

Biosynthesis of NiFe₂O₄ / Ag nanoparticles by Sandals Alikus Algae Extract (scenedesmus obliquus) and its impact on the breast cancer cell line

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Abstract Introduction: Cancer is still the second leading cause of death worldwide, despite advances in treatment. In the meantime, nanotechnology has been instrumental in achieving swift and effective treatment. Biological methods have also been considered for the synthesis of nanoparticles. **Materials and Methods:** In this experimental study, biosynthesis of NiFe₂O₄ / Ag nanoparticles was carried out by an extract of algae *Scenedesmus obliquus*. Then its effects on the breast cancer cell line were investigated. Various techniques and experiments, such as FTIR, DRS, XRD, and scanning electron microscopy (SEM), prove the existence of NiFe₂O₄ / Ag nanoparticles. The toxicity effects of nanoparticles in different concentrations were investigated by MTT assay. Apoptosis and cell death were determined by flow cytometry and caspase 3 tests. **Results:** The accuracy of nanoparticles NiFe₂O₄ / Ag bio-synthesized was proved. The size of the biosynthetic nanoparticles was in the range of 24-29 nm with a spherical structure. The MTT test showed that these nanoparticles at concentrations of 250 to 500 inhibited the proliferation of more cell line breast cancer cells (MCF7). Based on the results of flow cytometry test, induction of apoptotic was 73% and more than necrosis. Also, the Caspase test results showed that NiFe₂O₄ / Ag nanoparticles caused the death of MCF7 cell line breast cancer cells. **Conclusion:** Biosynthesis of bioactive nanoparticles causes apoptosis and induction of breast cancer cells and can be used to treat cancers. **Key Words:** Breast Cancer, *scenedesmus obliquus*, NiFe₂O₄ / Ag Nanoparticles

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