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Characterization of flavour composition and evaluation profile of TNM red wines by SPME-GC/MS

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Among the many factors that contributed to the typicity and quality of wine, aroma is probably the most important organoleptic characteristic and a key attribute for consumers. Several hundred chemically different flavour compounds such as: higher alcohols, aldehydes, ethyl esters of fatty acids, fatty acids, ketones, monoterpenes, volatile phenols, among others, have been found in wines. Most of them appear during fermentation process and others during conservation and ageing period. This study comprises two steps: I) characterization of flavour composition and ii) evaluation profile of the TNM red wines (TNM-dry and TNM-sweet) using solid-phase microextraction (SPME). The fibre coating removes the compounds from sample by absorption in the case of liquid coatings or adsorbing in the case of solid coatings. Traditional sample preparation methods try to completely remove the analytes of interest from sample with SPME, the amount of the analyte removed by the fiber is proportional to the concentration of the compound in the sample. The TNM wines used in this study were made from the 2004 harvest grapes grown in the Portuguese RAM Appellation. The wine samples were taken directly from the cellars in October 2005. TNM red wines samples were adjusted to pH 3.3 and the ionic strength was increased to improve the extraction efficiency using NaCl (30%). A 60 ml vial containing 30 ml of sample was placed in a thermostatic block on a stirrer. The fibre was then exposed to the gaseous phase for an appropriate time period at temperature $30 \pm 1^\circ\text{C}$. After extraction, the SPME fibre was withdrawn into the needle, removed from the vial and inserted into the hot injector port (240°C) of the GC-MS system where the extracted chemicals were desorbed thermally and transferred directly to the analytical column. Identification was achieved by comparisons with mass spectra obtained from the sample with those by comparison with the Kovats indexes and the mass spectra present in the NIST MS library database. The method enables high recovery of volatile compounds in wine, good linearity with (r^2) values higher than 0.980 and good sensitivity. These wines are characterized by a high content of higher alcohols, ethyl esters, fatty acids and lactones. The levels of sulphur compounds in Tinta Negra Mole medium sweet wines are very low, but they have the highest concentration of carbonyl compounds. Quantitative analysis of the main odorants followed by the determination of aroma index allowed us to elucidate the aroma of these varieties.