

Abstract:

Plant secondary metabolites are afforded very high economic and added value; chemical synthesis of these metabolites is usually complex and expensive. Culture organ, tissue and cells of plants and also the use of elicitors for increasing the secondary metabolites production is one of the ways that today more than any other subject in investigation and production of plant metabolites considered. Because of the valuable secondary metabolites, in addition to the medicinal and nutritional purposes, cumin seeds are also used in health and beauty industry and apply in certain perfumes and cologne. In order to evaluate best lighting conditions and effects of different concentrations of 0, 0.1, 0.5, 1, 2 milligram per liter 2.4-D hormone (2,4-Dichlorophenoxyacetic acid) and different concentrations of 0, 0.1, 0.5, 1, 2 milligram per liter Kinetin hormone on callusing and the growth of cumin seed callus, and also to evaluate the effect of chitosan elicitors biological and chemical silver nanoparticles (synthesis) and titanium dioxide nanoparticles in two periods of three and five hours on the amount of cumin seeds callus phenolic compounds, a two-factor factorial experiment was conducted in a completely randomized base design with three replications.

The results showed that the best organ for callus formation is stem and the best concentration of hormones is 0.5 milligrams per liter Kinetin together with 1 milligram per liter 2.4-D, and the best lighting conditions for cumin is dark conditions. The results of the analysis of data obtained from the HPLC device showed that in all cases, elicitor factor significantly changes ten examined phenolic compounds ((Gallic acid, chlorogenic acid, caffeic acid, vanillic acid, Syringic acid, p-coumaric acid, ferulic acid, Sinapic acid, benzoic acid and p-cinnamic acid) at 1% level. Except phenolic compounds of Gallic acid and Sinapic acid, in other phenolic compounds, time factor significantly changes them at the 5% level.



University of Zabol

Graduate School

Faculty of Agriculture

Department of Plant Breeding and Biotechnology

Evaluation of different parts of the callus and the effect of elicitors chitosan and nanoparticles titanium dioxide silver on the amount of plant phenolic compounds *cuminum cyminum*

Supervisor:

Dr. Barat Ali Fakheri

Supervisor:

Dr. Nafiseh Mahdi Nezhad

Advisors:

Dr. Sedighe Esmailzadeh

By:

Mohammad Amin Bahmani

September 2016