



**24-28 October**



**Book of Abstracts**

**Résumés des communications**

**Résúmenes de comunicaciones**

**Riassunti delle comunicazioni**

**Zusammenfassungen der Beiträge**



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14<sup>th</sup> General Assembly of the OIV  
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**"Vitiviniculture: Technological advances to market challenges"**

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## **2016-1166 STUDIES FOR THE ULTRASOUND APPLICATION IN WINEMAKING FOR A LOW IMPACT ENOLOGY**

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In winemaking, although some research has been carried out, the practical application is still in an early stage. The cavitation process induced by ultrasounds leads to the breakage of the yeast cells walls, thus facilitates the release of the cell content in the wine.

The aim of this work is to study the effects produced by the ultrasound on crushed red grapes, seeds, lees, and wines, in order to verify the possible speeding up of the extraction, the polymerization of the phenolic compounds, and the release of compounds from the yeast cells. After some preliminary tests, an experimental design has been created to optimize the test conditions, like time, amplitude and frequency. The tests that gave the best results in the laboratory have been compared to the common enological practices, like traditional maceration of the crushed grapes, aging "sur lies", and use of enzymes on lees. The treatments that gave the best extraction results have been those at 90 % amplitude, for 3-5 minutes and frequency between 20 and 27 kHz. The results of those tests carried out on different varieties of grape showed a 50 % increase of the total phenolic compounds, and an increase up to 100 % and more of the anthocyanins in same samples. The ultrasounds has been applied on crushed grapes before vinification; the results have shown that the ultrasounds can reduce significantly the maceration time on red grapes and can eliminate the maceration of white grapes. In order to evaluate the lytic effect on the yeast cell, some trials have been performed with ultrasounds on fine lees from white wines, according to the experimental plan. The results shown that the release of yeast cell compounds (e.g. colloids, proteins, polysaccharides and glycoproteins) was increasing mostly together with the increasing time of the treatment, and only marginally with the increasing amplitude percentage. This rapid release of cell compounds implies an acceleration of the maturation kinetic of wines on lees in comparison with conventional techniques like the use of enzymes and the long time aging "sur lies". Also the stabilizing properties of ultrasounds on tannins and anthocyanins have been tested on young red wines, in order to investigate the chance to accelerate the colour aging process. Good results have been reached in each test and the use of ultrasound it is proving to be available and promising technology for red wine polyphenols evolution.

Recent experience in the cellar with a prototype (27 kHz) have confirmed the possibility of using ultrasound for a short time (3-5 minutes) as a pre-treatment on crushed red grapes for the extraction of polyphenols and on crushed white grapes for the extraction of aromas. The treatment on the lees has confirmed the possibility of shortening the time of aging on the lees. Experiences are ongoing to create an industrial plant for treatment with ultrasound in cellar, with variable flow rates between 50 and 300 hL /h; we are also being studied further applications in other stages of the winemaking process. The application of ultrasound in the different stages of winemaking will reduce cost, time, adjuvants and additives, for sustainable and low-impact oenology.

### **APPLICAZIONE DELLA TECNOLOGIA AD ULTRASUONI IN VINIFICAZIONE PER UN'ENOLOGIA A BASSO IMPATTO**

In vinificazione, sebbene siano numerose le esperienze di laboratorio, l'applicazione degli ultrasuoni è ancora in fase embrionale. Il fenomeno della cavitazione prodotto dagli ultrasuoni genera la rottura delle pareti cellulari, la disgregazione del contenuto cellulare e il conseguente rilascio nel mezzo dei componenti della cellula.

Lo scopo del presente lavoro è lo studio dell'effetto degli ultrasuoni sul pigiato di uva, sui vinaccioli, sulle fecce di lievito e sul vino al fine di accorciare la macerazione sulle bucce, l'evoluzione dei polifenoli e il rilascio dei componenti cellulari del lievito durante la lisi. Dopo alcune esperienze preliminari è stato impostato un piano sperimentale per ottimizzare le condizioni di trattamento, in particolare tempo, amplitudine e frequenza degli ultrasuoni. I test che hanno fornito i migliori risultati in laboratorio sono stati confrontati con le tecniche tradizionali di cantina, in particolare con la macerazione, la sosta sulle fecce e l'uso di enzimi litici. Il trattamento che ha fornito il migliore risultato è stato quello al 90 % di amplitudine per tempi di trattamento variabili tra 3 e 5 minuti a frequenze variabili tra 20 e 27 kHz. I risultati di queste esperienze, realizzate su diverse cultivar hanno evidenziato un incremento del 50 % dei polifenoli estratti, in alcuni casi l'incremento arriva al 100 % se consideriamo gli antociani. Gli ultrasuoni sono stati applicati nel pigiato delle uve prima della vinificazione; i risultati hanno dimostrato che il trattamento con ultrasuoni può ridurre significativamente i tempi di macerazione delle uve rosse ed eliminare la macerazione di quelle bianche. Al fine di valutare l'effetto degli ultrasuoni sulle cellule del lievito, sono state realizzate alcune esperienze di trattamento su fecce fini di vini bianchi. I risultati dimostrano che il rilascio dei componenti cellulari (colloidi, proteine, glicoproteine e polisaccaridi) aumenta con l'incremento del tempo di trattamento e solo in parte



con l'aumento dell'amplitudine. Il trattamento rapido con ultrasuoni ha avuto un notevole risultato in confronto alle tecniche tradizionali, in particolare vengono ridotti notevolmente i lunghi tempi di sosta sulle fecce. Su vini rossi giovani è stato valutato l'impatto degli ultrasuoni sulla frazione antocianica e tannica, al fine di verificare eventuali effetti sull'evoluzione dei polifenoli dei vini rossi. Buoni risultati sono stati ottenuti in tutte le prove ed è verosimile considerare la possibilità di gestire l'evoluzione della sostanza colorante con la tecnologia ad ultrasuoni.

