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Evaluation of nanomaterials antibacterial activity by using in tissue culture media

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The field of nanotechnology is one of the most active areas of research in modern materials science. New applications of nanoparticles and nanomaterials are emerging rapidly. Nanocrystalline silver particles have found tremendous applications in the field of high sensitivity biomolecular detection and diagnostics, antimicrobials and therapeutics, Catalysis and micro-electronics. The use of nano-sized silver particles as antimicrobial agents has become more common as technological advances make their production more economical. One of the potential applications in which silver can be utilized is in management of plant diseases. TiO_2 is the most commonly used semiconductor photocatalyst. Among the different nanomaterials, it is the most studied. Activated by UV-A irradiation, its photocatalytic properties have been utilized in various environmental applications to remove contaminants from both water and air. A wealth of information on TiO_2 photocatalytic inactivation of bacteria has been acquired over the last 20 years. The concentration of TiO_2 usually required to kill bacteria varies and depending on the size of the particles and the intensity and wavelength of the light used. Plant tissue culture techniques involve the growing and multiplication of totipotent cells, tissues and organs of plants on defined solid or liquid media comprising nutrients under an aseptic and controlled environment. Plant tissue culture has an important role in the production of agricultural or ornamental plants and in the manipulation of plants for improved agronomic performance. This research was planned to evaluate the potential of nano silver and TiO_2 to remove bacterial contaminants that exist in plant tissue culture media. Potato explants were cultured on this modified MS medium and evaluated after four weeks. The results showed that nano silver and TiO_2 had a good potential for removing the bacterial contaminants in plant tissue culture procedures.

Biography

Kamran Safavi has completed his MSc. Degree in Agricultural Biotechnology from Isfahan University of Technology (IUT) at 2009. The title of his thesis was "Thaumatin-Like TLP-3 Gene Transformation into Tobacco", which led to several journal publications. In addition to his thesis related subjects he has completed research topics about Oligo software, primer and adaptor design-bioinformatics, tissue culture, gene cloning, plasmid construction, PCR, RT-PCR, bioassay, transformation by Agrobacterium tumefaciens. Finally, he has studied using nanomaterial in media of some plants tissue culture, using omega-3 in media of some plants tissue culture, DNA extraction and gene transformation. Until now he has some work experience such as director of technology incubator center and head of high-tech group at Khorasgan (Isfahan) University for two years.

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Pycnogenol ameliorates hyperlipidemia and antioxidant status in pancreas of type 1 diabetic rats

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The present study evaluated the role of pycnogenol (PYC) on hyperglycemia, hyperlipidemia, and oxidative damage in the pancreas of streptozotocin (STZ)-induced type 1 diabetic rats. Diabetes was induced in rats by an intraperitoneal injection of streptozotocin (STZ, 60mg/kg body-weight) followed by free access to 5% glucose for next 24h. Four days after STZ injection, rats were supplemented with PYC (10mg/kg body-weight) for four weeks. The PYC treatment was started after diabetes was confirmed. At the end of the experiment, blood was drawn and rats were then sacrificed and their pancreas was dissected for biochemical and histopathological assays. The level of fasting blood glucose, glycated hemoglobin, total cholesterol, triglycerides, low density lipoprotein-cholesterol and very low density lipoprotein-cholesterol significantly increased while high density lipoprotein cholesterol decreased in the STZ group. PYC treatment significantly augmented ($P < 0.05$) these effects in the STZ + PYC group. Moreover, treatment with PYC significantly ($P < 0.05$) ameliorated thiobarbituric reactive substances, malonaldehyde and protein carbonyl, and glutathione, glutathione-s-transferase and catalase in the pancreas of the STZ group. The study suggests that PYC is effective in reducing hyperglycemia, hyperlipidemia and oxidative stress related to the risk of diabetes. Thus, it may have a therapeutic value for the treatment of Type 1 diabetes.

Keywords: Pycnogenol; Type 1 diabetes; Oxidative stress; Streptozotocin.

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