

F.22. TESTING THE ANTIRADICAL POTENTIAL AND ANTIOXIDANT STABILITY OF WHITE WINES FROM LOCAL GRAPES VARIETIES

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Abstract. Determining the antioxidant capacity of white wines makes it possible to estimate the wine's ability to resist oxidative processes over time, its shelf life, and also provides general information about the wine's physiological value for the consumer. The study included white wines made from the traditional Feteasca Albă and Feteasca Regală grape varieties, produced both through small-scale winemaking at the Department of Oenology and Chemistry (DOC) at UTM and through industrial production, as well as wines made from the newly selected Viorica, Riton, and Legenda grape varieties (with and without a 2-hour maceration). The antioxidant potential of the wines was assessed using various tests—DPPH and POM—which were compared with the total phenolic content and the content of various groups of phenolic compounds. To identify the substances responsible for the DPPH (diphenyl-p-pyrocatechol) and total antioxidant (POM test) activity, a combined method was applied: the DPPH test was performed on native wines as well as after their oxidation during the POM test. The influence of certain conditions on the results of the POM test was highlighted: temperature, heating time, the concentration of the oxidizing agent H_2O_2 , and the concentration of Fe^{2+} ions—effective catalysts for the generation of OH and HO_2 radicals from H_2O_2 . In the range of Fe^{2+} ion additions at concentrations of 0.5–5 mg/L, a strict dependence on the degree of wine browning was observed (A_{420} , $R^2 = 0.968$). It has been demonstrated that the pH of the wine does not affect the POM residue results. Pre-treatment with PVPP, undertaken to stabilize or correct the composition of wines, results in lower final POM test values. For Viorica wine, the addition of SO_2 in concentrations of 15–60 mg/L did not significantly alter the results of the antioxidant potential assessment. Some wines with similar levels of total cinnamic acids (Feteasca Albă, 20.9 mg/L caffeic acid equivalent, and Feteasca Regală DOC, 22.2 mg/L) show completely different results for both DPPH and H_2O_2 : for FA, 16.3% and 436.8% (DPPH and POM, respectively), and for FR DOC, 81.5% and 194.4%, respectively. Otherwise, for the remaining wines, satisfactory correlations were observed between the total content of cinnamic phenolic substances (CPC) and DPPH ($R^2 = 0.988$), TPC

and POM ($R^2 = 0.9763$), DPPH and POM ($R^2 = 0.9552$), CPC and POM+DPPH ($R^2 = 0.9836$), and DPPH and POM+DPPH ($R^2 = 0.9652$). There is virtually no correlation between DPPH, POM, and POM+DPPH, on the one hand, and the Total Polyphenol Index (TPI) and total phenolic content (TPC) determined by the Folin-Ciocalteu method, on the other. This indicates a strong influence of certain individual substances on the ability to scavenge DPPH free radicals and to oxidize in the presence of H_2O_2 at temperature.

Keywords: white wines, oxidation, cinnamates, polyphenols, IPT, DPPH, POM test.

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