

## Identification of meat quality related genes in Korean Native Chicken using Proteomics

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### Abstract

There is growing interest for improving meat quality in chicken. Recently, the proteomics can be used as a valuable tool for identifying candidate proteins. In this study, we investigated the proteins expressed in chicken muscle for obtaining chicken muscle reference two dimensional(2D) map and identifying the proteins in muscle affecting Ginseng diet. A few candidate proteins have been currently characterizing using MALDI-TOF Mass spectrometry. Further investigations of the proteins can be used as valuable markers for selection of better quality chicken meat.

(Key words : Korean Native Chicken, meat quality, Proteomics, Ginseng)

### Introduction

The importance of *Gallus domesticus*(Chicken) on the entire agricultural economy for decades promoted a wide investigation on fundamental mechanisms controlling animal health and productivity. Most domestic animal species, including chicken, cattle and pigs, expected to have approximately 30,000 functional genes and their expressions patterns are different in organs and tissues(Brown, 2002). In parallel to the genetic investigation, a series of structural studies have been launched on isolated animal proteins with the help from the recently growing proteomics researches(Talamo, 2003). Using this proteomics tool, we investigated muscle related proteins from Korean Native Chicken. It is well known that the Ginseng have an outstanding effects including immune responses(Rivera et al., 2003) and people also prefer to have Ginseng fed chickens because of the better meat flavor (unpublished data). In this experiment, we firstly investigated the proteins expressed in chicken muscle for obtaining chicken muscle reference two dimensional(2D) map and secondly, identified the proteins in muscle affecting Ginseng diet.

### Materials and Methods

Korean Native Chicken were fed Ginseng extract diet for 3 weeks before collecting the muscle samples. The muscle proteins from Ginseng fed birds were compared with those of control birds for identifying deferentially expressed proteins. Collected chicken muscles were rinsed with TE buffer for avoiding blood contamination and treated with lysis buffer(8 M urea, 4 % CHAPS, 2 % Phamalyte 3-10) for 1 hour and collect the supernatant. Rehydration was then performed in the rehydration solution(8 M urea, 2 % CHAPS, 0.002 % Bromophenol Blue) with Immobiline DryStrip(pH 3-10, 18

cm, Amersham, USA) for 15 hours at 20 °C. The IEF(Isoelectric Focusing) was performed based on the manufacturer's instruction with IPGphor IEF system. The SDS-PAGE gel electrophoresis was performed for 6 hours at 300 V and the gel was silver stained using silver staining kit(Amersham, USA). The 2D image were analysed with Image Master 2D Elite Software(Amersham, USA). The differentially expressed proteins were analysed with MALDI-TOF Mass spectrometry for detailed verification of the proteins.

## Results and Discussion

Muscle samples from Korean Native Chicken were collected for identifying proteins affecting Ginseng diet. Initially, various 2D electrophoresis conditions were investigated for finding optimum experimental conditions for chicken muscles. As a result, we can obtain good quality 2D gels for further analysis(Fig 1). By comparing with control muscle with Ginseng diet chicken muscle, a few candidate proteins affecting Ginseng has been identified and MALDI-TOF Mass spectrometry is now performing for further verification of the proteins. Based on the known immunological effect of Ginseng, these proteins could be related with immune responses.

The meat quality related proteins identified in this study and their amino acids, nucleotide sequences can be used as valuable markers for selection of better quality chicken meat for the public.

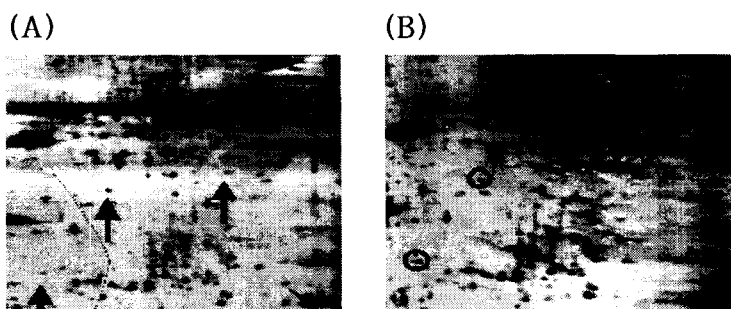


Fig. 1. 2D gel images for the Ginseng treated Korean Native Chicken muscle(A) compared with control(B). The differentially expressed proteins are indicated as arrows and circles.

## 적 요

본 연구는 proteomics의 방법을 이용하여 가금의 육질과 관련된 단백질을 찾고자 수행하였다. 인삼부산물 추출액을 급여한 실용 재래닭에서 육질과 관련된 것으로 추정되는 후보 단백질들이 선별되었으며, 이 결과는 가금의 육질을 향상시키는 단백질 Marker로서 이용될 수 있을 뿐만 아니라 현재까지 밝혀지지 않은 가금의 2D map을 만드는데 역시 중요하게 이용될 수 있다.

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