SEED POTATO PRODUCTION USING MICROTUBER

By

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B. Sc. Agric. Sc. (Horticulture), Ain Shams University, 2005

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Approval Sheet

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ABSTRACT

Ibrahim Hussein Osman Amer: Seed Potato Production Using Microtuber. Unpublished M.Sc. Thesis, Arid Land Agricultural Graduate Studies and Research Institute, Faculty of Agriculture, Ain Shams University, 2010.

This study was carried out at the tissue culture laboratory of Arid Land, Agriculture Research Unit, The Faculty of Agriculture, Ain Shams University, during the period from 2006-2009 . The objective of this work was to study the effect of some factors affecting in vitro microtuberization of potato as effect of cytokinins, growth retardants and sucrose concentrations. The second objective of this research was to know the best cultivar to produce shoots from microtubers and after that produce minitubers. Three concentrations of Kin and BA (1, 2 and 3 mg/l) were used, also three concentrations of Paclobutrazol and Uniconazol (1, 2 and 3 mg/l) were used in this experiment. Likewise, some concentrations of sucrose were used at 20, 40, 60, 80, and 100 g/l to know the best concentration of sucrose to enhance microtubers formation. The results showed that the highest percentage of tuberization was obtained from cv. "Draga" grown on modified MS medium supplemented with 3 mg/l Kin or BA. The same results with both fresh weight of microtubers and its number of microtubers / propagule. With regard to growth retardants, the results showed also that the highest percentage of tuberization was obtained from cv."Draga" grown on MS medium with 1 mg/l Paclobutrazol. The same results with both fresh weight of microtubers and its number of microtubers / propagule. The highest percentage of tuberization was obtained from cv. "Draga" when cultured on MS medium supplemented with 80 g/l sucrose. On the contrary, cvs. "Draga and Cara" produced the lowest values related to fresh weight of

microtubers , its number of microtubers / propagule and percentage of microtuberization without significant difference on the control medium. 80g/l sucrose gave the highest values of weight of microtubers / propagule, weight of microtubers and number of microtubers / propagule and percentage of microtuberization. Significant differences appeared between two cultivars in the yield characteristics. That cv. "Draga" had the highest survival percentage of microtubers, plant height, stem, leaves number per plant. Significant differences appeared between two cultivars in the yield characteristics. That cv. "Draga" had highest fresh weight / propagule, total yield and number of minitubers / propagule.

Key word:

in vitro, Potato, Kinetin, Benzyl adenine, Paclobutrazol, Uniconazol, sucrose, minituber.

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LIST OF ABBREVIATIONS

Abbreviation	Full name
ABA	Abscisic acid
BAP = BA	6-Benzylaminopurine = Benzyladenine
CCC	Cycocel (chlorocholine chloride)
CIP	International Potato Center
cv (s)	Cultivar (s)
2,4-D	2,4-Dichlorophenoxy acetic acid
GA_3	Gibberellic acid
h	Hour
IAA	Indole acetic acid
Kin	Kinetin (6-Furfurylaminopurine)
Lux	Light intensity unit
M	Molar
mM	Millimolar
Mg	Microgram
HM	Micromolar
Hmol	Micromol
MS	Murashige and skoog medium (1962)
NAA	Naphthalene acetic acid
PLRV	Potato leaf roll virus
PVX	Potato virus X
PVY	Potato virus Y
w/v	weight to volume
v/v	Volume to volume

1- INTRODUCTION

The potato, in terms of quantity, comes fourth after rice, wheat and corn on the list of the crop species that are most important for the human nutrition worldwide (**FAO, 2008**). More than one-third of the global potato output now comes from developing countries, comparing to just 11% in the early 1960s. According to the latest FAO data, potato production worldwide stands at 327 million tons and covers more than 18 million hectares.

Egypt is one of the largest producers and exporters of potatoes in Africa. Potato is the second most important vegeTables after tomato. Commercial production of potato (*Solanum tuberosum*) in Egypt concentrates in the Nile Delta and mid of Egypt. Potato (*Solanum tuberosum*) is cropped continuously in Egypt from August to June (**Geddes and Monninkhof, 1984**). The area grown in Egypt was 153745 Fadden, and total production was 1654537 ton, and yield / Fadden was 10.762 ton/Fadden (**Bulletin of Agriculture Statistics, 2009**).

Potato productions systems are needed to meet the increased demand of people worldwide (**CIP, 1984**).

the potato is infected by a many of diseases such as *Rhizoctonia* and *fusarium* , leading to use the fungicide as stated before method has dangerous effects on livings and cause much dangerous disease as cancer .

Many techniques have been developed during the last decades for producing potato certified seeds, such as plant tissue culture. Tuber production *in vitro* was described as an