

# **Synthesis of Cobalt Oxide nanoparticle functionalized by Thiosemicarbazone and its effect on breast Cancer cell line**

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**Background:** Breast cancer is the most common cancer among women. Recently, it has been proven that nanotechnology can improve the treatment efficiency of these types of diseases. The aim of this study is to investigate the cytotoxic properties of Cobalt oxide nanoparticles, activated by carbazone thiosum, which is prepared by a co-precipitation method. **Materials and Methods:** In this study, cobalt oxide nanoparticles activated by carbazone thiosis were designed as anticancer agents against MCF-7 cells in breast cancer. Identification of phase morphology and also the functional groups of this nanoparticle were also studied by FESEM, XRD, and FTIR tests, respectively. In addition, the cytotoxic effect of this nanoparticle was tested using the MIT test and its effect on induction of apoptosis was also investigated by studying the activity of Caspase 3, and the study of Annexin V and PI using a flow cytometry device. **Results:** SEM images showed that the nanoparticle size of cobalt oxide particles activated by carbazone thiosis is in the range of 30 to 50 nm. The FTIR spectrum showed that carbazone thiosis is connected to a cobalt oxide nanoparticle and also the results of MIT test has been shown that the growth and survival of MCF-7 cells the 24-hour treatment with this nanoparticle has been reduced in the form of hypothyroidism. In addition, our studies have shown that the produced nanoparticle causes apoptosis in MCF-7 cells, which is due to increased activity of Caspase 3, which ultimately leads to fragmentation of the cell nucleus. **Conclusion:** The results of this study shows that the cobalt oxide nanoparticles activated by carbazone thiosis can inhibit MCF-7 cells by activating the pathway of apoptosis and it's a new suggestion to cancer treatment. **Keywords:** cobalt oxide nanoparticles activated, carbazone thiosis , breast cancer

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