



Biochemical and physiological changes of callus growth and Lycopene pigment production from Tomato (*Lycopersicon esculentum* Mill) under drought stress

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Abstract : This experiment was conducted in faculty of Science labs, Kufa University, carried out during 2014 to applied methods for extraction, purification and Quantitative of Lycopene red pigments, from callus tissue and tomato fruits mother plant (*Lycopersicon esculentum* Mill). This study include of three parts. Firstly, Tomato seeds (Supper queen) hybrid were germinated in free MS medium and callus induction from shoot tip (3cm pieces) by using MS medium supplemented with Dichlorophenoxyacetic acid (2,4-D) at different concentration (1, 2, 3) mg/l with (BA) benzyl adenine at concentration of (0.2) mg/l. Secondly, identically callus fresh weight recultured in the same Ms medium supplemented with high molecular weight (polyethylene glycol) PEG was used as selective agent at level of (5,15,20 and 30 %). Thirdly, comparisons study were made between *in vitro* and *in vivo* grown plant. Powder of control (lycopene) used as standard solution. The content of lycopene was done by using HPLC (high performance liquid chromatography), and compare of the quantitatively of lycopene with these content in fruits of mother plant, and callus tissue. Also, include alcohol extraction of Lycopene from tomato fruit by using acetone and hexane mixture. The result showed significant increased ($P < 0.05$) of Lycopene production and the superiority of lycopene content in Callus than the content in fruits of mother plant. Antioxidant enzymes activity like Catalase (CAT), guaiacol peroxidase (POX) and Superoxide dismutase (SOD) were high in callus under drought stress than in fruit of mother plant. However, Proline and total sugar content were at higher levels in callus under drought stress than in fruit of mother plant.

Key Words: Culture media, callus, CAT, POX, SOD, Lycopene pigment.

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