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**Resúmenes de comunicaciones**  
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**Zusammenfassungen der Beiträge**  
**Riassunti delle comunicazioni**

37<sup>th</sup> World Congress of Vine and Wine  
12<sup>th</sup> General Assembly of the OIV  
9<sup>th</sup> to 14<sup>th</sup> November 2014, Mendoza (Argentina)

**“Southern vitiviniculture, a confluence of knowledge and nature”**

37° Congreso Mundial de la Vid y el Vino  
12ª Asamblea General de la OIV  
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**“Vitivinicultura del sur, confluencia de conocimiento y naturaleza”**

37<sup>ème</sup> Congrès Mondial de la Vigne et du Vin  
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**“Viticulture du sud, rencontre de la connaissance et de la nature”**

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Poster n° **120122**: **FRUITY/TROPICAL SULFUR AROMA PRECURSORS IN HYBRID GRAPES.**

2014-696 : Roberto Larcher, Loris Tonidandel, Giorgio Nicolini, Tomas Roman Villegas, Massimo Gardiman, Riccardo Flamini : CRA-VIT, Italy, [riccardo.flamini@entecra.it](mailto:riccardo.flamini@entecra.it)

In the last century, several hybrid grape varieties were produced in order to overcome pest (phylloxera) and vine diseases, such as downy, powdery mildew. As they are not currently used to any significant extent either for wine-making in Europe, for technological and legal reasons (European Community Regulation, 1998) or for edible purposes, they are little studied and relegated to germplasm collections. However, there is a renewed interest for many of these varieties, due to their richness of secondary metabolites. As a matter of fact, the chemical metabolites of these grapes are often qualitatively and quantitatively superior to *V. vinifera* varieties. For instance, recent studies showed that several hybrids are very rich in monoglucoside and diglucoside anthocyanins [De Rosso et al., 2012], flavonol glycosides [De Rosso et al., 2014], and have relevant contents of trilinolein [De Marchi et al., 2012]. Varietal thiols (e.g. 3-mercaptohexan-1-ol; 3-mercaptohexyl acetate; 4-mercapto-4-methylpentan-2-one), belonging to an important class of aroma compounds characterized by extremely low sensory threshold, can impart strong tropical and citrus-like sensory notes to wine. Their occurrence in wine is related to the presence of non-volatile S-glutathionylated and S-cysteinylated precursors in grapes, even if other alternative pathways of synthesis have been proposed. Moreover, the cleavage of the S-cysteinylated precursors caused by mouth bacteria suggests a direct retronasal contribution of this precursors also in unfermented beverages [Starkenmann et al., 2008]. This study presents for the first time a detailed survey on the varietal thiol precursors in hybrid grapes with the aim of giving support to possible new uses in soft drinks and low-alcohol beverages production.

- De Rosso M., Tonidandel L., Larcher R., Nicolini G., Ruggeri V., Dalla Vedova A., De Marchi F., Gardiman M., Flamini R. (2012) Study of anthocyanic profiles of twenty-one hybrid grape varieties by liquid chromatography and precursor-ion mass spectrometry. *Anal Chim Acta* 732:120-129

- De Rosso M., Tonidandel L., Larcher R., Nicolini G., Dalla Vedova A., De Marchi F., Gardiman M., Giust M., Flamini R. (2014) Identification of new flavonols in hybrid grapes by combined liquid chromatography-mass spectrometry approaches. *Food Chem* 1635:244-251

- De Marchi F., Seraglia R., Molin L., Traldi P., De Rosso M., Panighel A., Dalla Vedova A., Gardiman M., Giust M., Flamini R. (2012) Seed oil triglyceride profiling of thirty-two hybrid grape varieties. *J Mass Spectrom* 47:1113-1119.

- Starkenmann C., Le Calvé B., Niclass Y., Cayeux I., Beccucci S., Troccaz, M. (2008). Olfactory perception of cysteine-S-conjugates from fruits and vegetables. *Journal of Agricultural and Food Chemistry*, 56, 9575–9580.

