شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

EVALUATION OF NANOMETRIC ZINC AND MANGANESE ELEMENTS EFFECT ON BIOMASS, FRUIT YIELD AND QUALITY OF CRIMSON SEEDLESS GRAPE CULTIVAR

By

MOHAMED KHALED ABOU EL-NASR ABBAS
B. Sc. Agric. Sc. (Plant Production), Faculty of Agriculture, Ain Shams University, 2012
M. Sc. Agric. Sc. (Horticulture), Faculty of Agriculture, Ain Shams University, 2015

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ABSTRACT

Mohamed Khaled Abou El-Nasr Abbas: Evaluation of Nanometric Zinc and Manganese Elements Effect on Biomass, Fruit Yield and Quality of Crimson Seedless Grape Cultivar. Unpublished PhD Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2021.

This investigation was carried out during the two consecutive seasons of 2019 and 2020 in a private farm, Cairo Alex Desert Road, Egypt to determine the effect of nano materials as nutrient supplement on some vegetative parameters, chemical components and fruit characteristics of Grapevine "*Vitis vinifera* L." Crimson seedless cultivar. The co-precipitation protocol used in the preparation of nanoscale zinc and manganese particles; the characterization and identification of nanoparticles advocated that ZnO NPs and Mn NPs are in spherical shape within size range 97.3 nm and 59.1 nm, respectively. The obtained nanoparticles were foliar sprayed on 3 years crimson grapevines in three times (April, May and June). Biomass, fruit yield and quality of the experimental units were measured in three experiments, the first experiment was designed to study the effect of foliar spraying of ZnO NPs (0, 25, 50, 100 and 250 ppm) and ZnO 250 ppm; the second experiment was conducted to study the effect of foliar spraying of Mn NPs (0, 25, 50, 100 and 250 ppm) and MnO 250 ppm, and the third experiment was designed to study the effect of foliar spraying of 25 combinations treatments among different concentrations of ZnO NPs and Mn NPs. These experiments were arranged in completely randomized block design in five replicates. Data were recorded on vegetative growth (shoot length, number of leaves and leaf area) after each spray time. Also, physiochemical parameters of clusters (Cluster dimensions and weight, firmness, T.S.S, acidity, T.S.S/Acid ratio, sugars and anthocyanin) beside PAL

and SOD enzymatic systems were recorded once at the harvest time. Results indicated that the use of the lowest concentration (25 ppm) of ZnO NPs surpassed the higher experimented concentrations significantly in shoot length, number of leaves, leaf area and achieved remarkable increase in anthocyanin content of berries compared to foliar spray with ZnO bulk and control treatment in both seasons. Moreover, scored the highest significant enzyme activity (PAL and SOD). Furthermore, the physiochemical parameters of clusters including T.S.S, sugars content in berries were increased significantly and acidity decrease simultaneously. On the other hand, the use of 250 ppm concentration of Mn NPs led to increase some of vegetative and fruit quality traits, especially anthocyanin content and berries firmness. Accordingly, the superior combination was ZnO NPs at 25 ppm plus Mn NPs at 250 ppm which achieved the best effect on some vegetative and fruiting traits, improving fruit coloration in particular compared to the control vines with increase of enzyme activity (PAL and SOD).

Finally, A complementary experiment was carried out in order to investigate the potential toxic effect of ZnO NPs, Mn NPs and their combinations residues to ensure safety concept for grape consumers. This study carried out on rabbits as mammals' model by oral feeding with smashed berries of the recommended treatments (ZnO NPs at 25 ppm, Mn NPs at 250 ppm, 25 ppm ZnO NPs + 250 ppm Mn NPs combination and the berries of control vines in comparison with control with no grape feeding. Both of biochemical analysis and histological test referred to normal blood indicators and no histopathological changes were detected in liver or kidney structures under the experimental conditions.

Key words: Nanoscale, ZnO NPs, Mn NPs, anthocyanin, PAL, SOD, crimson seedless and grape.

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