



# Confined housing system increased abdominal and subcutaneous fat deposition and gene expressions of carbohydrate response element-binding protein and sterol regulatory element-binding protein 1 in chicken

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**ABSTRACT.** Free-range production system is increasingly being used in poultry breeding and feed production in many countries. The objective of the current experiment was to evaluate the effects of different raising systems on fat-related traits and mRNA levels of liver lipogenesis genes in Erlang Mountainous chicken. Each of 10 birds (91 day old) from caged, indoor-floor housed, and free-range housing systems was slaughtered, and fat-related traits, live body weight (BW), subcutaneous fat thickness (SFT), abdominal fat weight (AFW), abdominal fat percentage (AFP), and intramuscular fat content were determined. The mRNA levels of liver

X receptor  $\alpha$ , carbohydrate response element-binding protein (*ChREBP*), sterol regulatory element-binding protein-1 (*SREBP1*), and fatty acid synthase were detected. The caged chicken exhibited significantly higher BW, SFT, and AFW than those of free-ranged chicken ( $P < 0.05$ ). All the 4 genes had a similar expression pattern, and they showed the highest level in caged chicken, while the lowest level was found in free-ranged chicken. Association analysis indicated that there were significant ( $P < 0.05$ ) or highly significant ( $P < 0.01$ ) positive correlations between the mRNA levels of *ChREBP*, *SREBP1*, and fat traits of SFT, AFW, and AFP. Thus, we deduced that increased fat deposition in caged chicken was probably induced by increased gene expression of *ChREBP* and *SREBP1* in the liver.

**Key words:** Chicken; Fat-related traits; Gene expression; Housing system