#### **PRECURSORI DI AROMI SOLFORATI FRUTTATO-TROPICALI IN UVE DA IBRIDI.**

La necessità di superare la crisi dovuta all'arrivo di nuovi patogeni quali fillossara, oidio e peronospora portò all'introduzione nello scorso secolo di nuove varietà ibride. A causa del loro abbandono da parte dell'industria enologica europea per supposti impedimenti tecnologici e legali (Regolamento Comunitario, 1998), sono pochi gli studi recenti e queste uve, sostanzialmente, sono oggi relegate nelle collezioni di germoplasma. Pur tuttavia, si osserva un crescente interesse per molte di queste varietà in ragione della loro ricchezza di metaboliti secondari. Molti dei metaboliti sono addirittura qualitativamente e quantitativamente superiori in queste varietà rispetto alla *V. vinifera*. Recenti studi dimostrano come queste varietà siano spesso ricche di antocianine mono e diglucosilate [De Rosso et al., 2012], flavonoli glicosilati [De Rosso et al., 2014] e di trionoleina [De Marchi et al., 2012]. Alcuni tioli varietali (3-mercaptoesan-1-olo; 3-mercaptoesil acetato; 4-mercapto-4-metilpentan-2-one), appartenenti ad una classe di composti aromatici caratterizzati da bassissime soglie sensoriali, sono capaci di impartire ai vini forti note tropicali e agrumate. La presenza nei vini di tali composti è da mettere in relazione alla presenza nelle uve dei rispettivi precursori glutationilici e cisteinilici, benché anche altre vie di formazione siano state proposte. Inoltre, la capacità mostrata da alcuni batteri presenti nel cavo orale di liberare i tioli dai precursori cisteinici suggerisce un possibile loro diretto contributo sensoriale retronasale anche in bevande non fermentate [Starkenmann et al., 2008]. Il presente studio mostra la prima volta un'indagine dettagliata su contenuto di precursori di tioli varietali in uve ibride con lo scopo di fornire supporto per un loro possibile nuovo utilizzo in soft drink o nella produzione di bevande a bassa gradazione alcolica.

#### **PRECURSORES AROMÁTICOS SULFÚREOS AFRUTADOS/TROPICALES EN UVAS HÍBRIDAS.**

En el siglo pasado, varias variedades de uva híbrida han sido producidas para resistir a las plagas (filóxera) y a enfermedades, cuales el mildio o la peronospora. Dado que en Europa actualmente no se utilizan de manera significativa, ya sea para la producción de vino -por motivos técnicos y legales (European Community Regulation, 1998)- o como alimento, han sido poco estudiadas y relegadas a las colecciones de germoplasma. Aún así, hay un creciente interés en muchas de estas variedades debido sobre todo a la riqueza en metabolitos secundarios, al alto contenido en azúcares y a la resistencia a las enfermedades. Se da por hecho que el contenido de estos metabolitos químicos es, a menudo, cualitativa y



cuantitativamente superior al de variedades de *V. vinifera*. Por ejemplo, estudios recientes mostraron como las variedades híbridas presentan mayores concentraciones en antocianinas mono y diglucósidos [De Rosso et al., 2012] y flavonoles glucósidos [De Rosso et al., 2014], así como un contenido relevante en trilinoleína [De Marchi et al., 2012]. Los tioles varietales (por ejemplo, 3-mercaptohexan-1-ol; acetato de 3-mercaptohexilo; 4-mercapto-4-metilpentan-2-ona) pertenecientes a una clase importante de aromas, caracterizados por un umbral sensorial extremadamente bajo, pueden donar notas sensoriales tropicales y cítricas a los vinos. Su frecuencia en los productos vinícolas está relacionada con la presencia en las bayas de precursores S-glutacionilados y S-cisteinilados, aunque hayan sido propuestas otras vías de biogénesis. Más aún, la división de los precursores S-cisteinilados provocada por las bacterias bucales insinúa un contributo retronal de estos precursores incluso en bebidas no fermentadas [Starkenmann et al., 2008]. Este trabajo muestra por primera vez un estudio detallado de los precursores sulfúreos contenidos en bayas de vides híbridas con el objetivo de dar soporte a posibles nuevos usos en refrescos y bebidas con bajo contenido alcohólico.

