IN VITRO REGENERATION OF TOMATO (*Lycopersicon esculentum* Mill.) AS INFLUENCED BY BAP AND SALT (NaCl)

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ABSTRACT

Tomato (*Lycopersicon esculentum* Mill.) is an important crop plant cultivated all over the world, and its production and consumption continuously increasing. Protocol for *in vitro* regeneration can provide advantage for the production of stress tolerant cultivars. This study was conducted to develop an efficient protocol for the regeneration of tomato (*Lycopersicon esculentum* Mill.) Variety KC 1 for the tolerance against salt stress at the laboratory of plant tissue culture, Department of Crop Science, Faculty of Agriculture, Eastern University, Sri Lanka in 2017

The first experiment was done to obtain the suitable explant for the multiple shoot production in the medium fortified with 2.0 mg/l BAP (6-Benzyl amino purine) and 0.2mg/l NAA (Naphthalene acetic acid). Different types of explants derived from 12 day old seedlings were used for this experiment. Cotyledon explants node were exhibited better *in vitro* response. *In vitro* shoot regeneration frequency was significantly higher when cotyledon explants also used as explants and they produce somatic embryos as well. From the cotyledons, somatic embryos were formed in indirect callus phase.

The second experiment was done to select the suitable concentration of BAP for the *in vitro* culture. Different concentrations of BAP were tested. Cotyledon and hypocotyl explants were used as explants in this experiment. Among the media and explants, MS medium fortified with 1.5 BAP and 0.2 NAA was exhibited better result for the shoot regeneration from hypocotyl and medium with 2 BAP and 0.2 NAA was exhibited better result for the shoot regeneration from cotyledons after 4 weeks of culture. Among the four levels (0, 1.0, 1.5 and 2mg/l) of BAP employed in Murashige and Skoog (MS) media, 2.0 mg/l BAP was found superior in growth traits (callus and

shoot formation). No significant difference was noticed between cotyledon and hypocotyl explants on medium having 2.0 mg/l BAP.

Last experiment was done to assess the *in vitro* response of hypocotyl explants to the salinity stress and to develop a protocol for the salt tolerant cell lines for the tomato variety KC1. Both explant and growth regulator concentrations influenced shoot proliferation. Hypocotyl explants were excised from *in vitro* grown seedlings and inoculated onto MS medium supplemented with 1.5 mg/l BAP, 0.2 mg/l NAA and salt. *In vitro* morphogenesis is greatly influenced by plant growth regulators and NaCl. It was observed that morphology of hypocotyl was significantly different from the salt and control media. And also after four weeks of culture, the fresh weight and colour of callus was observed and it was compared with the salt free media (0 mM) which showed a significant different in each explant portion.

The results revealed in hypocotyl explants the different portion could exhibit different response to the salinity. And when the concentration of salinity increased there was a significant difference in the *in vitro* response. Fresh weight of callus was higher in both control (0 mM) and 15 mM salt medium (MS + 1.5 mg/l BAP +0.2 mg/l NAA). Also the hypocotyl top portion produced shoots from the 35 mM salt media but with the distinct necrotic patches.

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