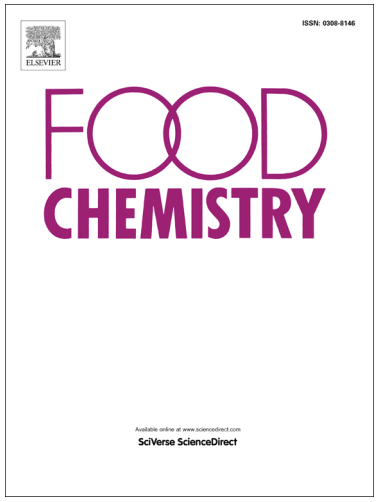

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PII: S0308-8146(17)31113-5
DOI: http://dx.doi.org/10.1016/j.foodchem.2017.06.131
Reference: FOCH 21353

To appear in: *Food Chemistry*

Received Date: 22 February 2017
Revised Date: 16 June 2017
Accepted Date: 22 June 2017

Please cite this article as: Malacarne, M., Antoniolli, G., Bertoldi, D., Nardin, T., Larcher, R., Botanical origin characterisation of tannins using infrared spectroscopy, *Food Chemistry* (2017), doi: http://dx.doi.org/10.1016/j.foodchem.2017.06.131

Botanical origin characterisation of tannins using infrared spectroscopy

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ABSTRACT

Different approaches to analysing the botanical origin of tannins have been proposed in the last fifteen years, but are generally time consuming and require the use of advanced instrumentation. This study aims to suggest an effective, easy, rapid and cheap method based on the acquisition of FT-IR spectra of 3 g/L hydroalcoholic tannin solutions, overcoming possible disadvantages due to sample or particle size inhomogeneity. 114 commercial powder tannins from 7 different botanical sources (oak, chestnut, gall, quebracho, tea, grape skin and grape seed) were collected and the FT-IR spectra were acquired in the region 926-5011 cm^{-1}. Partial Least Squares regression, Discriminant Analysis and Artificial Neural Networks were applied to FT-IR spectra to investigate the possibility of differentiating the 7 botanical origins. The best results were obtained using Discriminant Analysis, with 95% correct re-classification, and 97% grouping of grape skin and seed in a single source.

1. INTRODUCTION

The term tannin is believed to derive from tan, whose original sense was to convert skins into leather, and probably goes back to a Celtic word indicating an oak tree (http://www.etymonline.com/index.php?l=t&p=4&allowed_in_frame=0. Accessed 08.06.17). Tannin compounds are widely distributed in many species of plants, where they play a role in protecting against predation and perhaps also as pesticides, as well as in plant growth regulation.