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Poster n° **120123**: **EFFECT OF THE LIGHT ON GROWTH AND ETHYL-PHENOLS PRODUCTION BY *B. BRUXELLENSIS***

2014-697 : Marilyn Gonzalez, Lourdes Carmona, Luis Larrondo, Angélica Ganga : USACH, Chile, [angelica.ganga@usach.cl](mailto:angelica.ganga@usach.cl)

Wine characteristics are defined by both, the variety of grape used and the action of yeasts on the must. Yeasts are used in winemaking to ensure a product of high quality and decreased the risk of wine spoilage. Even though, alterations may occur due to biological agents such as bacteria or yeast. Advances in wine technology and the implementation of good manufacturing practices throughout the winemaking process have significantly decreased the risk of wine spoilage by bacteria, but spoilage by yeast contamination still remains a potential threat. Indeed, yeasts are so far the most dangerous contaminants affecting wine quality. Among this group, the yeast species *Brettanomyces/Dekkera* has received particular attention for its ability to develop in post-fermentative conditions.

*B. bruxellensis* is considered the main cause of wine spoilage worldwide, due to be able to affect the sensory properties of wine by producing off-flavor compounds. These undesired odors correspond to ethyl-phenols produced from hydroxycinnamic acids (HA) present in low quantities in grape must. Among HA, the p-coumaric and ferulic acids are the main acids present in the must. *B. bruxellensis* produces phenolic volatile compounds: 4-vinylphenol and 4-ethylphenol from p-coumaric acid and 4-vinylguaiacol and 4-ethylguaiacol from ferulic acid. These ethyl-phenols are produced in *B. bruxellensis* by sequential action of two enzymes: coumarate descarboxylase (CD) and vinylphenol reductase (VR). Because of its slow growth rate, *Brettanomyces* sp. usually imparts flavors only when wine is in the aging process. Moreover, due to *Brettanomyces* sp. is present at low numbers early in the fermentation, it is outnumbered by other indigenous yeasts and may go undetected, becoming an important problem in winemaking industries. The contamination imparted by this yeast is related with important economic losses for producers. For instance, in Chile, the fourth largest wine exporter worldwide, 5% of the national production is lost annually by *B. bruxellensis* spoilage.

The addition of HA carry an increase of lag phase in *B. bruxellensis*. It has been described as an adaptive mechanism to certain adverse environments, allowing adaptation to the new situation by re-structuring of its cellular machinery. It is known that most of organisms are regulated by circadian rhythms which modulate internal metabolism with the changes of environment. Thus, in this work, we studied the effect of light and darkness on both: growth and ethyl-phenols production by *B. bruxellensis* L2480. The experiments were carried out in yeast nitrogen base (YNB) in absence and presence of 0.6 mmol/L of p-coumaric acid or ferulic acid. We observed that growth curves did not show any difference between both conditions: light and dark, in both treatments. Production of ethyl-phenols was analyzed by HPLC, displaying that in presence of p-coumaric acid or ferulic acid were detected traces of vinyl-phenols intermediated 4-vinylphenol and 4-vinylguaiacol, respectively, only in light conditions. Interestingly, p-coumaric acid and ferulic acid consumption was higher in light conditions, but only traces of the ethyl-phenols were noticed. Nevertheless, despite of there was less consumption of HA in darkness, it was observed a higher accumulation of ethyl-phenols: 4-ethylphenol and 4-ethylguaiacol. Taken together, these data suggest that the presence or absence of light could be mediated the metabolism of HA and production of ethyl-phenols by different way.

#### **EFFECTO DE LA LUZ EN EL CRECIMIENTO Y EN LA PRODUCCIÓN DE ETIL-FENOLES DE *B. BRUXELLENSIS***

Las características del vino se definen por la variedad de uvas y por la acción de las levaduras del mosto. La adición de levaduras es una práctica habitual para asegurar un producto de alta calidad y disminuir el riesgo de contaminaciones en vino. Pese a de ello, se producen alteraciones debidas a agentes biológicos como bacterias o levaduras. Los avances en tecnología vínica y la implementación de buenas prácticas de manufactura en la elaboración del vino han reducido significativamente el riesgo del deterioro del vino debido a bacterias, sin embargo, las contaminaciones a causa de