14·15·16
june·2023

Sustainability of wine production and food systems in the Mediterranean region

ABSTRACT BOOK

Science & Wine
CIÊNCIA & VINHO

COVER CROPS PROMOTED A BALANCE BETWEEN SOIL QUALITY, GRAPEVINE PHYSIOLOGY AND MUST ATTRIBUTES IN A SEMI-ARID STEEP SLOPE FARMING

Sandra Martins[1], Cátia Brito[1,2], Manuel Ângelo Rodrigues[3], Adelaide Perdigão[1], Lia-Tânia Dinis[1,2], José Moutinho-Pereira[1,2], Carlos Manuel Correia[1,2]

[1]CITAB - Centre for the Research and Technology of Agro-Environmental and Biological Sciences, University of Trás-os-Montes and Alto Douro (UTAD), Quinta de Prados, 5000-801, Vila Real, Portugal
[2]Inov4Agro - Institute for Innovation, Capacity Building and Sustainability of Agri-Food Production, University of Trás-os-Montes and Alto Douro (UTAD), Quinta de Prados, 5000-801, Vila Real, Portugal
[3]Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, 5300-253 Bragança, Portugal
scpmartins@utad.pt

Climate change and the susceptibility to soil degradation represents major challenges for the sustainability of Mediterranean viticulture. The implementation of sustainable soil management strategies such as cover crops has emerged as alternative practices to conventional management, in order to preserve soil health, while ensure grapevine performance and must quality. Three soil management systems, soil tillage (T), ground cover with natural vegetation (NV) and with a commercial mixture of annual legume species (LC), were studied for two years, and their effects on soil quality indicators, photosynthetic performance, growth, yield and must attributes were evaluated. Leguminous cover crop enhanced soil organic matter and the contents of P, K and Zn, while Cu availability was higher in tilled soil. The total glomalin-related soil protein content was increased by both LC and NV treatments. A positive influence of LC was verified on plant photosynthetic performance, mainly in the second year. Crop yield varied significantly only in the second year of experiment with an increase of 97% and 99% in LC and NV plants, respectively. The higher Ravaz Index was obtained in NV plants. Considering the effects of treatments on must attributes, probable alcohol contents were consistently higher in LC and NV treatments in both years, while yeast assimilable nitrogen was higher in LC. Overall, both LC and NV ground cover soil systems appear to confer advantages when compared to T, although LC was able to promote a better balance between soil health, plant performance and must attributes.

The authors are grateful to the Foundation for Science and Technology (FCT, Portugal) and FEDER under Programme PT2020 for financial support to CITAB (UIDB/04033/2020).

RECENT APPLICATIONS OF STABLE ISOTOPE RATIO ANALYSIS IN THE STUDY OF WINE AND WINE PRODUCTS

Silvia Pianezze[1], Perini M.[1], Paolini, M.[1], Allari, L.[2], Tonidandel, L.[1], Finato, F.[2], Guardini, K.[2], Traldi, U.3, Larcher, R.[1]

[1]Technology Transfer Centre, Fondazione Edmund Mach, San Michele all'Adige, Italy
[2]Unione Italiana Vini Servizi (UIV), Verona, Italy
[3]Thermo Fisher Sci, Bremen, Germany
matteo.perini@fmach.it

Traceability can verify some sustainability claims about commodities and products, such as the geographical origin of raw materials, helping to fight counterfeits and to ensure the respect for people and environment in the supply chains. In the last decays, to allow an effective traceability, several analytical techniques have been proposed, including the stable isotopes analysis of the major bio elements (SIRA) and the quantification of minor tracers. Based on the measurement of the ratio between the heaviest and the lightest isotope of an element (such as carbon or oxygen), SIRA has proved to be an effective technique for the traceability and the authentication of wine [1-3] and wine products [4,5]. Recently, new methods based on this technique have been developed. A liquid chromatographer coupled with an isotope ratio mass spectrometer (LC-co-IRMS), measuring the carbon isotopic ratio (δ13C) of the major sugars of Italian musts, made it possible to detect fraudulent addition of exogenous glucose and fructose deriving from C4 plants and to characterise the product based on its geographical origin [6].
Furthermore, a recent study based on the use of a continuous-flow isotope ratio mass spectrometer (CF-IRMS) GasBench II (Thermo Fisher Sci, Bremen, Germany) allowed to improve the analysis of the oxygen isotopic ratio (δ18O) of wine, must, vinegar and balsamic vinegar by optimising analytical conditions such as temperature and run duration. The improvement of the working condition results in a more efficient analytical procedure, helping in the reduction of analysis time and waste. Finally, new tracers like polyalcohol's (e.g., myo-inositol and scyllo-inositol) or minor sugars (e.g., lactose) characteristic of grape must, have been recently used to detect the fraudulent addition of sugar syrups to concentrated musts. To this purpose, 450 authentic Italian grape musts of different varieties and coming from different Italian regions have been considered [7].