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Enrichment of grapes with zinc for vinification: Mineral analysis with XRF, atomic absorption spectrophotometry and tissue analysis techniques

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Abstract

The micronutrient deficiency affects more than two billion individuals, that is, one in three individuals globally, there for it is a public health problem that can lead to various diseases, so we should pay more attention to it nowadays. In order to combat this problem, several alternatives have appeared, namely biofortification, which consists on increasing the amount of nutrients in food crops. Zinc is one of the most relevant micronutrients for the body. This micronutrient has three main roles: catalytic, structural and regulatory, and its deficiency leads to several health issues. Zinc has recognized benefits for atopic dermatitis, prostate disorders, pregnancy, spermatogenesis, alopecia, and osteopenia. In order to put zinc biofortification into practice, a technical itinerary was outlined which took place in the fields located near the Montijo region in Portugal. This work aims to optimize a response to zinc biofortification of four grape varieties Fernão Pires, Moscatel, Castelão and Syrah. Biofortification was performed with leaf applications of zinc oxide (OZn) and zinc sulfate (SZn) throughout the production cycle. In order to assess the efficiency of biofortification, XRF, atomic absorption spectrophotometry and tissue analysis techniques were used in this process. All the techniques demonstrated an increase in zinc content. Using XRF, progressively higher levels were observed in all varieties, with increasing applications with OZn and SZn. Considering all the forms measured by atomic absorption spectrophotometry, the average biofortification index at harvest varied between 17.3% -123%. And with the aid of the technique of localization and quantification of nutritional elements at the tissue level, Castelão, Syrah and Fernão Pires showed a substantial rise in zinc levels in the grape's skin, with the application of zinc oxide or zinc sulfate.

Biography:

Diana Daccak with a degree in Biochemistry and Agro-industrial Production and Transformation technologies. Presently is a PhD in Agroindustrial Technologies student with an emphasis on functional foods.

Speaker Publications:

1. Bouis, H. E., Saltzman, A. (2017)- Improving nutrition through biofortification: A review of evidence from HarvestPlus, 2003 through 2016- Global Food Security, volume 12, pp 49-58.
2. Cakmak, I., Kutman, U. B. (2017)- Agronomic biofortification of cereals with zinc: a review.
3. Elise, F., Talsma, Pachón, H. (2017)- Biofortification of crops with minerals and vitamins -Biological, behavioural and contextual rationale. HarvestPlus, International Center for Tropical Agriculture (CIAT), Cali, Colombia; Emory University, Atlanta, USA.

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