OMICS International
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Abdel Rahman R A et al., J Pharma Care Health Sys 2015, 2:4
http://dx.doi.org/10.4172/2376-0419.S1.006

European Pharma Congress

August 25-27, 2015 Valencia, Spain

Mutagenic effects of sodium azide and gamma rays on callus development and silymarin production in *Silybum marianum* (L) Gaernt

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Plants are important source for natural drugs and modern medicines. It is estimated that approximately one quarter of prescribed drugs contain plant extracts or active ingredients obtained from plant substance. *Silybum marianum* (L) Gaernt, is a member of the family Asteraceae, native to the Mediterranean area. The plant extract has anticancer, anti-inflammatory, antioxidant, hepatoprotective, antidiabetic and immune-modulatory effects. In the present study, callus cultures obtained from leaf explants using MS medium supplemented with 1 mg/l BA and 1 mg/l 2, 4-D. Effects of sodium azide and gamma rays on callus growth and silymarin production were tested. Callus treated with 1, 2, 3, 4 or 5 mM NaN3 for 1 h or exposed to γ–radiation at doses of 10, 20, 30, 40, or 50 gray. Results indicated that the fresh weight of treated callus decreased by increasing the dose of NaN3 and γ–rays. The chemical composition of silymarin was determined by HPLC. Sodium azide and gamma rays could induce the production of isosilybin A that was not detected in control callus. They reduced or enhanced the production of other silymarin components. Differential display technique was used to identify differentially expressed genes associated with silymarin production. Nine unique cDNAs over-expressed in treated callus and representative of suspected genes that expressed due to mutagen stress, were purified and sequenced. Most of the obtained nucleotide sequence and corresponding amino acid displayed 100% similarities to chalcone synthase that is a key enzyme in flavonolignans biosynthesis. The over-expression of chalcone synthase may be the cause of enhanced production of some silymarin components.

Biography

Abdel Rahman R A has completed her PhD in 2003 at Alexandria University, Faculty of Agriculture, Genetics Department, through a collaborative scholarship with University of Georgia, Athens, USA. She completed a research project entitled 'Exploring IRES mediated discistrons for the phytoremediation of Mercury'. Currently, she is the Director of Pharmaceutical Bio-products Research Department, City of Scientific Research and Technology Applications, Alexandria, Egypt. Her main research interests are using plant tissue culture and genetic engineering techniques to conserve rare and endangered plant species, as well as enhancement of the productivity of important pharmaceutical compounds from plants. She is working in several projects dealing with the production of antiviral, anticancer, and antioxidant compounds from plants using *in vitro* cultures.

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