

# Extending the applicability of pulsed glow discharge mass spectrometry to GHK-Cu determination.

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Xiaqing Xu, Yan Pan, FredKing  
C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV, 26506-6045,  
United States

## Abstract

The well-known elemental quantification method of glow discharge mass spectrometry (GDMS) is explored here for its potential in biomolecule quantification, specifically for the case of glycyl-L-histidyl-L-lysine copper (GHK-Cu) complex. A pulsed glow discharge (GD) coupled with time-of-flight mass spectrometer (TOF MS) is employed to examine analyte behaviors in different segments of a pulse. The  $^{63}\text{Cu}^+$  ion signal observed in the afterpeak regime of the discharge pulse provides a strong and stable signal suitable for quantification of the GHK-Cu complex. GD operating conditions were optimized based on the  $^{63}\text{Cu}^+$  ion signal. Using cesium iodide as an internal standard, the normalized  $^{63}\text{Cu}^+$  ion signal measured from a set of pure standard solutions exhibited a strong correlation to the GHK-Cu concentration. A linear response of  $^{63}\text{Cu}^+$  ion can be obtained from GHK-Cu in 5–40  $\mu\text{g}/\mu\text{L}$ , with a limit of detection of 3.54  $\mu\text{g}/\mu\text{L}$ . The good correlation of the elemental signal and the tripeptide concentration demonstrates the capability of GDMS in quantification of GHK-Cu and its potential for application in the quantification of other biomolecules.

