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Effects of dietary threonine levels on laying performance, offspring traits and its regulation of embryo expressions of pTOR and TDH in Chinese yellow-feathered broiler breeder hens

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The effects of dietary threonine (Thr) level on performance, offspring traits and embryo protein deposition in broiler breeder hens was investigated. A total of 720 Lingnan yellow-feathered broiler breeder hens were randomly divided into 1 of 6 dietary treatments with 6 replicates per treatment (20 birds per replicate). The hens were fed either the basal diet (Thr 0.38%) or the basal diet supplemented with 0.00%, 0.12%, 0.24%, 0.36%, 0.48% and 0.60% Thr from 29 w to 38 w. The results showed that Thr supplementation produced quadratic positive responses in laying rate. Hatchability was higher in breeders fed 0.12% and 0.24% Thr than those of control birds ($P<0.05$). Dietary supplemental Thr had significant effects on expressions of mucin 2 (MUC2) in duodenum, colon and uterus and ZO-1 in duodenum of hens ($P<0.05$). In chick embryo at embryonic age 18, there were significant up-regulations of dietary Thr levels on the transcripts of liver and breast muscle poultry target of Rapamycin, thigh threonine dehydrogenase, duodenum and ileum amino-peptidase ($P<0.05$), but no effects on MUC2 expression of duodenum and ileum ($P>0.05$). Chick livability and serum uric acid nitrogen concentration were increased and liver glutamic-pyruvic transaminase activity was decreased by dietary Thr supplementation ($P<0.05$). It concluded that there were positive effects of adding Thr on laying production of breeder hens and offspring performance and this was associated with the regulations of gene expressions related to amino acid transportation and protein deposition. The optimal dietary Thr supplemental level was 0.298% or 0.388 g/d for broiler breeders.

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The effect of *in vitro* rumen digestion on polyphenol content and free radical scavenging activity of apple pomace

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This project is part of a larger task pursuing the development of naturally produced, health-contributing, polyphenol-enriched milk products that are derived from byproduct plant matter from agricultural sources. Apple pomace (AP), an abundant agricultural byproduct in Canada has high polyophenol content (1000-1415 g Gallic acid equivalent/100 g dry weight). The objective of this study is to evaluate the effects of *in vitro* rumen digestion on the total polyphenol content and free radical scavenging activity of AP. AP will be collected fresh and kept at -20 °C until analysis. Rumen inoculum will be collected from a mature lactating cow and *in vitro* digestion will be performed for 24 and 48 hours of digestion in an ANKOM RF Gas Production System as per manufacturer's instructions. After digestion, the samples will be centrifuged at 26.940 g and filtered through 0.2 um polyethersulfone filters to remove bacterial cells. All samples (treated and untreated) will be freeze-dried and ground, after which polyphenols will be extracted by solvent extraction (80% methanol at 21 °C for 1 hour). Fast Blue BB assay for total polyphenol quantification and 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging activity assay will be performed on all samples in triplicate with 3 technical replicates to assess the extent of polyphenol degradation in the rumen. The fraction of polyphenols remaining after *in vitro* digestion will be roughly representative of the amount available for absorption into the cow's bloodstream and subsequently the mammary gland.

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