IRIS AperTO

UNIVERSITÀ DEGLI STUDI DI TORINO

AperTO - Archivio Istituzionale Open Access dell'Università di Torino

Impact of postharvest dehydration process of Nebbiolo winegrapes on mechanical and acoustic properties of the seeds and their relationship with flavanol extraction during simulated maceration

This is the author's manuscript

Original Citation:

Availability:

This version is available http://hdl.handle.net/2318/1553040 since 2016-02-04T16:35:10Z

Publisher:

Fondazione Edmund Mach

Terms of use:

Open Access

Anyone can freely access the full text of works made available as "Open Access". Works made available under a Creative Commons license can be used according to the terms and conditions of said license. Use of all other works requires consent of the right holder (author or publisher) if not exempted from copyright protection by the applicable law.

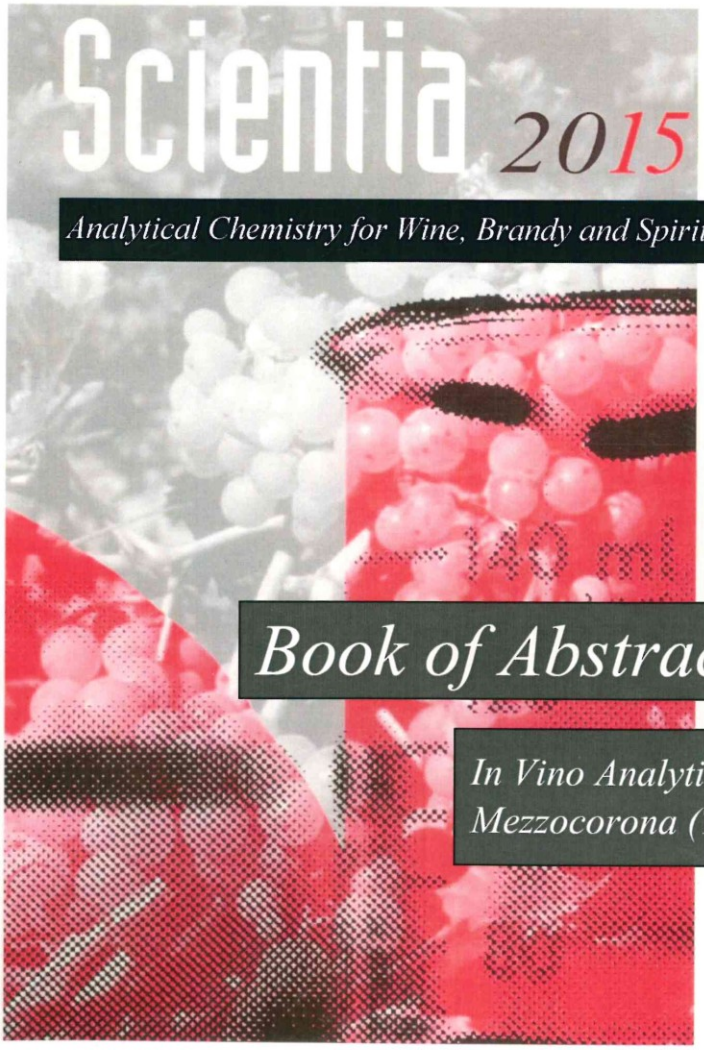
(Article begins on next page)

12 October 2024

NINTH SYMPOSIUM

In Vino Analytica Scientia 2015

Analytical Chemistry for Wine, Brandy and Spirits



Book of Abstracts IVAS 2015

In Vino Analytica Scientia Symposium
Mezzocorona (Tn) Italy 14-17 July 2015

FONDAZIONE EDMUND MACH

LAIMBURG Research Centre for Agriculture and Forestry

Impact of postharvest dehydration process of Nebbiolo winegrapes on mechanical and acoustic properties of the seeds and their relationship with flavanol extraction during simulated maceration

Susana Río Segade[a#], Fabrizio Torchio[a#], Vincenzo Gerbi[a], Natalia Quijada-Morín[b], Ignacio García-Estévez[b], Simone Giacosa[a], M. Teresa Escribano-Bailón[b], Luca Rolle[a]*

[a] Università degli Studi di Torino, Dipartimento di Scienze Agrarie, Forestali e Alimentari, 10095 Grugliasco (TO), Italy
[b] Grupo de Investigación en Polifenoles, Unidad de Nutrición y Bromatología, Facultad de Farmacia, Universidad de Salamanca, E-37007 Salamanca, Spain
* luca.rolle@unito.it
[#] Equal contribution to the study

The dehydration of winegrapes is promoted in the production of dry wines (sfursat) with unique and appreciated characteristics. Postharvest dehydration induces significant metabolic changes in the grape berry that affect the chemical composition and physical properties. The magnitude of these changes depends mainly on the grape cultivar and maturity stage, but it can be partially modulated by the management of the dehydration process. The influence of the thermohygrometric conditions on the mechanical attributes and phenolic composition of winegrape seeds has been recently studied.
The histological and histochemical changes that occur in the seeds affect the extractability of phenolic compounds. The oxidation of flavanols favors their association with cell wall components and, therefore, the extractable content of seed flavanols gradually declines during grape ripening. On the other hand, the intensive lignification of the medium integument and the dehydration of the outer integument cause the increase in the hardness and cracking of the seeds. In this sense, a novel methodology has been developed to predict the extractable content of phenolic compounds during ripening from instrumental acoustic parameters of the seeds [1]. However, knowledge on this relationship is lacking during postharvest grape dehydration.
Because the contribution of seed flavanols to total content of the berry increases during dehydration, the aim of this work was to evaluate the effect of postharvest dehydration process of Nebbiolo winegrapes on the instrumental texture properties of the seeds and the extraction of flavanol compounds. Small clusters were withered in an environmentally controlled chamber during different times to obtain berries with a dehydration grade of 15, 30, 45 and 60% weight loss. Various mechanical (F_s, W_s, E_s, DI_s) and acoustic attributes (LD, AE, N_{pk}, AV_{pk}) were determined during the compression test of the seeds. The extraction kinetics into a model solution was followed by the determination of total and individual monomeric, oligomeric and polymeric flavanol compounds. Finally, seed texture parameters were also assessed as predictors of the extractable content of flavanol compounds based on the robustness of the relationships found.

Reference

1. Rolle, L.; Giacosa, S.; Torchio, F.; Perenzoni, D.; Río Segade, S.; Gerbi, V.; Mattivi, F. *Journal of Agricultural and Food Chemistry*, 61 (2013), pp 8752-8764.