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The Potential Distribution of Chlorocholine Chloride (CCC) Residues in Selected Tissues of Laying Hens Based on Labelled ^{15}N

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Abstract

Chlorocholine chloride (CCC) is mostly used commercially in agriculture as a plant growth retardant to improve yield of cereal crops by increasing lodging resistance. It due to the Cl- group in the structural formula of CCC, prevents its structural alteration during metabolism in plants. As a result, CCC accumulates in plant residues as well as plant products. The residual CCC can be exposed on the animal products if hens are fed diets contaminated with this compound. It also can be transferred along the food chain to human either directly through consumption of contaminated food or indirectly through consumption of animal products from animals, which have been fed CCC contaminated feed. This study examined the potential distribution of CCC and/or its metabolites in tissues (meat, inner organs, eggs and blood) of laying hens using delta value (δ) and atom percentage of ^{15}N derived from ^{15}N -CCC containing diets. In a completely randomised design, 20 layer hens of Brown breed were divided into 4 groups and each fed on one of the four diets of 0-ppm ^{15}N -CCC (control diet / group A); 5-ppm ^{15}N -CCC (group B); 50-ppm ^{15}N -CCC (group C) and 100-ppm ^{15}N -CCC (group D) for eleven days. During the 7 days that followed, ^{15}N -CCC diets were withdrawn and all groups fed the control diet. The $\delta^{15}\text{N}$ and atom % ^{15}N increased significantly ($p < 0.05$) with increasing level of ^{15}N -CCC in diet eleven days after receiving ^{15}N -CCC diets. The excesses still remained even after diets withdrawn and differed ($P < 0.05$) significantly in tissues except egg albumen which not significantly different ($P > 0.05$). Femur meat ^{15}N abundance was lowest and differed ($p < 0.05$) from others. The ^{15}N content was highest in egg yolk. The results suggest that CCC residues and or their metabolites are distributed in chicken tissues in varying concentrations.

Keywords: Chlorocholine chloride, poultry products, radioactive labelled ^{15}N , residue