

Unravelling the total antioxidant capacity of pinotage wines: contribution of phenolic compounds.

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The total antioxidant capacity (TAC) and phenolic composition of 139 Pinotage wines (2002 and 2003 vintages) were determined using the 2,2'-azino-di(3-ethylbenzo-thialozine-sulfonic acid) scavenging assay and high-performance liquid chromatography, respectively. The contribution of individually quantified phenolic compounds to the wine TAC was calculated using their concentrations and Trolox equivalent antioxidant capacity (TEAC) values. The TEAC values of quercetin-3-galactoside, isorhamnetin, and peonidin-3-glucoside are reported for the first time. Between 11 and 24% of the measured TAC of Pinotage wines was explained by the sum of the calculated contributions of their quantified phenolic compounds comprising monomeric phenolic compounds and procyanidin B1. Ultrafiltration was carried out to attempt separation of monomeric and polymeric phenolic compounds. Analysis of ultrafiltration permeates and retentates enabled estimation of the TAC contribution of large molecular weight (MW) unknown compounds (46%) (>50 kDa), including oligomeric and polymeric phenolic compounds and small MW unknown compounds (34%) (<50 kDa). Three mixtures, containing 12 phenolic compounds in typical concentrations expected in Pinotage wines, exhibited 16-23% synergistic antioxidant activity. This suggests that synergy between phenolic compounds does play a role in the wine TAC but that it does not explain the large discrepancy between measured and calculated TAC values.