

## Pegylated Liposomes of Trans Resveratrol, an Anticancer Agent, for Enhancing Therapeutic Efficacy and Long Circulation

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**Abstract :** Trans resveratrol (RES) is a natural molecule proved for cancer preventive and therapeutic activities devoid of any potential side effects. However, the therapeutic application of RES in disease management is limited because of its rapid elimination from blood circulation thereby low biological half life in mammals. Therefore, the main objective of this study is to enhance the circulation as well as therapeutic efficacy using PEGylated liposomes. D- $\alpha$ -tocopheryl polyethylene glycol 1000 succinate (vitamin E TPGS) is applied as steric surface decorating agent to prepare RES liposomes by thin film hydration method. The prepared nanoparticles were evaluated by various state of the art techniques such as dynamic light scattering (DLS) technique for particle size and zeta potential, TEM for shape, differential scanning calorimetry (DSC) for interaction analysis and XRD for crystalline changes of drug. Encapsulation efficiency and invitro drug release were determined by dialysis bag method. Cancer cell viability studies were performed by MTT assay, respectively. Pharmacokinetic studies were performed in sprague dawley rats. The prepared liposomes were found to be spherical in shape. Particle size and zeta potential of prepared formulations varied from  $64.5 \pm 3.16$  to  $262.3 \pm 7.45$  nm and  $-2.1$  to  $1.76$  mV, respectively. DSC study revealed absence of potential interaction. XRD study revealed presence of amorphous form in liposomes. Entrapment efficiency was found to be  $87.45 \pm 2.14$  % and the drug release was found to be controlled up to 24 hours. Minimized MEC in MTT assay and tremendous enhancement in circulation time of RES PEGylated liposomes than its pristine form revealed that the stearic stabilized PEGylated liposomes can be an alternative tool to commercialize this molecule for chemopreventive and therapeutic applications in cancer.

**Keywords :** trans resveratrol, cancer nanotechnology, long circulating liposomes, bioavailability enhancement, liposomes for cancer therapy, PEGylated liposomes

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