

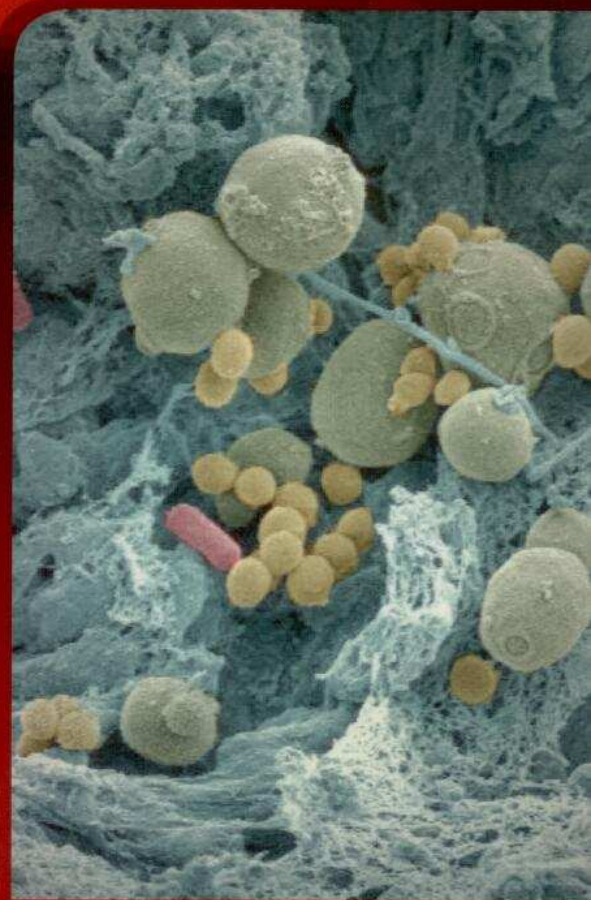
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Combined new approaches for identifying the botanical origin of commercial tannins

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Tannins are polyphenolic compounds able to produce stable combinations with proteins and other plant polymers such as polysaccharides. They can be extracted from different plant tissues (e.g. wood of different species and fruit), and basically classified into two groups: hydrolysable tannins (gallo- and ellagi-tannins), mainly extracted from gall, tara, oak, chestnut, and condensed tannins (*proanthocyanidins*), present in skin and seeds of grapes, tea, quebracho. They are largely used in food preparation as flavourings and food ingredients, whereas in winemaking they are admitted as clarification agents for protein stabilization. Moreover, many other positive effects are well-documented: besides colour stabilisation, metal and thiolic off-flavour removal, they inhibit the activity of laccase in botrytized grapes. Interestingly, they have also an antimicrobial action, being able to hinder lactic bacteria and yeast activity.

Since the several possible plant sources of commercial tannins lead to huge differences in chemical characteristics and oenological properties, as well as considerable differences in the cost, the ability to correctly recognise the origin of tannins can represent a useful tool for the wine industry. Many works have shown that tannins of different origin have characteristic spectra and chromatographic fingerprints, as highlighted using UV-Vis spectroscopy, Fourier-Transform Mid-Infrared Spectroscopy (FTIR), NMR, Size-exclusion chromatography (SEC) and LC-MS/MS, whereas the Organisation Internationale de la Vigne et du Vin (OIV) proposed separate approaches based on the ultraviolet absorption spectrum, phenolic content and the polyalcohol and monosaccharide profile to characterise the botanical origin of oenological tannins.

This paper investigated the possibility of verifying the declared botanical origin of commercial tannins (N=102; 10 origins) on the basis of statistical modelisations of the analytical contents of sugars (by ionic chromatography), simple phenols (UHPLC-coulometric electrochemical detection), mineral profile (ICP-MS) and stable isotope ratio of C (IRMS). Our approaches showed better performances of correct re-classification than that proposed by OIV.