

# DETERMINATION OF CROCINS CONTENT IN SAFFRON (*CROCUS SATIVUS L.*) EXTRACTS USING RAMAN SPECTROSCOPY

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Crocins, the glucosyl esters of crocetin, are water soluble carotenoids and responsible for saffron yellowish color. The identification and quantification of these substances are based mainly on liquid chromatography. Although this technique is sensitive and accurate, it is expensive, time consuming, destructive for the sample and must be supported by specialised staff.

The aim of this study is to compare the performance of Raman spectroscopy with that of high performance liquid chromatography (HPLC) in the quantitative determination of crocins in order to achieve an affordable cost and fast analysis without pre-treatment for routine analysis of saffron.

For this purpose, the Raman spectra of 114 saffron stigmas were recorded in the spectral region 2000-200  $\text{cm}^{-1}$ . A partial least square (PLS) method was used in the spectral region 1700-955  $\text{cm}^{-1}$ . PLS calibration carried out with the TQ Analyst software (ver. 7.2.0.161, Thermo Electron Corporation).

The saffron samples were divided into two sets, a calibration and a validation one. The PLS model which was constructed, has correlation coefficient ( $r$ ) of 0.97, root mean square error of calibration (RMSEC) 0.96 and root mean square of prediction (RMSEP) 0.99. The crocins content as determined with HPLC fluctuated between 189.4 and 317.4 mg/kg saffron. The corresponding values, as calculated using Raman method, fluctuated between 192.6 and 326.1 mg/kg saffron. The relative standard deviation (RSDV) oscillated between 0.1 and 10.0 %.