



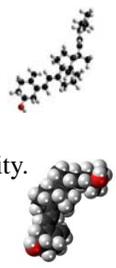
Gene Expression in Breast Muscle yield in broiler chickens fed 25-OH vitamin D3 (HyD) by using Microarray technique

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Abstract: The aim of the present study is to test reason(s) of improvement on breast muscle yield and innate immunomodulation in growing broiler chicken fed dietary Vitamin D₃ and 25-OH D₃ (HyD) by using Microarray technique. to understand molecular mechanism of this improvement which is how many genes are in charge and from which biochemical pathways dietary vitamin D₃ and HyD can cause improvement in breast muscle yield.

Introduction: 25-Hydroxycholecalciferol (25OHD₃) is the major circulating cholecalciferol (Vitamin D₃) metabolite; it is formed in the liver from vitamin D₃ by the 25-hydroxylase. Its activation to 1,25-dihydroxycholecalciferol. (1,25(OH)₂D₃), the active hormonal form of vitamin D₃, takes place in the kidney by the action of 25OHD₃-1-hydroxylase (1-hydroxylase) which is a highly regulated pathway. Dietary vitamin D₃ and HyD cause changes in different tissues. Previous studies showed that HyDTM increases breast meat yield, and has an important role in the development of the innate immune system and small intestine in young birds. HyDTM has also been shown to increase villus length and result in a higher ratio of villus length to crypt depth in both the duodenum and jejunum in broilers. This may reduce the maintenance requirements of the gut, and increase the amino acids available for breast muscle growth.

- Breast yield (More meat 2-4%)
- Innate Immune response (Increased IGg).
- Small intestinal morphology (Better nutrient absorption).
- Growth performance (Shorter cycles and better feed efficiency).
- Bone mineralization (Stronger bones).
- Sustain egg production
- Developing embryo, hatchability.
- Reduce the bon diseases



Material and methods:

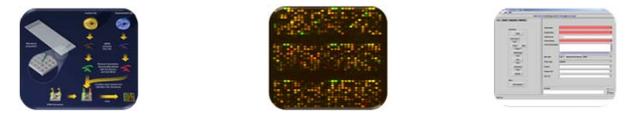
Three hundred twenty 1-day-old male Ross 308 broilers will be randomly assigned to 32 pens. Experiment will be conducted as a completely randomized design in a factorial arrangement (2 × 2) with 10 birds in each pen and 8 replicates.

Treatments:

Control	Treatment 2	Treatment 3	Treatment 4
Vitamin D3 2,760 IU	25-OH-D ₃ 69 mg/t	Vitamin D3 + 25-OH-D ₃ 2,760 IU + 69 mg/t	Vitamin D3 + Vitamin D3 2,760 IU + 2,760 IU

Genomics

Six-week-old male broilers (n = 10/treatment) will be selected from a group of 320 broilers. Birds will be euthanized with i.v. injection of pentobarbital into the caudal tibial vein. Breast muscle and liver samples will be collected from similar sites of breast muscle and liver from each bird. Breast muscle and liver samples for RNA assay will be collected and frozen in liquid nitrogen within 2 min after birds will be killed. mRNA expression in breast muscle will be obtained from male commercial broiler for the increased breast muscle will be investigated. mRNA samples will be labeled with cyanine 3 or 5 fluorescent dyes to generate cDNA probes will be hybridized on a chicken microarray.



Variable and measure:

Growth rate, feed intake and FCR will be measured on a per pen basis at the end of the starter (0 to 10 d), grower (11 to 28 d) and finisher (29 to 45 d) dietary phases. gut weight and villus height and crypt depth. Blood samples will be obtained for the following measurements: plasma nitric oxide, plasma minerals, and plasma acute phase proteins.

Implications: We expect to see the effect of the 25-OH vitamin D3 on important aspects of broiler chicken production: increase growth rate and breast meat yield, less skeletal disorders and find the molecular mechanism of those changes.

Sponsors:



- * University of Alberta, Edmonton, AB Canada
- (1) Alberta Agriculture and Rural Development, Edmonton, AB Canada
- (2) Alberta Chicken Producer
- (3) Alberta Livestock and Meat Agency
- (4) Poultry Research Center

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