



Impact of Maternal Nutrition on Egg Composition, Embryo Development, Chick Quality and Broiler Growth

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INTRODUCTION

❖ Maternal nutrition influences egg production, egg weight, embryo development and hatchability, nutrient content of the egg, gene expression and metabolism in the progeny.

❖ Excess of certain nutrients may cause problems as serious as those from deficiencies [1].

❖ High energy intake and excess body weight are the main causes of low fertility in broiler breeder hens [2].

❖ Hatch weight affects broiler growth and hatch weight is related to egg weight.

❖ Dietary fat and protein are the most important dietary components known to alter egg weight [3].

Objective: Verify impact of energy to protein ratios in broiler breeder diet on egg composition, embryo development, chick quality and broiler growth.

APPROACH

❖ A total of 128 Ross 708 broiler breeders will be artificially inseminated and eggs collected.



Artificial Insemination

❖ The breeders will have been provided with high ME and low protein diet (HELP=2,950 Kcal/kg;14% CP, n=64) and low energy high protein diet (LEHP=2,650 Kcal/kg;16% CP, n=64) during rearing and laying phase. They were feed restricted in order to achieve breeder recommended body weight curve.

Experiment 1: chick quality

Hypothesis: Different energy: protein ratios in breeders' diet influence hatchability, hatch weight and chick quality.

❖ Weight of eggs from hens at 29 and 36 wk of age will be recorded prior to incubation in single stage incubator at 37.5°C and 85% RH with turning each hour.

❖ Transfer to individual baskets in hatcher at 18 d.

❖ Hatchability, fertility, hatch weight, hatch time and chick quality will be evaluated.



Eggs in individual baskets



Measuring hatch weight

Experiment 2: broiler performance

Hypothesis: Breeder diet influences broiler growth rate and yield.

❖ Birds hatched from experiment 1 (n=500) will be placed sex separately in 16 pens.

❖ Individual body weight and feed intake will be recorded weekly until 42 d, when birds will be dissected to measure breast muscle, liver, abdominal fat pad weight and yield.

Experiment 3: embryo development

Hypothesis: Maternal diet has an influence on the rate of embryo development.

❖ Eggs from hens at 30 and 37 weeks of age will be incubated and opened at 5, 7, 10, 13, 15, 18 and 20 days of incubation (n=60/day) to evaluate embryo weight, embryo length, and stage of development based on morphological characteristics of the embryo.

Experiment 4: egg composition

Hypothesis: Different diets influence egg weight, yolk and albumen ratio and yolk composition.

❖ Eggs collected from hens at 31 and 38 weeks of age will be weighed. Eggshell weight and thickness, albumen weight and height and yolk weight will be measured.

❖ In the yolk, the effect of maternal nutrition on total fat, fatty acid profile and total protein will be evaluated.

RELEVANCE FOR INDUSTRY

Manipulation of the parental diet is expected to improve hatchability, broiler uniformity, performance and growth.

REFERENCES:

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- [3] Lopez, G., Leeson, S. 1994. J. Appl. Poult. Res. 3:303-311.