SUPPORTING INFORMATION

Rapid organic solvent extraction coupled with surface enhanced Raman spectroscopic mapping for ultrasensitive quantification of foliarly applied silver nanoparticles in plant leaves

Zhiyun Zhang[1], Ming Xia[1,2], Chuanxin Ma[3], Huiyuan Guo[4], Wenhao Wu[4], Jason C. White[3], Baoshan Xing[4], and Lili He[1]

[1]Department of Food Science, University of Massachusetts, Amherst, Massachusetts 01003, United States

[2]College of Pharmacy, Zhejiang Chinese Medical University, Zhejiang Province 310053, P. R. China

[3]Department of Analytical Chemistry, The Connecticut Agricultural Experiment Station, New Haven, Connecticut 06511, United States

[4]Stockbridge School of Agriculture, University of Massachusetts, Amherst, Massachusetts 01003, United States

*** Corresponding Author:** Lili He,
Mailing Address: 240 Chenoweth Laboratory, 102 Holdsworth Way, Amherst, MA 01003,
E-mail: lilihe@foodsci.umass.edu,
Telephone: +1 (413) 545-5847

Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). To determine the extraction efficiency of AgNPs from spinach leaves by organic solvent, AgNPs contaminated spinach leaves with organic solvent treatment were stored at ambient temperature prior to digestion. For the digestion process, spinach leaves were immersed with 3 mL HNO_3 (ACS reagent, 70%) in a 15 mL centrifuge tube overnight. Spinach leaves were microwaved to reach a temperature of 115 ℃ for 40 min, and then samples were cooled to room temperature. Five hundred μL of H_2O_2 was added to further digest the sample at 115 ℃ for 30 min. DI water was used to dilute the resultant digests to a total volume of 40 mL and then the diluent was filtered through polyethersulfone (PES) membrane prior to ICP-MS (Agilent 7500ce, Santa Clara, CA) analysis.

$$\eta_p = \left(\frac{[AgNPs]_{nominal} - [AgNPs]_{leaf}}{[AgNPs]_{nominal}}\right) \times 100$$

Where η_P refer to the extraction efficiency of AgNPs from plants.