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التوثيق الالكتروني والميكروفيلم

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بالرسالة صفحات

لم ترد بالاصل

Biotechnological studies on potato (*Solanum tuberosum L.*) plants.

A thesis
Submitted for the degree of Ph.D. of Science in Botany

(Cell and Genetics)

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بسم الله الرحمن الرحيم

يسألونك عن الروح قل الروح

من أمر ربى و ما أوتيتم من

العلم إلا قليلا

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Abstract

Potato plantlets were produced free from : PVA, PVM, PVS PVX, PVY and PLRV viruses, by a combination between different meristem sizes and chemotherapy (virazole). Three different meristem sizes were used (0.3, 0.5 and 1 mm) in a combination with five virazole concentrations (0, 80, 100, 120 and 150 mg/l). The studies showed that the most difficult virus to be removed completely was PLRV , where there was a must to use the highest virazole concentration (150 mg/l) combined with the smallest meristem size (0.3 mm).Then, Random amplified polymorphic DNA (RAPD) markers were used to characterize and detect the variations which might be occurred as a result of virazole presence in potato tissues. Five treatments were used involving different virazole concentrations (0, 80, 100, 120 and 150 mg/l). Ten primers were run here, only six primers were found to be polymorphic.

Also, the effect of virazole on protein content in potato tissues was studied. This process was performed using SDS-PAGE technique for the five treatments of the same concentrations of virazole (0, 80, 100, 120 and 150 mg/l). The results showed that when virazole concentration increases, protein density also increases up to virazole concentration (150 mg/l), protein density here decreases. This may be due to plants excrete more protein to overcome the negative effect of virazole which delay potato growth. The effect of virazole on some isozymes activity was studied concerning four isozymes (peroxidase ,esterase ,alkaline phosphatase and acid phosphatase).

There is no any effect of virazole on isozyme peroxidase activity in potato tissues.

In case of esterase, increasing virazole concentration led to an increase in the density and the activity of the esterase isozyme.

The results showed also that virazole has a negative effect on the activity of acid phosphatase isozyme in potato tissues.

The final isozyme was alkaline phosphatase, where its activity was very high in control treatment (0mg/l virazole) while this activity was decreased in all the other treatments with the same degree (the higher virazole concentration had the same effect like the lower one), so the effect here of all virazole concentrations is similar which decreases alkaline phosphatase density and activity.

Using virus-free potato plantlets, A trial to make an adjustment for transformation conditions in potato was carried out here. *Agrobacterium tumefaciens* (LBA4404) clones were used , where results were verified by both GUS Assay and PCR reaction.

Virus-free potao microtubers were produced , while the best treatment for microtubers production was that of (0.5) mg/l 2,4-D which gave 2.5 microtuber per plant with an average weight of 627 mg.

Also, Potao minitubers were produced where two treatments were carried out here, the first one was involving plants which were cultured *in vitro* in MS supplemented with 2 mg/l silver thiosulphate (STS) , and the other was involving plants which were cultured in normal MS without STS. It was found that the treatment of silver thiosulphate (STS) { 2mg/l } gave the best results for all the parameters.

Dedication

To the memory of my sincere father,

my fiddle and kind mother,

my sincere uncle Moustafa,

my brother and my sister,

my wife and my daughters:

Sara , Hoda and Menna,

to my great professors,

to my relatives and my deer friends,

and to my honest students

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