Recenti esperienze di cantina con un prototipo alla frequenza di 27 kHz hanno confermato la possibilità di utilizzare gli ultrasuoni per brevi tempi (3 – 5 minuti) come pre-trattamento sul pigiato di uve rosse per l'estrazione dei polifenoli e sul pigiato di uve bianche per l'estrazione degli aromi. Anche il trattamento sulle fecce fini ha confermato la possibilità di accorciare i tempi di affinamento sulle fecce.

Sono in corso esperienze per realizzare un sistema industriale di trattamento con ultrasuoni, con portate variabili tra 50 e 300 hL/h, inoltre sono allo studio ulteriori applicazioni in altre fasi del processo di vinificazione. L'applicazione degli ultrasuoni nelle diverse fasi di vinificazione consentirà di ridurre costi, tempi, coadiuvanti e additivi, per un'enologia sostenibile e a basso impatto.

### **ESTUDIO DE LA APLICACIÓN DE LOS ULTRASONIDOS EN DISTINTAS FASES DE LA VINIFICACIÓN PARA UNA ENOLOGÍA DE BAJO IMPACTO**

Sin embargo, en enología, si bien ha habido estudios preliminares prometedores, la aplicación práctica de los ultrasonidos se encuentra en fase temprana de desarrollo. El fenómeno de la cavitación producida por los ultrasonidos genera la ruptura de las paredes celulares, la desintegración del contenido celular y la consiguiente liberación en el medio de los componentes de la célula.

El objetivo de esta investigación es estudiar los efectos producidos por los ultrasonidos en uva tinta, semillas, lías y vino joven, para verificar la aceleración de la extracción, la polimerización de los compuestos fenólicos, y la liberación de compuestos coloidales de las levaduras. Después de las pruebas preliminares, se estableció un diseño experimental para optimizar los parámetros experimentales, como tiempo, amplitud y frecuencia de los ultrasonidos. Las pruebas que dieron mejores resultados en laboratorio han sido comparadas con las prácticas comunes en bodega, como la maceración tradicional, la crianza sobre lías finas y el uso de enzimas sobre levaduras. Los tratamientos que dieron lugar a una mayor extracción son la aplicación con una amplitud del 90%, así que fijando dicho parámetro, se han realizado pruebas entre 3 a 5 minutos a distintas frecuencias entre 20 y 27 kHz. Las pruebas a dicha amplitud se han aplicado en uvas de distintas variedades con el resultado de un incremento del 50% en el índice de compuestos fenólicos totales, y un 100% o superior del contenido total de antocianinos. El ultrasonido se aplicó en las uvas trituradas antes de la fermentación; los resultados mostraron que el tratamiento con ultrasonidos puede reducir significativamente el tiempo de maceración de las uvas rojas y eliminar la maceración de los blancos. Para evaluar el efecto sobre la lisis de la pared celular de las levaduras, se han realizado diferentes pruebas sobre lías finas de vino blanco. Los resultados muestran que la liberación de los coñuestos de la pared celular (coloides, proteínas, polisacáridos y mannoproteínas) aumentó proporcionalmente con el tiempo de tratamiento, y muy poco en relación con el aumento del % de amplitud. La aceleración de la liberación de los compuestos de la pared celular de las levaduras implica una reducción del tiempo de crianza sobre lías en comparación con las técnicas convencionales. Fueron estudiadas también las propiedades estabilizantes de los ultrasonidos en taninos y antocianinas en vinos tintos jóvenes, para evaluar la posibilidad de acelerar el proceso de crianza. Se han obtenido resultados positivos con cada prueba y se ha relevado una técnica prometedora para la evolución de los polifenoles del vino. La experiencia reciente de la bodega con un prototipo a la frecuencia de 27 kHz, han confirmado la posibilidad de utilizar el ultrasonido por un tiempo corto (3-5 minutos) como un pre-tratamiento de las uvas trituradas de uvas rojas para la extracción de polifenoles y las uvas trituradas uvas blancas para la extracción de aromas. El tratamiento de las lías ha confirmado la posibilidad de acortar el tiempo de crianza sobre lías.

Son las experiencias en curso para crear un sistema industrial de tratamiento con ultrasonidos, con caudales variables entre 50 y 300 hl / h, también se está estudiando otras aplicaciones en otras etapas del proceso de elaboración del vino. La aplicación de los ultrasonidos en las diferentes etapas de la elaboración del vino reducirá costes, tiempo, coadyuvantes y aditivos, para la enología sostenible y de bajo impacto.

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### **2016-1243 LABORATORY DEVICE FOR THE EVALUATION OF SELECTIVE VEGETAL FIBRES**

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Protection of the vineyard against diseases and pests may lead to pesticide residues in the wine. Traces of these active substances, even at concentrations below the legal limits, alarm the consumers and can hinder the potential to export wines to some markets. A new oenological practice based on the use of selective vegetal fibres for the reduction of pesticide residues in wine is under evaluation by the International Organization of Vine and Wine (OENO-TECHNO 582 and OENO-



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