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Proteomic Profiling Analysis of Pectoralis Muscle in Thai Indigenous Chicken using two-Dimensional Gel Electrophoresis

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Abstract

The pectoralis muscle in particular, growth at a greatly enhanced rate in chickens selected for meat production. In order to understand the proteome control of this trait, proteomic profiling in pectoralis muscle of Thai indigenous chicken was analysed in during growth periods. The muscle tissues were collected from individual chickens at 0, 3, 6 and 18 week of ages. Extracted muscle proteins were analysed and identified with two-dimensional gel electrophoresis (2-DE) and matrix assisted laser desorption ionisation time of flight mass spectrometry (MALDI-TOF/MS). A total of 360 individual spots were found, ranging from 14 to 97 kDa (pH 3–10). Allowing seven well-resolved protein spots were identified by MALDI-TOF/MS. In this investigation, the profiling of seven protein spots changed significantly in quantity in during growth periods could be divided into three groups: **(i)** the expressed protein markers showed a significant increase of levels ($p < 0.05$), as the following: Phosphoglycerate mutase1 (PGM1), Ribosomal protein S2 (RPS2) and Triosephosphate isomerase1 (TPI1); **(ii)** the expressed protein markers showed a significant decrease of levels ($p < 0.05$), as the following: Apolipoprotein A-I (APOA1), Putative dihydrofolate reductase (DHFR) and Fatty acid binding protein3 (FBP3); and **(iii)** the Heat shock protein 25kDa (HSP25K) represented the up-regulate and down-regulate. Five protein spots as the following: PGM1, APOA1, TPI1, HSP25K and FBP3 were associated with chicken muscle metabolism. The mRNA expression levels of these five protein spots were evaluated using quantitative real-time PCR; Fatty acid binding protein 3 was shown to increase significantly during growth periods ($p < 0.05$). In addition, TPI1 was tended to be increased of mRNA levels during growth periods, especially at 6–18 week-olds. Moreover, an increasing of TPI1 mRNA levels is consistent with its protein expression levels.

Keywords: Protein expression, proteomics, real-time PCR, Thai indigenous chicken, two-dimensional gel electrophoresis