

Analysis of Collagen in Meat Extracts using Liquid Chromatography and Tandem Mass Spectrometry

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Collagen is the main protein of connective tissue in animals and the most abundant protein in mammals, including humans. In fact, it makes up about 25% to 35% of the total amount of protein in the body. Hydroxyproline is a major component of the protein collagen playing a key role for collagen's stability. Creatinine is a break-down product of creatine phosphate in muscle. These compounds determine how juicy and tender meat is. Traditionally, colorimetric methods are used routinely in the meat and leather industries. Here we present a method using Liquid Chromatography coupled to tandem Mass Spectrometry (LC/MS/MS) for the analysis of hydroxyproline and creatinine from collagen extracts. The samples were simply diluted and injected onto a Hydrophilic Interaction LC column (HILIC) coupled to an API 3200™ LC/MS/MS system operated in positive polarity. Multiple Reaction Monitoring (MRM) was used for detection because of its high selectivity and sensitivity. The developed method had excellent limits of detection, linear range and reproducibility and was successfully applied to the analysis of meat extracts. The high sensitivity of the developed LC/MS/MS method allowed dilution of meat extracts greatly increasing robustness and reducing the risk of possible matrix effects. This analytical procedure can speed up the sample analysis for hydroxyproline and creatinine, which in turn, improves the whole processing of collagen products.

Keywords: collagen, LC/MS/MS, meat, mass spectrometry

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