# CALIFORNIA STATE SCIENCE FAIR
# 2014 PROJECT SUMMARY

**Name(s)**

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**Project Number**

34258

**Project Title**

## Nitrate/Nitrite Remediation by Means of Modified Chicken Feed

**Abstract**

**Objectives/Goals**

The objective of this study is to identify the most reliable and cost effective solution which will reduce nitrates, nitrites, and phosphates in poultry manure.

**Methods/Materials**

This test includes 3 independent variables and a control. Test subjects are 8 adult Rhode Island Red layer chickens in test groups of 2 subjects. Feed modifications will consist of a 2% modified, standard layer feed. The control feed will be 100g of layer feed. 10g of composite chicken excrement from the control subjects each independent variable will be collected daily for ten days. Samples will then be transferred into Ion Chromatograph test tubes and diluted to 10:10, 5:10, and 1:10 dilutions using Millipore water and analyzed by the Ion Chromatograph.

**Results**

Control:
nitrates 0.3692ppm, nitrites 0.1900ppm, phosphates 3.9494ppm.
Protease Enzyme Modification:
nitrates 0.3571ppm, nitrites 0.2188ppm,
phosphates 3.2914ppm.
Sodium Bicarbonate Modification:
nitrates 0.4153ppm,nitrites 0.2640ppm, phosphates 3.5745ppm.
Charcoal:
nitrates 1.0123ppm, nitrites 0.4781ppm, phosphates 4.3300ppm.
None of the modifications tested reduced nitrite levels when compared to the control group. Protease enzyme did show to reduce nitrates and phosphates levels.

**Conclusions/Discussion**

This study does indicate that nitrate and phosphate in chicken manure can be affected by means of feed modifications. Nitrite levels did not show reduction with feed modifications. Although, nitrite levels did not indicate reductions, further study should be done with revised testing methods to eliminate sample interference. Protease enzyme modification demonstrated to reduce both nitrate and phosphate levels and has shown in other studies to improve bio feed conversion rates in chickens.

**Summary Statement**

Can poultry diet modifications reduce levels of nitrates, nitrites, and phosphates which contribute to the eutrophication of aquatic environments?

**Help Received**

Conducted sample testing at APPL Labs using a Ion Chromatograph, Dr. Maurice Pitesky helped me with statistical analysis of project