Abstract

The present study was aimed at assessing the phytoconstituents present in *Tabebuia roseo-alba* followed by the determination of its anti-proliferative and apoptotic potential on lung cancer. The study was carried out in four phases. In phase I, the presence of phytochemical constituents in various solvent extracts of *T. roseo-alba* was screened by preliminary phytochemical screening, High performance thin layer chromatography. The results revealed the presence of various bioactive constituents like flavonoids, phenols, alkaloids, tannins and terpenoids in the leaves of *T. roseo-alba*. Further, based on the peaks obtained in GC MS analysis, the presence of diverse group of pharmacologically active compounds were confirmed. To explore the therapeutic potential of the candidate plant free radical scavenging activity of various extracts of *T. roseo-alba* was carried out by following standard procedures. The results revealed the ability of ethanolic extract of *T. roseo-alba* in scavenging all the radicals tested in a dose dependent manner. In phase II, silver nanoparticles of *T. roseo-alba* were synthesized using the ethanolic extract and they were characterized by adopting various parameters. In the present study, eco-friendly, cost effective green synthesis of silver nanoparticles using ethanolic extract of *T. roseo-alba* was explored and crystalline, spherical shaped, highly stable silver nanoparticles of varying size in the range between 5-100nm have been synthesized. In phase III, the anticancer activity of the ethanolic extract of *T. roseo-alba* and its AgNPs were determined by the MTT assay. It is evident from the results that, though both the samples were showing prominent antiproliferative activity on lung cancer cell lines, AgNPs of *T. roseo-alba* was found to be more potent than the ethanolic extract. Moreover, the ability to induce apoptosis was evaluated by FITC Annexin V and PI staining and the results have proved the efficiency of ethanolic extract of *T. roseo-alba* and its AgNPs to cause oxidative stress and subsequent cellular death, which was further confirmed by measuring the mitochondrial membrane potential after staining the cells with JC1. Apoptotic mode of cell death was further confirmed by DNA fragmentation and caspase assay by western blot analyis. In phase IV, to establish the drug efficiency of the extract, *In silico docking* studies were done to confirm the interactions of the bioactive compounds of the *T. roseo-alba* extract and the proteins involved in apoptotic and cell signalling pathways associated with lung cancer. The results of the present study revealed that the phytoconstituents of *T. roseo-alba,*

were able to interact efficiently with the apoptotic targets and selected protein molecules involved in lung cancer, thus blocking cell proliferation that eventually suppress cancer progression. Therefore the results of the present study would be the platform for exploring novel clues and insights for drug discovery and therapeutic strategies against lung cancer.

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