

## Determination of gentamicins in meat by LC/FL accompanied with online immunoaffinity chromatography cleanup system

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Yasuhiro Sakamoto, Yusuke Iwasaki, Rie Ito, Koichi Saito

Department of Analytical Chemistry, Faculty of Pharmaceutical Science, Hoshi University

### Abstract

A sample cleanup method that employs immunoaffinity chromatography (IAC) was investigated for potential use in the analysis of residual gentamicins (GMs) in meat samples. A column switching system was constructed to automate IAC operation online. GMs were measured by liquid chromatography with fluorescence detection after derivatization with 9-fluorenylmethylchloroformate. Most of the impurities in the meat samples were eliminated by IAC compared with conventional solid-phase extraction. The average recoveries of GMs from chicken meat and pork meat samples ranged from 77.5% to 89.0% (RSD: < 7.0%) and from 75.6% to 87.7% (RSD: < 6.4%), respectively. Method detection limit (MDL, S/N = 3) and method quantification limit (MQL, S/N > 10) were 30 ng/mL and 100 ng/mL, respectively, when calculations were conducted using MDL and MQL of pork meat thigh as total GM concentration. The results suggest that IAC is a useful cleanup method for the determination of residual GMs in meat samples.

Keywords : immunoaffinity chromatography, gentamicin, FMOC derivatization, LC/FL, meat

### I Introduction

Gentamicins (GMs, Fig. 1) are broad-spectrum aminoglycoside (AG) antibiotics that are used as veterinary medicines for the treatment of infectious diseases. However, the indiscriminate use of AGs<sup>1)</sup> has spurred anxiety regarding AG migration to meat sold in the market, as the consumption of AG-tainted meat may impair the health of humans. Conventionally, microbiological methods and physicochemical methods are used for the determination of residual antibacterial agents, particularly AGs. A microbiological method that is based on growth inhibition by antibacterial agents was used in the screening for residual antibacterial agents<sup>2-4)</sup>. However, the microbiological method could not identify the antibacterial agents because of low selectivity. On the other hand, some physicochemical methods, such as LC/UV, a sensitive fluorescence detector (FL), and a mass spectrometer (MS), were also used<sup>5-8)</sup>. However, when sample cleanup was insufficient, the physicochemical methods were affected by the impurities from the food matrix. The cleanup

of residual AGs in meat samples is difficult because most AGs are polar compounds. Impurity-derived interference peaks sometimes appeared on LC/UV and/or LC/MS chromatograms even if sample cleanup by conventional solid-phase extraction<sup>9-11)</sup> was carried out.

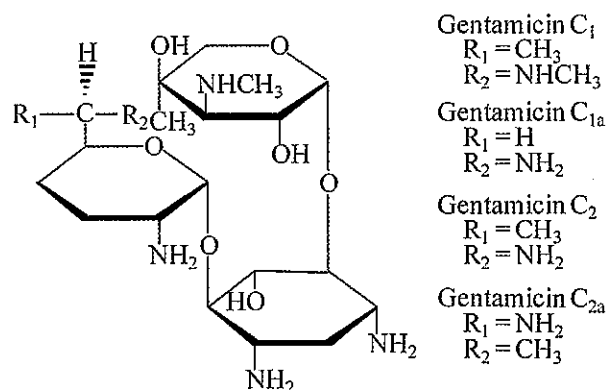


Fig. 1. Chemical structures of gentamicins