

Alma Mater Studiorum Università di Bologna
Archivio istituzionale della ricerca

Potential of the on-field hyperspectral imaging to measure the sugar content in grape.

This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:

CHIARA CEVOLI, ANGELO FABBRI, GIOVANNI MOLARI (2019). Potential of the on-field hyperspectral imaging to measure the sugar content in grape.. Foggia : Università di Foggia.

Availability:

This version is available at: <https://hdl.handle.net/11585/724356> since: 2020-02-11

Published:

DOI: <http://doi.org/>

Terms of use:

Some rights reserved. The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. For all terms of use and more information see the publisher's website.

This item was downloaded from IRIS Università di Bologna (<https://cris.unibo.it/>).
When citing, please refer to the published version.

(Article begins on next page)

Potential of the on-field hyperspectral imaging to measure the sugar content in grape

Chiara Cevoli, Angelo Fabbri, Giovanni Molari

Department of Agricultural and Food Sciences, Alma Mater Studiorum, Università di Bologna

The main factors impacting on wine quality are related to grape composition depending on grape varieties and climatic grown conditions, and winemaking process. To enhance the product quality, the wine industry has need for simple, rapid and non-destructive techniques to evaluate the quality of the grapes in field. Among others, the sugar content is a typically parameters used to determined grape quality and maturity state. The hyperspectral imaging is a powerful technique used to evaluate and to predict different parameters in grapes during the harvest.

The aim of this study was to evaluate the potential of the on-field application of the hyperspectral imaging (400-1000 nm) to determine the sugar content in grape (cv. *Sangiovese*). A specific moving set-up was developed and the difficulties related to variable solar illumination (lighting source) were evaluated. The work was divided in two steps: i) development of a PLS calibration model between sugar content (from 16 to 30 °Brix) and reflectance spectra of the grapes detached from the plant (solar lighting); ii) sugar content prediction of the on-field grapes by using the calibration model previously built. Several spectral pre-treatment methods were tried before to develop the calibration model and the best results were achieved applying the second derivate transformation (calibration: $R^2=0.970$; RMSE 0.6; cross validation: $R^2=0.894$, RMSECV 1.1). The prediction results obtained on the on- field grapes was $R^2=0.809$ and RMSET, suggesting that the hyperspectral imaging could be a promising technique to assess sugar content on grape directly on-field. However, some difficulties related to the management of solar lighting, specular reflection and variable illumination level must be evaluated and take into account.