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Thesis title: New techniques to accelerate Ageing On Lees process

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Abstract (max 300 words)

Topic: position and objectives: Ageing over lees has long been considered to benefit the overall quality of wine products, enhancing the body and mouthful as well as sensorial complexity, colour stability and spontaneous clarification of wine products. However, the normal yeast autolysis under wine condition could last up to years. In this fiercely competing market, it is reasonable to develop new strategies and techniques to accelerate the ageing over lees process, shorten the storage time and achieve better quality.

Methods : In this study, two novel techniques: ultrasound, microwave, heating as well as simulated bâtonnage and abrasive-improved treatment were applied to accelerate yeast autolysis of two *Saccharomyces cerevisiae* yeast strains in module medium. Release of polysaccharides was analyzed by HPLC-RI. The effects of ultrasonic treatment to red wine ageing over lees were also studied. Anthocyanins and aroma compounds were analyzed by using HPLC-PDAD/ESI-MS, GC-FID respectively. Color and Total Phenolic Index were recorded along the experiment. Sensorial analysis was performed by tasting panel.

Results: The results showed that, ultrasonic treatment and heating significantly increased the polysaccharides release. The abrasive improved ultrasonic treatment improved further the polysaccharides concentration while simulated bâtonnage slightly enhanced yeast autolysis in the relevant essays. Ultrasonic treatment normally reduced the anthocyanins in wine compared with normal lees aging over lees. Aroma compounds acted variously to ultrasonic treatment while the TPI and color intensity sufferer a loss with increasing of yellow%. Ultrasonic treatment improved the oxidation in wine and played a complementary role to reductive lees ageing process.

Main conclusions: This study illustrated the potential of using ultrasound to accelerate aging over lees process with or without abrasive assistance. Noticeably, the two yeast strains reacted differently to the treatments, showing their own kinetics of yeast autolysis and effects on wine anthocyanins and aroma compositions. Therefore, further research is promising to define the effects and interaction between different yeast strains and ultrasonic treatment.

Keywords (5): ultrasound, microwave, polysaccharides, ageing over lees, batonnâge;

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