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بسم اللّه الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

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MICROPROPAGATION OF JERUSALEM ARTICHOKE (*Helianthus tuberosus* L.) PLANT

By

NEAMA ABDELMONEIM ABDELAAL ABDALLA

B.Sc. Agric. Sci. (Vegetables), Fac. Agric. Tanta University, 1999
M.Sc. Agric. Sci. (Veg. Crops), Fac. Agric. Ain Shams University, 2013

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Approval Sheet

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This thesis for Ph.D. degree has been approved by:

Dr. Fouad Hassan Mohamed …….

Prof. Emeritus of Vegetable Crops, Faculty of Agriculture, Suez Canal University

Dr. Sabry Mousa Soliman …….

Prof. of Vegetable Crops, Faculty of Agriculture, Ain Shams University

Dr. Salah El-Deen Mahmoud El-Miniawy …….

Associate Prof. Emeritus of Vegetable Crops, Faculty of Agriculture, Ain Shams University

Dr. Mohamed Emam Ragab …….

Prof. Emeritus of Vegetable Crops, Faculty of Agriculture, Ain Shams University

Date of Examination: 13/2 /2020

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Under the supervision of:

Dr. Mohamed Emam Ragab

Prof. Emeritus of Vegetable Crops, Department of Horticulture, Faculty of Agriculture, Ain Shams University (Principal Supervisor)

Dr. Salah El-Deen Mahmoud El-Miniawy

Associate Prof. Emeritus of Vegetable Crops, Department of Horticulture, Faculty of Agriculture, Ain Shams University

Dr. Hussein Sayed Taha

Researcher Prof. of Plant Biotechnology and Genetic Engineering, Department of Plant Biotechnology, National Research Center

ABSTRACT

Neama Abdelmoneim Abdelaal Abdalla: Micropropagation of Jerusalem Artichoke (*Helianthus tuberosus* L.) Plant. Unpublished Ph. D. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2020.

This study was carried out on three cultivars of Jerusalem artichoke (i.e., Alba, Fuza and Balady). The main target was to establish a cost effective and an efficient *in vitro* propagation protocol of J. artichoke by tissue culture technique for large scale production. The tubers of J. artichoke were released of dormancy by using 400 mg L^{-1} gibberellic acid. Aseptic cultures of stem nodes were successfully initiated on ½ MS + 62.5 mg L^{-1} cefotaxime. The best results for shoots multiplication were observed on MS + 1 mg L^{-1} BA + 0.1 mg L^{-1} NAA + 50 mg L^{-1} nano-selenium. In vitro shootlets were efficiently rooted on ½ MS + 2 mg L^{-1} IBA + 0.1 mg L^{-1} NAA + 0.5 mg L^{-1} kin. In vitro derived plantlets were well acclimatized on a mixture of peat moss, sand (1:1). In addition, callus cultures of Balady, Fuza and Alba cultivars were successfully established from stem explants on MS supplemented with 1 mg L^{-1} BA + 2 mg L^{-1} NAA. Callus cultures could be used for inulin production. Moreover, in direct shootlets regeneration from stem callus of the three cultivars was achieved on MS + 6.0 mg L^{-1} picloram + 0.1 mg L^{-1} NAA. Furthermore, for enhancement and accumulation of inulin, hairy root cultures of Balady cultivar by *Agrobacterium rhizogenes* (A4) were obtained. Finally, for molecular characterization of the *in vivo* plants and the *in vitro* derived cultures (*in vitro* plantlets and callus), RAPD, ISSR and SCoT based markers techniques were performed to identify the differences between them. Furthermore, the results of dendogram were indicated that there was highly similarity between Balady and Fuza and very low similarity between those and Alba cultivar was identified.

Key words: *Helianthus tuberosus*, micropropagation, callus cultures, regeneration, molecular characterization, RAPD, ISSR and SCoT

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