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(Article begins on next page)

Grape seed flavanols extraction and mechanical-acoustic properties as influenced by maceration time and ethanol content

AIM: Grape flavanols are involved in wine quality markers such as in-mouth sensations and colour stability. In particular, seed flavanols are characterized by low molecular weight and high galloylation ratio, which are correlated respectively with bitterness and astringency. Their release during maceration is derived from the seed hydration and the ethanol-driven disassembly of cell walls that is promoted by maceration time. In this study, acoustic and mechanical parameters were tested to investigate the effect of maceration length and ethanol content on seed flavanols extraction. The magnitude of the changes observed in seeds hardness in the different maceration conditions was evaluated in the attempt to establish correlations with the extracted compounds. **METHODS:** Pinot noir seeds were macerated in a wine-like solution (pH 3.40, 5 g/L tartaric acid) with different ethanol content (0, 5, 10, 15 and increasing addition up to 15% v/v). After 3, 7, and 10 days, total polyphenols (A280), condensed tannins (methylcellulose assay), flavanol composition as mean degree of polymerization (mDP), and monomeric content by HPLC were determined in the resulting solutions. Mechanical and acoustic parameters of macerated seeds were evaluated through compression test by instrumental texture analysis. **RESULTS:** Seed tannins extraction was influenced by both ethanol and maceration time, in different extent depending on the specific compound. In all macerations, an initial seed deformation together with a loss of elasticity was reported. As well, seed hardness (as seed break force, N) increased in all macerations except for 15% ethanol samples that showed a significant decrease. In accordance, some acoustic parameters (as average acoustic energy, dB) increased significantly during maceration, and this last parameter was positively correlated with total polyphenols and condensed tannins extractions. **CONCLUSIONS:** Initial ethanol content and maceration length influenced flavanols richness and composition in the maceration extract. However, limited differences in both phenolic composition and texture parameters were found between the samples with no ethanol content and gradually-increasing alcohol strength.

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