Indian Journal of Experimental Biology
Vol. 62, June 2024, pp. 393-399
DOI: 10.56042/ijeb.v62i06.3807

Synthesis of phycoerythrin-Ag-ZnO nanobiocomposite from marine red algae *Porphyridium purpureum* for anticancer applications against MCF-7 cell line

Baskar G*, Keerthana K, Supriya A, Pravin R, Abinesh AR & Yuvaraaj SA

Department of Biotechnology, St. Joseph's College of Engineering, OMR, Chennai - 600 119, Tamil Nadu, India

Received 10 July 2023; revised 15 March 2024

The focus on utilization of marine macroalgae for green synthesis of bimetallic nanoparticles with potential applications in cancer treatment has gained a lot of attention in recent years. In this present study, we synthesized a nanobiocomposite using the red pigment R-phycoerythrin from the marine red algae *Porphyridium purpureum* and explored its anticancer potential. This vibrant red fluorescent pigment plays a crucial role as a reducing and stabilizing agent. Ag-ZnO nanobiocomposite was synthesized by green approach using phycoerythrin as a capping agent. The synthesized nanobiocomposite was characterized using UV-Vis spectroscopy, XRD, FT-IR and SEM-EDX techniques. The obtained UV-Vis graph has confirmed the presence of Ag, Zn and phycoerythrin in the synthesized nanobiocomposite. The FT-IR showed the occurrence of Zn–O vibration peak along with hydroxyl and carboxyl groups. The XRD results confirmed the crystalline nature and hexagonal shape of the nanobiocomposite. The overall effect of the synthesized phycoerythrin-Ag-ZnO nanobiocomposite was studied by MTT assay to check its anticancer applications. From the obtained results, the IC_{50} value was found to be 100 µg against MCF-7 cell line. This confirms that the synthesized phycoerythrin-Ag-ZnO nanobiocomposite inhibited the growth of MCF-7 cell line and thus can be efficiently used as a photosensitive drug for chemotherapy in future.

Keywords: Bimetallic nanoparticles, Cancer, Chemotherapy, Red seaweed

Chemotherapy plays