

# Effect of Phytohormones and chemical elicitors on growth and phenolic acids production in *Solanum tuberosum* cultivars through in-vitro cultures, RP-HPLC profiling of phenols and their antioxidant & anticancer potential

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## Abstract

Current research work comprises effects of phytohormones and chemical elicitors on the multiplication of *Solanum tuberosum* shoots along with production of therapeutic compounds such as phenolic acids. Quantification assays of major antioxidants such as TPC, Catalase, SOD and GSH were done along with evaluation of antioxidant activity by adapting DPPH and ABTS methods from *Solanum tuberosum*. *L* cultivar regenerated in MS medium supplemented with different concentrations of Phytohormones and chemical elicitors respectively. Furthermore, *in vitro* regenerated plants were analyzed by reversed phase HPLC for the identification and quantification of major phenolic acids that showed the presence of Phenolics such as Quercetin, gallic acid, ferulic acid, sinapic acid, vanillic acid 4-hydroxy-3-methoxy benzoic acid, m-coumaric acid, trans-4-hydroxy 3-methoxy, cinnamic acid caffeic acid and syringic acid.

Each stage of in-vitro multiplication was performed by using different concentrations /combinations of phytohormones such as benzyl amino purine, Indole butyric acid and Indole acetic acid along with different chemical elicitors like Sodium acetate, calcium chloride, salicylic acid and copper sulphate with different concentrations in the medium. The effect of phytohormones on regenerated plants varied in term of length, percentage of culture survival and number of shoot or roots/explant. Best response of shoot induction was acquired on MS medium containing IAA 2.0mg/L alone, ideal development of shoots from apical meristem was obtained with BAP 2.0mg/L and from nodal meristem with BAP 3.0mg/L, while multiplication of shoots showed good results with combination of BAP 1.0mg/L + IAA 2.0mg/L, IAA 1.0mg/L+ IBA 2.0mg/L and alone with IBA 3.0mg/L and IBA 4.0mg/L.

Similarly, chemical elicitors used in MS medium showed varied trend in phenolic acid enhancement, antioxidant activities in regenerated plants grown in MS media supplemented with elicitors. According to our study calcium chloride showed an enhanced quantity of SOD and TPC i.e. 18.605  $\mu\text{g/ml}$  and 7.09  $\mu\text{g/ml}$  while Copper sulphate showed increased production of Catalase i.e. 87  $\mu\text{g/ml}$ . Salicylic acid

showed enhanced glutathione concentration that is 9.43  $\mu\text{g/ml}$ , just like these activities chemical elicitors shows maximum percentage inhibition in DPPH free radical scavenging, ABTS scavenging activities and Lipid peroxidation. In DPPH salicylic acid Shows 37.25% and in ABTS calcium chloride shows 84.55% while in lipid peroxidation salicylic acid shows 32.735% inhibition. Plants regenerated were analyzed to study the effect of phytohormones and chemicals elicitors on the enhanced production of phenolic acids by using reverse phase HPLC. Results showed the presence of polar phenolic acids with major 03 different types of phenolics such as quercetin (7.25 $\mu\text{g/g}$ ), vanillic acid (65.59  $\mu\text{g/g}$ ) and Chlorogenic acid (41.65  $\mu\text{g/g}$ ). Our study showed that further isolation and purification of Phenolics acids may lead to add valued products along with the new and novel bioactive compound for their use in the food and pharmaceutical industries to cope with different disorders.

## Biography:

Mr. Asif Saleem has completed his Masters and PhD in the age of 30 years from reputed universities of Pakistan. He has been associated with different universities as Lecturer, Assistant professor and has an academic and research experience of almost 10 years. He has published 10 research papers in reputed journals along with 02 books by international publishers. He has presented many times his research work on both national and international conferences. Being a plant bio-technologist he has signed different MOUs with different firms for commercial technology transfer under Industrial- Academia linkage.