

## **ABSTRACT**

Liposomes vesicles have drawn attention of researchers as carriers of various drugs that could be used for therapeutic applications.

In the present work liposomes were prepared from a mixture of egg yolk L- $\alpha$ -phosphatidylcholine,, 3-sn- phosphatidylcholine from soybeans (as commercial substance) and 1,2-dipalmitoyl-sn-3-phosphatidylcholine (DPPC) (as a photosensitive substance) and cholesterol in a ratio of 1: 3: 2: 1.2 respectively. Liposomes loaded with Methotrexate (MTX) as a model drug.

Effect of 30, 60, and 80 joules/ml of laser 650 nm irradiation on the drug release of MTX, phase transition  $T_c$  size distribution, dielectric properties and molecular stability of the prepared liposomes were studied pre and post irradiation with laser.

The results indicated that, the drug release percentages of the irradiation samples increase in comparison with the control as laser doses increase. The drug release was followed by using spectrofluorometer technique excitation wavelength of 345 nm and emission wavelength of 450 nm measured every 3 hours. The phase transition temperature  $T_c$  showed a decrease as the laser dose increase. All studied liposomes have a dielectric dispersion in the frequency range from 0.1 – 10 MHz.

Liposomes exposed to different laser doses showed an increase in and decrease in  $\alpha$  dielectric decrement  $\Delta\epsilon$  and slight changes in the relaxation time corresponding to the higher laser dose. FTIR spectra showed that the laser energy did not cause any changes in the chemical stability of the encapsulated drug.

It was concluded that, laser irradiation can be powerful technique in order to increase the encapsulated drug release from liposomes in comparison with the control which consequently thus reducing the side effects of the drug and increasing its therapeutic effect.