Atlantic Sourced Shells as Alternative Calcium Sources for Laying Hens

Introduction:
Currently ground limestone and large particle oyster shell are the common sources of calcium for laying hens providing both small and large particle sizes in the diet. However, the price of oyster shell is approximately 3 times that of limestone. In Atlantic Canada, over 5000 tonnes of blue mussel shells and over 6000 tonnes of whelks are produced annually. By-product from these industries consists of broken and crushed shells and undersized animals.

Atlantic Sourced Shells:

- Blue Mussels – *Mytilus edulis*
- Surf Clam – *Spisula solidissima*
- Common Whelk – *(Buccinum undatum)*

Objective:
The objective of each project was to determine the effect of replacing traditional oyster shell and ground limestone with large and fine ground blue mussel, surf clam or common whelk shell on production performance throughout short and long-term replacement periods.

Methods and Materials:
Three trials were conducted and each trial used 240 White Lohmann Lite Laying hens (20-25wks of age). Experimental diets were formulated to meet or exceed breeder nutrient specifications.

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<th>Table 1: Commercial and Alternate Calcium Sources for each of the Three Laying hen Research Trials</th>
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<td><strong>Trial 1</strong></td>
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<td>Common Commercial Sources</td>
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<td>Alternative Calcium Sources</td>
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Results:

**Trial 1- Surf Clam and Blue Mussel:**
This was a short cycle trial, 8 weeks in duration. Calcium source did not have an effect (P>0.05) on hen-day production (Fig.1) feed consumption, or body weights. At 26 weeks of age, eggs from hens fed the OS/GL diet had lower (P≤0.05) specific gravity. At 28 weeks of age, the specific gravity of eggs from
Hens fed the SM/GL diet was higher (P≤0.05) than the specific gravities of eggs from hens fed the other diets. The amount of force required to break the eggshells was not affected (P>0.05) by calcium source.

**Conclusions:** Large particle blue mussel and surf clam shells were successful replacements for oyster during a short-term production cycle.

**Trial 2 - Blue Mussel:**

This was a 52 week study. Calcium source did not have an effect on hen-day production (Fig. 2), feed consumption, egg specific gravity, egg breaking strength, or body weights for the duration of the trial. Egg weights did not differ (P>0.05) among the treatments except at the end of the trial. Eggs laid by hens fed the GBM treatment weighed less (P≤0.05) (64.6 g) than those from hens fed the OS/GL (66.3 g) and BM/GBM (67.3 g) during the last period only. Although there was a difference, mean egg weights at 77 weeks of age were all in the extra-large category.

**Conclusions:** Large and finely ground blue mussel shells were successful replacements for oyster shells and finely ground limestone during a full-term production cycle.

**Trial 3 - Whelk:**

Feed consumption (Fig.3), body weights, and hen-day production (Fig.4) were similar regardless of calcium source up until 64 weeks. From 65-72 weeks temperature in the facility increased (Fig.5) which ay have resulted in decreased feed consumption, body weights and hen-day production for birds fed W/GW and GW over birds fed OS/GL. Egg weight, egg specific gravity, and shell breaking strength were not affected (P>0.05) by treatment during the trial.

**Conclusion:** Production data up to 64 weeks of age were similar, however, performance was reduced from 65-76 wks of age for birds fed ground whelks, potentially due to increased environmental temperatures.

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Funds provided by: NS Dept. of Agriculture, Nova Scotia Egg Producers, PEI ADAPT Council, PEI Seafood Processors Assoc., St. Laurent Gulf Products, PEI Dept. of Agriculture, Marine Institute of Memorial University, Cape Mariner Enterprises, ACOA, NRC, CCFI, Nfld & Labr. Dept. of Fisheries and Aquaculture.