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PLANT EXTRACT-ENCAPSULATED LIPOSOMES: STABILITY VARIATION WITH THE LIPID CONTENT IN LIPOSOMES

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Liposomes, vesicular delivery vehicles made up of polar lipids and an aqueous component, play very significant roles in the pharmaceutical, cosmetic, and food industries. Much emphasis is placed on the stability of liposomes that function as carriers of numerous agents, including bioactive agents, since stability has a pronounced effect on the ability for these carriers to execute their function.

The aim of this research was to evaluate the effect of cholesterol on the stability of plant extract-encapsulated phosphatidylcholine liposomes. Five types of plain liposomes were prepared varying the ratio of phosphatidylcholine to cholesterol from 10:0 to 6:4 (w/w), using the reverse-phase evaporation method. Thereafter liposomes encapsulated with the methanol extract of stem-bark of *Schumacheria castaneifolia*, which exhibits a very high antioxidant activity, were prepared using the same lipid ratios. Particle sizes and zeta-potentials of these liposomes were determined since these properties are indicative of the stability of liposomes. While determining the particle size and zeta-potential, the stability of liposomal preparations was observed visually, over a period of 8 weeks.

The sizes of both plain liposomes and plant extract-encapsulated liposomes were in the nanometer range. Upon increasing the cholesterol content, the sizes of these liposomes increased. However, plant extract-encapsulated liposomes were much larger than plain liposomes. The zeta-potentials of all liposomal formulations showed negative values suggesting that the negatively charged phosphate of the head group of polar lipids, orients itself towards the outer aqueous environment. Zeta-potentials of all liposomal formulations were more negative than -30 mV indicating that those liposomal formulations were stable. Moreover, it was revealed that upon increasing the cholesterol content of liposomal bilayers, liposomes of increased negative zeta-potentials could be obtained. Furthermore, increasing cholesterol contents in liposomal formulations increased the degree of sedimentation and precipitation of particles from liposomal solutions.

The lipid composition of liposomes affects the stability of both plain and plant extract encapsulated liposomes, in solution. Thus, the stability of plant extract (i.e. the methanol extract of stem-bark of *S. castaneifolia*)-encapsulated liposomes could be modulated by varying the lipid composition.

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