

White Wine Discrimination Based on Deconvoluted Surface Enhanced Raman Spectroscopy Signals

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Abstract : Food and beverages authentication using rapid and non-expensive analytical tools represents nowadays an important challenge. In this regard, the potential of vibrational techniques in food authentication has gained an increased attention during the last years. For wines discrimination, Raman spectroscopy appears more feasible to be used as compared with IR (infrared) spectroscopy, because of the relatively weak water bending mode in the vibrational spectroscopy fingerprint range. Despite this, the use of Raman technique in wine discrimination is in an early stage. Taking this into consideration, the wine discrimination potential of surface-enhanced Raman scattering (SERS) technique is reported in the present work. The novelty of this study, compared with the previously reported studies, concerning the application of vibrational techniques in wine discrimination consists in the fact that the present work presents the wines differentiation based on the individual signals obtained from deconvoluted spectra. In order to achieve wines classification with respect to variety, geographical origin and vintage, the peaks intensities obtained after spectra deconvolution were compared using supervised chemometric methods like Linear Discriminant Analysis (LDA). For this purpose, a set of 20 white Romanian wines from different viticultural Romanian regions four varieties, was considered. Chemometric methods applied directly to raw SERS experimental spectra proved their efficiency, but discrimination markers identification found to be very difficult due to the overlapped signals as well as for the band shifts. By using this approach, a better general view related to the differences that appear among the wines in terms of compositional differentiation could be reached.

Keywords : chemometry, SERS, variety, wines discrimination

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