

## Drug Delivery 2015 : Physical stability and absorption increase of encapsulated vitamins with liposomal carrier to formulate therapeutic cream for Psoriasis disease treatment - Azadeh Izadyari - Islamic Azad University

Azadeh Izadyari<sup>1</sup> , Masood Sahraie<sup>2</sup> , Saharnaz Rakizadeh<sup>3</sup> and Fariba Sadat Alambin<sup>4</sup>

<sup>1</sup> Islamic Azad University, Iran

<sup>2</sup> Pars Azmaye Teb, Iran

<sup>3</sup> College of Science, Iran

<sup>4</sup> University of Tehran, Iran

One of the negative aspects of vitamins is their low absorption through skin. Also, the combination of water or lipo-soluble vitamins and their biological properties protection such as anti-oxidant are difficult for formulating in therapeutic products. Encapsulation of these macromolecules, by liposomal carrier is an important method to preserve their native properties. The aim of this research is producing multi-layer liposomes for encapsulation of vitamins D3 , E, A, C and B5 and increasing physical stability of vitamins in therapeutic cream for psoriasis disease treatment. In the current study, liposomes containing vitamins were prepared with thin-film hydration-sonication method. According to FTIR and DSC results, no interaction was observed between encapsulated vitamins and liposome constituents. The particle size and its distribution and encapsulation efficiency were respectively calculated about 250 nm, 0.70–0.85 and more than 92%. Also, liposomes morphology analysis by scanning electron microscopy (SEM) showed spherical form for multi-layer vesicles. Then liposomal carriers were formulated in anti-psoriasis cream to compare its absorption rate and effectiveness with/without encapsulated vitamins. For treated group with liposomal cream, the results showed an increase in its absorption rate through skin (less than 4 minutes) and rapid improvement of lesions (in comparison with cream without vitamin vesicles). So, it can be said the liposomes containing bioactive materials and macromolecules have therapeutic potential applications, improvement of drugs shelf life and its stability in cosmetic products. In this field, physical stability of vitamins in various industry (such as medicine and dermatology) are most important effect of encapsulation method and liposomes as cover, play the great protection role against vitamins degradation. As of not long ago the clinical employments of liposomes were for focused medication conveyance, yet new applications for the oral conveyance of certain dietary and wholesome enhancements are in development. This new utilization of liposomes is to some degree because of the low assimilation and

bioavailability paces of customary oral dietary and nourishing tablets and cases. The low oral bioavailability and assimilation of numerous supplements is clinically well documented. Therefore, the regular epitome of lypophilic and hydrophilic supplements inside liposomes would be a powerful strategy for bypassing the damaging components of the gastric framework permitting the typified supplement to be proficiently conveyed to the phones and tissues. Note that specific components have sweeping impacts on the level of liposome that are yielded in assembling, just as the real measure of acknowledged liposome capture and the real quality and long haul security of the liposomes themselves. They are the accompanying: The genuine assembling technique and arrangement of the liposomes themselves; The constitution, quality, and kind of crude phospholipid utilized in the detailing and assembling of the liposomes; The capacity to make homogeneous liposome molecule estimates that are steady and hold their epitomized payload. These are the essential components in creating powerful liposome bearers for use in dietary and healthful enhancements. A liposome is a circular vesicle having at any rate one lipid bilayer. The liposome can be utilized as a vehicle for organization of supplements and pharmaceutical drugs. Liposomes can be set up by disturbing natural films, (for example, by sonication). Liposomes are frequently made out of phospholipids, particularly phosphatidylcholine, however may likewise incorporate different lipids, for example, egg phosphatidylethanolamine, inasmuch as they are perfect with lipid bilayer structure. A liposome configuration may utilize surface ligands for connecting to undesirable tissue. The significant sorts of liposomes are the multilamellar vesicle (MLV, with a few lamellar stage lipid bilayers), the little unilamellar liposome vesicle (SUV, with one lipid bilayer), the huge unilamellar vesicle (LUV), and the cochleate vesicle. A less alluring structure are multivesicular liposomes in which one vesicle contains at least one littler vesicles. Liposomes ought not be mistaken for lysosomes, or

with micelles and opposite micelles made out of monolayers. A liposome has a fluid arrangement center encompassed by a hydrophobic layer, as a lipid bilayer; hydrophilic solutes disintegrated in the center can't promptly go through the bilayer. Hydrophobic synthetic concoctions partner with the bilayer. A liposome can be subsequently stacked with hydrophobic and additionally hydrophilic atoms. To convey the particles to a site of activity, the lipid bilayer can combine with different bilayers, for example, the phone layer, along these lines conveying the liposome substance; this is a complex and non-unconstrained occasion, however. By getting ready liposomes in an answer of DNA or medications (which would ordinarily be not able to diffuse through the film) they can be (aimlessly) conveyed past the lipid bilayer, yet are then normally disseminated non-homogeneously. Liposomes are utilized as models for counterfeit cells. Liposomes can likewise be intended to convey tranquilizers in different manners. Liposomes that contain low (or high) pH can be developed with the end goal that disintegrated watery medications will be charged in arrangement (i.e., the pH is outside the medication's pI run). As the pH normally kills inside the liposome (protons can go through certain layers), the medication will likewise be killed, permitting it to uninhibitedly go through a film. These liposomes work to convey medicate by dissemination as opposed to by direct cell combination. A comparable methodology can be abused in the biotransformation of medications by infusing void liposomes with a transmembrane pH slope. For this situation the vesicles go about as sinks to search the medication in the blood dissemination and forestall its poisonous effect. Another technique for liposome tranquilize conveyance is to target endocytosis occasions. Liposomes can be made in a specific size range that makes them practical focuses for normal macrophage phagocytosis. These liposomes might be processed while in the macrophage's phagosome, in this manner discharging its medication. Liposomes can likewise be improved with opsonins and ligands to enact endocytosis in other cell types. The utilization of liposomes for change or transfection of DNA into a host cell is known as lipofection. Notwithstanding quality and medication conveyance applications, liposomes can be utilized as transporters for the conveyance of colors to textiles, pesticides to plants, compounds and healthful enhancements to nourishments, and beauty care products to the skin. Liposomes are additionally utilized as external shells of some microbubble differentiate operators utilized interestingly upgraded ultrasound.

### Biography

Azadeh Izadyari has completed her PhD of Chemical Engineering from the Islamic Azad university.

izadyari\_a@yahoo.com