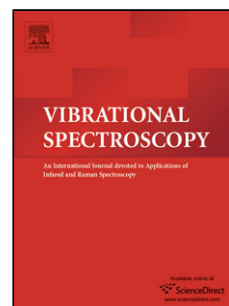


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# Surface Enhanced Raman Spectroscopy of Phenolic Antioxidants: A Systematic Evaluation of Ferulic Acid, p-Coumaric Acid, Caffeic Acid and Sinapic Acid

Iris Aguilar-Hernández<sup>1</sup>, Nils Kristian Afseth<sup>2</sup>, Tzarara López-Luke<sup>3</sup>, Flavio F. Contreras-Torres<sup>1</sup>, Jens Petter Wold<sup>2</sup>, Nancy Ornelas-Soto<sup>1\*</sup>

<sup>1</sup>Laboratorio de Nanotecnología Ambiental, Centro del Agua para América Latina y el Caribe, Tecnológico de Monterrey, 64849, Monterrey, Nuevo León, México.

<sup>2</sup>Nofima AS – Norwegian Institute of Food, Fisheries and Aquaculture Research, Osloveien 1, N-1430, Ås, Norway.

<sup>3</sup>Centro de Investigaciones en Óptica, León, Gto., C.P. 37150, México.

**Corresponding Author:** ornel@itesm.mx

## Abstract

Surface-Enhanced Raman Spectroscopy (SERS) is a powerful surface-sensitive technique to study the vibrational properties of analytes at very low levels of concentration. In particular, detection of bioactive molecules, specifically antioxidants, is an area of interest to gain insights into the reproducible and quantitative SERS-determination. In this study, SERS measurements were systematically evaluated for ferulic acid, p-coumaric acid, caffeic acid and sinapic acid. The study objective in this research was to: 1) prepare and characterize SERS-active silver colloids; 2) cluster the as-obtained colloids through Principal Component Analysis on the basis of concentration and nanoparticle size; and 3) develop a highly sensitive SERS-based method for phenolic antioxidant detection. The reliability of the proposed method was demonstrated through detection of the phenolic antioxidants evaluated at low levels of concentration. In particular, sinapic acid was evaluated for the

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