



# Effects of parental dietary canthaxanthin and 25-hydroxyvitamin D<sub>3</sub> on broiler chickens

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## Summary

A study was done to investigate the interaction between dietary canthaxanthin (CXN) and 25-hydroxyvitamin D<sub>3</sub> (25-OH D<sub>3</sub>) in broiler breeders. Early embryonic mortality showed no change with breeder age in the 25-OH D<sub>3</sub> hen treatment, but it decreased with increasing breeder age to 45 weeks of age for all other treatments. Parental HC increased breast meat yield in broiler chickens and maternal CXN and/or 25-OH D<sub>3</sub> increased early innate immunity. This indicates that paternal and maternal CXN and/or 25-OH D<sub>3</sub> may increase the broiler performance and early immune system, respectively and may be beneficial to supplement breeders with these nutrients to obtain broilers with higher breast meat yield and more viable broiler chicks. This study shows the preliminary data and results, with more data to be analyzed.

## Background

- Canthaxanthin is a lipid soluble pigment with antioxidant properties. It has been shown to increase total egg production and hatchability in broiler breeders as well as increase broiler innate immunity
- 25-hydroxyvitamin D<sub>3</sub> is a metabolite of vitamin D<sub>3</sub>. It has been found to increase early innate immunity in broiler chicks when fed to breeders and increase breast meat yield when fed to broiler chickens

## Objectives

- To examine the interaction between dietary CXN and 25-OH D<sub>3</sub> on broiler breeder production
- To investigate the interaction between parental dietary CXN and 25-OH D<sub>3</sub> on broiler performance and innate immunity

## Hypotheses

- The effect of CXN and 25-OH D<sub>3</sub> is additive
- There is an increase in total egg production, hatchability and early broiler innate immunity when these nutrients are fed to breeders
- Maternal 25-OH D<sub>3</sub> will increase the broiler breast meat yield

## Materials and Methods

### Dietary Treatments

- 4 dietary breeder hen treatments
  - Control, CXN, 25-OH D<sub>3</sub>, CXN plus 25-OH D<sub>3</sub> (HC) diet
- 2 dietary breeder rooster treatments
  - Control and HC diet

### Experimental Design

- Ross 308 breeder hens (n=288)
- Ross 544 breeder roosters (n=60)
- Hens inseminated and weighed weekly
- Fertile eggs were identified by hen
- Sent to commercial hatchery every other week from 33 to 45 weeks of age
- Hatching eggs collected at 25 (broiler performance) and 28 (innate immunity assay) weeks of age
- Broilers processed at 43 days of age
- Broiler immune assay done at 1 and 4 days of age

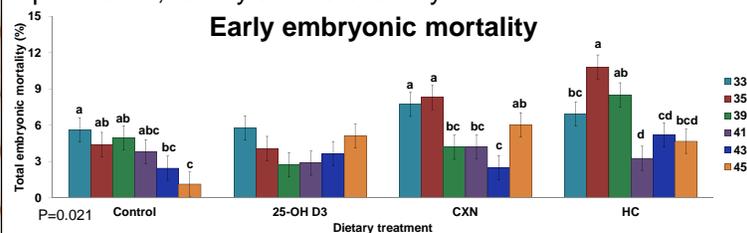


### Statistical Analysis

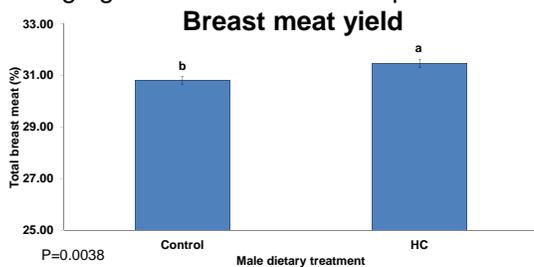
- Data were analyzed using Proc mixed of SAS as a 4 x 2 factorial arrangement (P<0.05)

## Results

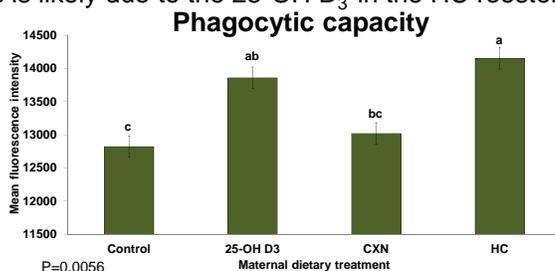
- The preliminary results are shown in this study and we will also have data from hatches at 37, 49 and 58 weeks of breeder age
- Breeder hen dietary treatments had no effect on total egg production, fertility and hatchability



- Early embryonic mortality did not change with the breeder ages for 25-OH D<sub>3</sub> treatment but generally decreased with increasing age for other treatments up to 45 weeks of age



- Though all broilers were fed the same diet, HC in the rooster diet resulted in increased breast meat yield in the offspring. This is likely due to the 25-OH D<sub>3</sub> in the HC rooster diet



- Breeder hen diets that included 25-OH D<sub>3</sub> had broiler chicks with increased phagocytic capacity than the control diet. This effect could possibly be from maternal 25-OH D<sub>3</sub>

## Implications

- Though the broilers were fed with the same diet, supplementing CXN and 25-OH D<sub>3</sub> to broiler breeders has an effect on the broiler performance and immune function
- Based on the preliminary results, most of the effect seems to be from the inclusion of 25-OH D<sub>3</sub> breeder hen and rooster diet
- These are preliminary results, and we have 3 other data sets from various flock age yet to analyze

## Acknowledgements



## Contact information

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