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Ultrasounds application during prefermentative maceration to optimize the extraction of aromatic precursors in white grapes

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The application of ultrasounds (US) in food industry is wide and regards many different areas as an aiding technology for homogenization, degasation, cristallization, meat tenderization, filtration, extraction or sanitization. Its mechanism is based in the production of multiple compression and rarefaction series that can lead to acoustic cavitation in a liquid medium, creating micro-bubbles cavitation (small amounts of steam). The collapse of these bubbles generates micro-zones with extremely high conditions of temperature (5000K) and pressure (2000 bars) that, on the one hand accelerates the kinetic of chemical and enzymatic reactions and on the other the mechanical breakage of the cellular wall. Ultrasound technology has been successfully proposed during fermentation skin contact (Ferraretto et al., 2013) and ageing steps (Cacciola et al., 2013; Ferraretto and Celotti, 2016; del Fresno et al., 2018) of red winemaking. These results has encouraged the investigation of its possible use during prefermentative steps of aromatic white grapes and precisely on the extraction of 3-mercaptohexan-1-ol precursors, compounds responsible of grapefruit-like and citric aromas in wines with an active role on the typicality perception of Sauvignon blanc wines (Lund *et al.*, 2009) or Gewürztraminer (Roman et al., 2018). 5 samples of sound grapes were treated with US (frequency: 20 kHz, wave amplitude: 153 µm) during 5 min in triplicate. Following, samples were analysed as reported by Larcher et al. (2015) for their content on glutathion-3-mercaptohexan-1-ol (GSH-3MH) and cysteine-3-mercaptohexan1-ol (Cys-3MH) as well as for the conductivity, total polyphenols and catechins to validate the cells rupture effect. US treated samples presented a higher mean value for both precursors (83.3±17.9 µg/L and 109.4±16.8 µg/L respectively for GSH-3MH and Cys-3MH) compared to control's (79.3±17.8 µg/L and 93.2±16.8 µg/L) even if not statistically different. The augmentation on the conductivity, total polyphenols and catechins confirmed the goodness of the treatment on cell wall breakdown.

Keywords: Ultrasounds, Thiols, precursors, 3-mercaptohexan-1-ol