

# Luminescent Determination of Protocatechuic Acid in Grape Wines and Juices

O.I. Teslyuk<sup>\*†</sup>, S.V. Beltyukova<sup>‡</sup>, Ie.V. Cherednychenko<sup>\*\*‡</sup>, E.O. Liventsova<sup>‡</sup>

<sup>†</sup> Bogatskii Physicochemical Institute, National Academy of Sciences of Ukraine, 86 Lyustdorfskaya dor., Odessa, Ukraine, 65080; \*e-mail: olgateslyuk@rambler.ru

<sup>‡</sup> Odessa National Academy of Food Technologies, 112 Kanatnaya st., Odessa, Ukraine, 65039; \*\*e-mail: cherednychenko.liza@gmail.com

Received: October 18, 2017; Accepted: December 06, 2017

DOI: 10.17721/moca.2017.130-134

---

*The possibility of determination of protocatechuic acid (PC) in wines and juices using the sensitized luminescence of the Tb(III) ion in the sorbent layer on TLC plates was studied. It has been established that the relative position of the triplet PC level energy values and the excited ion Tb(III) level, as well as the overlap of the most intense bands in the lanthanide ion luminescence spectrum by the long-wavelength wing of the ligand spectrum, contribute to the efficient excitation energy transfer from the ligand to the Tb(III) ion and to the production of an intensive luminescence. It has been demonstrated, that luminescence intensity ( $I_{lum}$ ) of Tb(III) in complex with PC significantly increases at complexation on a solid matrix. The optimal conditions for the sorbate complexation were studied. It has also been observed a significant increase of the luminescent signal in the presence of trioctylphosphine oxide (TOPO) and the micellar medium Triton X-100. The optimal chromatographic conditions have been determined. The benzene-methanol-acetic acid system (100:50:1) was chosen as the mobile phase. The terbium chloride (III), trioctylphosphine oxide and Triton X-100 were proposed as an enhanced solution. Determination of the content of PC in juices and wines was conducted using a calibration curve, while registering  $I_{lum}$  of Tb(III) ion at  $\lambda = 545$  nm ( $\lambda_{exit} = 365$  nm). The validity of the obtained results was checked by the «entered-found» method. The determination accuracy and reliability was verified by statistical processing of the of the results obtained. The PC detection limit was 0.02 mg/l.*

**Keywords:** protocatechuic acid, solid-phase luminescence, Tb(III) ions