**ABSTRACT**

Magnetic nanocarriers has become popularised in the research field as well as in the biomedical application due to their unique exotic possession, and processability. The present study involves the synthesis of nanocarrier, Iron Oxide nanoparticle conjugated with silibinin (SLN-Fe2O3) using co-precipitation method and also to detect their efficacy against the colon cancer cell. The synthesized SLN-Fe2O3 were undertaken for several analysis including UV-visible spectroscopy, dynamic light scattering, scanning electron microscope, Fourier transform infra-red spectroscopy, zeta potential analysis, and X-ray diffraction analysis. The analysis had end up in confirming the polydispersity and crystalline nature of the synthesized SLN-Fe2O3 with an average size of 70 nm. Further the synthesized SLN-Fe2O3 was undertaken for in vitro (AO/EtBR and DAPI) studies to find their effectiveness against human colon cancer using HT-29 cell line. The fragmentation occurs in nuclear material of the SLN-Fe2O3 treated cells had revealed that the cell death was due to the induction of apoptotic signals in the treated cancer cells. Thus the current study had clearly validated the potency of synthesized Iron Oxide nanoparticles conjugated with silibinin (SLN-Fe2O3) against the colon cancer cell and holds a promising therapeutic potency in treating cancer cells.