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Carlo Andreotti, Francesca Scandellari e Massimo Tagliavini

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Con il contributo di

Studies on effect of nutritional components on the olive micropropagation

Micheli Maurizio[1], Eugenia Berenato[1], Daniel Fernandes da Silva[2]
maurizio.micheli@unipg.it
[1] *Dipartimento di Scienze Agrarie, Alimentari ed Ambientali, Università di Perugia*
[2] *Departimento de Biologia (DBI), Universidade Federal de Lavras, Lavras/MG, Brasile*

Although the olive tree (*Olea europaea* L.) is a species of great importance, the use of micropropagation for the species still faces obstacles mainly of economic order. The aim of this study was to analyze the effect of the nutritional components in the culture medium for the multiplication phase and their effectiveness in combination with growth regulators. Two trials were conducted: for the first we used three concentrations of the substrate called OM (OM, OM/2 and 2OM) combined with three concentrations of Zeatin (0, 2 and 4 mg L^{-1}). For the second trial we tested the effect two concentrations of OM substrate (OM, OM/2) added with 10% coconut water along two concentrations of zeatin (2 and 4 mg L^{-1}), and a control treatment only with coconut water. In both experiments uninodal explants of shoots obtained in vitro of olive variety 'Moraiolo' were employed and kept in a growth chamber at 21±2°C with a photoperiod of 16 hours light at an intensity of 40 µE m^{-2} sec^{-1} for 45 days. In order to evaluate the effect of the treatments we analyzed the percentage of survival, regeneration rate, number of shoots, shoot length, number of nodes, number of leaves, percentage of callus formation, average fresh weight, total dry weight and the vegetative activity index. It is concluded that the use of medium OM added 2 mg L^{-1} zeatin provides best results for in vitro regeneration of olive. Also, the use of coconut water added to the medium OM culture provided interesting results for in vitro regeneration of 'Moraiolo', and the use of lower concentration of zeatin could be considered from an economic point of view. In fact, it was also observed that the use of coconut water significantly increases the number of shoots produced, and this factor should be further studied with the aim to improve the micropropagation of olive.

Parole chiave: alternative substances, culture medium, coconut water, *Olea europea* L., *in vitro* propagation

Traceability of sustainable management practices through fruit metabolomic and ionomic profile

Mininni Alba Nicoletta[1], Adriano Sofo[1], Vito Gallo[2], Roberto Terzano[3], Antonino Rizzuti[2], Ignazio Alegretta[3], Bartolomeo Dichio[1]
alba.mininni@unibas.it
[1] *Scuola di Scienze Agrarie, Forestali, Alimentari ed Ambientali, Università della Basilicata, Potenza*
[2] *Dipartimento di Ingegneria Civile, Ambientale, del Territorio, Edile e di Chimica, Politecnico di Bari*
[3] *Dipartimento di Scienze del Suolo, della Pianta e degli Alimenti, Università di Bari Aldo Moro*

The consumer demand for healthy environmentally friendly food products has today become a very high priority. Fruit and vegetable production is one of the most important in the Italian agri-food system, thus it needs to assure high quality products. The majority of elements that make up a plant, except for carbon and oxygen, are obtained from soil through the roots. Thus, the elemental composition of a tissue, i.e. the ionome, is mainly a consequence of plant-soil environment interactions. This study examined whether different soil management practices generated different metabolomic and ionomic profiles in peach fruit as assessed through HPLC/MS and TXRF analyses. Fruits (30 per treatment) were sampled at harvest from sustainable orchards (e.g. no-tillage, mulching of pruning residues, calculated irrigation, compost supply and cover crops) receiving a total of about 8 t ha-1 carbon per year, and from conventional orchards (soil tillage, burning of pruning residues, mineral fertilization, empirical irrigation). Preliminary results show that the management options impacted the metabolomic and ionomic profiles of fruit. Particularly, in fruit picked at the sustainable orchard, the content of certain key metabolites for human health and food industry were higher than that in conventional fruit (e.g. +5% for quinic acid and derivatives, +30% for gluconic acid and +15% for amygdalin). Similarly, the ionomic profile of fruit was differentiated by the orchard management highlighting that some mineral elements (e.g. Mn, Ni, Cu and Zn) could be associated to the different management options. The identification of ionomic and metabolomic profile of fruit seems to be a promising approach that could be used for characterization of an environmentally friendly product being conceivably supportive for the implementation of quality product certification strategy.

Keywords: C input, HPLC/MS, TXRF, soil fertility, peach