Metabolism of imidazole dipeptides and taurine of the breast muscle are affected by post-hatch development in meat-type chickens

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Objectives: Imidazole dipeptides (carnosine, anserine, and balenine) and taurine are one of the characteristic and abundant bioactive substances in chicken meat. Understanding of their metabolism will be important for poultry industry. In the present study, to explore metabolic characteristics of imidazole dipeptides and taurine in breast muslce during the post-hatch developmental period, metabolomic analysis of the breast muscle was performed in two kinds of meat-type chickens (Chunky and Kumanojidori).

Materials and Methods: Breast muscles of Chunky and Kumanojidori (7, 28 and 42 days old, male) were collected and deproteinized. Untargeted and semi-quantitative analysis using a gas chromatography-mass spectrometry and quantitative analysis of imidazole dipeptides (carnosine, anserine and balenine) and taurine using ultra-performance liquid chromatography-tandem mass spectrometry were performed as previously described (Tomonaga et al., 2022).

Results and Discussion: The increase rates of body and breast muslce weights of Chunky were significantly higher than those of Ku- manojidori. The most significant growth-related changes in metabolite levels were observed between seven and 28 days of age. Total imidazole dipeptides increased with the development. In contrast, taurine levels in the muscle decreased. This would be substrate availability-dependent because some upstream metabolites, methionine, cysthationine, and homocysteine, decreased with the development. These changes in metabolite levels with the development were identical to those of male egg-type chickens (Tomonaga et al., 2022). Most metabolite levels in imidazole dipeptides and taurine metabolism in 28 days of age were identical be- tween two kinds of meat-type chickens.

Conclusions: Total Imidazole dipeptide level increased while taurine level decreased with the development in the breast muslce of meat-type chickens. The difference in growh rate would affect little on these metabolite levels.

Reference:

Tomonaga S, Kawase T, Tsukahara T, Ohta Y, Shiraishi J-i. Metabolism of Imidazole Dipeptides, Taurine, Branched-Chain Amino Acids, and Polyamines of the Breast Muscle Are Affected by Post-Hatch Development in Chickens. Metabolites. 2022; 12(1):86.

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