

Analysis of the Low-Molecular Weight Protein Profile of Egg-White and its Changes during Early Chicken Embryological Development

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Many low-molecular weight (LMW) proteins in egg-white are potentially bioactive, but the mass range and number of these are not yet fully characterized. The aim of the present study was to map the LMW protein profile in egg-white and provide the basis for further understanding of the physiological function of these proteins. For this purpose, six time points (days 0, 1, 2, 3, 4, 5 of incubation) were selected in an attempt to delineate the LMW proteomic profile in egg-white and its changes during early chicken embryological development. Samples were pretreated using gel chromatography techniques prior to analysis by matrix-assisted laser desorption/ionization-time of flight mass spectrometry (MALDI-TOF MS). Protein search focused on the mass range m/z 1,000 to 8,000. One hundred and fourteen mass signal peaks of LMW proteins ranging from m/z 1,035.88 to 7,112.91 were detected at all six time points. The observed changes in the LMW protein profile during development were highly dynamic. Eighty six novel mass signal peaks of LMW proteins were generated during incubation, the origin of which could be assigned to the high-molecular weight protein fractions. The list of egg-white LMW proteins provided in this paper is by far the most comprehensive and is intended to serve as a starting point for the isolation and functional characterization of interesting LMW proteins which may play a crucial role in early embryo nutrition and immunity.

Key words: Egg-White, Low-Molecular Weight Protein, Matrix-Assisted Laser Desorption/Ionization Mass Spectrometry