Poultry Scientist, University of Nebraska (Lincoln, NE):

"It seems that skeletal depletion is becoming more and more of a problem early on in laying hens. I think it is likely due to several factors: genetics, early sexual maturity with lower body weights, stress, enteritis and poor nutrient absorption. I agree with you that it is not likely due to poor nutrient availability. We (*at University of*

Nebraska poultry research/ farm) are trying to offer more calcium early on in the rations, but have seen some very soft keels/bone early on.

We just bought a used x-ray bone densitometer that will allow us to follow bone density in live birds over time to assess bone loss and osteoporosis. Hopefully we can start shedding some light on this important problem." Regards, Sheila Purdum

3. Dr. Mike Persia, Poultry Scientist, Iowa State University (Ames, IA)
Telephone interview:

Mike acknowledged the complexity of "soft bones" in young laying hens. Initially he, too, mentioned the complexity of the *dynamics of Ca/P as well as Vitamin D*. Naturally, they are either in dietary balance or not, but if questionably low they are doubtfully near deficieny as such. Mike did suggest three additional avenues of thought.

First, he suggested that birds **if stressed may experience lowered feed intake**. Obviously, if dietary concentrations are adequate and yet feed intake is low, there could be insufficiencies just due to actual consumption of nutrients.
Second, he mentioned that **bone integrity is also tied in with** not just Ca/P but rather the **micro-minerals** as well. Their role in bone development is not adequately defined as yet but he stated they do add to the dynamics. Thus, this is another area to explore.
Third, Mike acknowledged that **retention of large particle Ca in the gizzard is a function of particle size** too. Is it possible that by lowering the topside of *the large particulate* $CaCO_3$, retention time in the gizzard could be reduced; thus, making less Ca^{++} available when needed? We shared with him the test results (Shell & Bone Builder) we've seen so far this year. The average particle size remained unchanged with virtually no change seen in *acid solubility*.

4. Dr. Kristjan Bregendahl, Nutritionist, Sparboe Farms (Litchfield, MN) – formerly nutritionist Hy-Line International – formerly Iowa State University Poultry Scientist

"Soft bones in young birds are typically caused by one (or a combination of the following):

- Not enough Ca in the diet (or diet intake too low)
- Not enough available P in the diet (or diet intake too low)
- Not enough Vitamin D_3 in the diet (or diet intake too low)
- Phytase is not delivering the available P that is formulated for.
- The too-low Ca and av-P could be from byproducts, if used (e.g., meat and bone meal). E.g., if the MBM or other byproduct (DDGS, bakery meal, etc) doesn't contain the Ca and/ or P content that was expected (have it analyzed at a laboratory).

I suppose there could be other issues (other vitamins, trace minerals, too-coarse Ca particle size), but the above-mentioned should be checked first." Cheers, Kristjan

ILC comment --

What can be said as we draw together these inputs? We are certain that more questions will arise than answers already provided. However, these ideas provide useful fodder for thought into investigating *soft bone* dynamics. ILC Resources perceives its role as providing quality products of consistent uniformity ensuring expected performance. To do so, we analyze our products continuously to maintain consistency of processing as well as gather informational data meaningful to their proper use.