CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

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Project Number

33197

Project Title

Does Particle Size of Calcium Ingested by Chickens Affect How Calcium Is Metabolized in Increasing Egg Shell Strength?

Preliminary

Abstract

Objectives/Goals

The purpose of my project is to determine if the particle size of calcium ingested by chickens affect how calcium is metabolized in increasing egg shell strength.Humans have teeth and chew their food however chickens do not have teeth but have a gizzard.The gizzard is like a food crusher, it uses strong muscles, grit, and small rocks that the chicken has ingested for grinding hard feed stuffs.My previous investigation on effects of inherited vs. non-inherited calcium indicated that calcium supplemented feed produces stronger egg shells. I questioned if the particle size of calcium affected shell strength.My independent variables were different particle sizes of calcium supplemented feed. No calcium as a control, greater than 5mm, less than 5mm, and crushed powder calcium.The calcium form I used was non-inherited egg shell calcium (chicken egg shells from nonrelated chickens to my six tests subject chickens).

Methods/Materials

Greater than 5mm particles sized calcium feed was lightly crushed egg shells that stayed on top of a 5mm wire net sifter.Less than 5mm particles sized calcium feed was lightly crushed egg shell that passed through the holes of a 5mm wire net sifter.Crushed calcium feed was egg shells crushed.To insure that the previously tested calcium cleared the chickens systems, I waited 3 days between the different particle sizes to collect test eggs.I fed my chickens twice a day with a mixture of pellets and the calcium feed for trials.To test egg shell strength I constructed a mechanism to crush eggs.This mechanism included PVC pipe, with a cap, a sleeve for the pipe, and sand.I placed the test egg in a shallow pan bottom up with the test egg placed under the crushing mechanism.I filled the pipe of the mechanism with sand until the egg broke.This pipe had a silicone ring on the capped bottom to stabilize the egg.I weighed the sand on a gram scale and recorded each egg by chicken and feed type onto my data log.I used 6 chickens, 10 eggs per chicken/independant variable in my study.This totaled 240 eggs.

Results

No calcium =5246.40g
Greater than 5mm calcium =5444.08g
Less than 5mm calcium =5938.10g
Crushed calcium =5326.02g

Conclusions/Discussion

The weakest egg shell strength was the control eggs, at an average of 5246.40g to crush the eggs.The strongest egg shell was produced by the less than 5mm particle sized calcium feed, at an average of 5938.10g to crush the eggs.

Summary Statement

Does particle size of calcium ingested affect egg shell strength?

Help Received

Interview, Dr. Gregg Cutler, Doctor of Veterinary Medicine,/ Interview, Michelle Ganci, California State University Fresno, Poultry Professor