

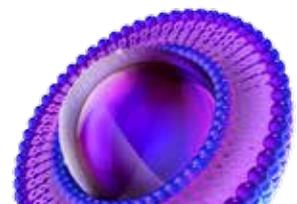
The World's First Liposomal Powder Technology

www.aurebiolabs.com



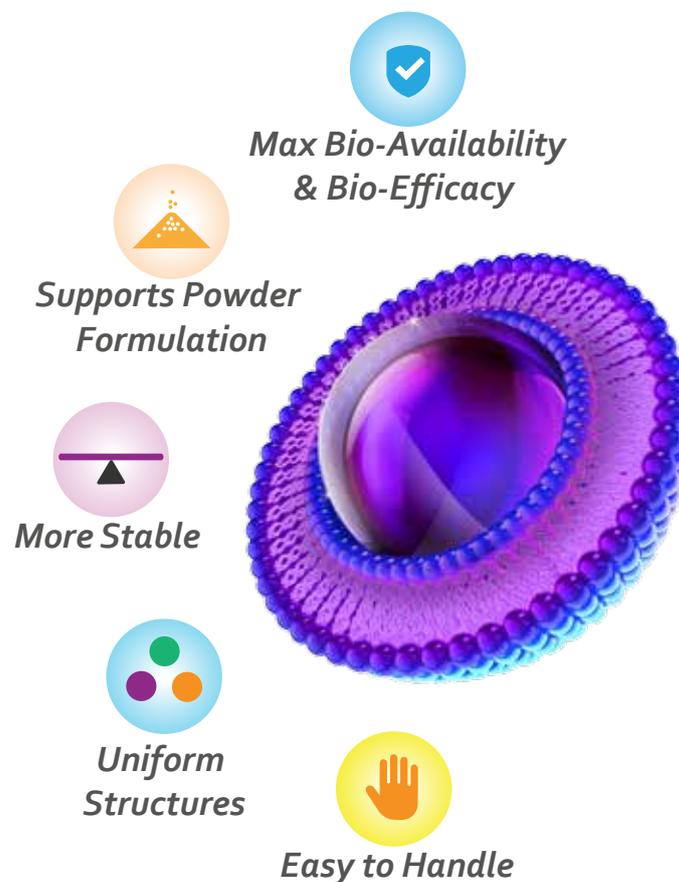
Contents

Zeal Technology™	3
What is Zeal Technology™?	4
Advantages of Liposomal Powder Formulations	6
What makes Zeal Technology™ different from other Liposomal Products?	6
How Zeal Technology™ Works	7
Applications of Zeal Technology™	8



Zeal Technology™

Aurea Biolabs brings together new age technologies and age old Ayurvedic wisdom to harness the full power of nature and deliver sustainable, eco-friendly products that significantly better the quality of life. With **Zeal Technology™** - The world's first liposomal powder technology, Aurea Biolabs has created one of the most advanced liposomal delivery techniques, for maximum bio-efficacy, potency and bio-availability. This patent-pending technology offers higher bio-availability for active ingredients by using liposomes in a uniquely stable powder form instead of liquid/suspension, for maximum bio-efficacy.



What is Zeal Technology™?

The last decade has witnessed a considerable leap in liposomal technology which has proven to be beneficial in the pharmaceutical world, with the numerous new applications of liposomes in drug delivery. The idea of optimization in these technological developments lies in maximum efficiency and transmits vital molecules to a target site, in a controlled and time-dependent manner. Considerable research has been carried out to achieve new and improved liposomes for therapeutic delivery, raise the potential of such liposomes and manipulate the bio-physical parameters of the phospholipid bilayer by revamping its constituents, which has shown great potential in its applications. An advantage of phospholipid formulations in oral drug delivery is that drugs vulnerable to decomposition by enzymes in the gastrointestinal tract may be protected by formulation with phospholipids. However, one of the main disadvantages of liposomes as drug carriers is their fast elimination from blood circulation and Reticuloendothelial System Macrophages.

Most liposomal products are available in the liquid/suspension form, because phospholipids are stabilised by water-in-oil emulsion as vehicle-like compartments for encapsulation. Even though they have low stability due to the random nature of the bi-layer, the folding of phospholipids in the presence of water typically leads to non-uniform formations in both shape and size.



Liposomal products are available in suspension form, and most products are less stable due to the random nature of the phospholipid bilayer in water. Hydrolysis is also a drawback due to the water emulsion, and the applications of the liquid liposomes are limited and cannot be delivered through capsules, in functional foods or dietary supplements. The powder form of liposomal products after drying can be a good remedy to rectify these issues but during the drying process, the core structure of liposome might be destroyed due to evaporation of water. To overcome this, well-aligned specific carriers can be utilized to retain the core structure of the liposomal bi-layer in powder form which will help encapsulate the bio-active molecules effectively. Hence, Aurea Biolabs has formulated **Zeal Technology™** for a powder form of phospholipid vehicles, through well-ordered specific carriers from natural sources and the removal of water through a spray drying process. These specific carriers have been utilized in strengthening the liposomal vesicles and these are mechanically strong, stiff and highly crystalline with outstanding thermal stability. **Zeal Technology™** can be used to make novel food-grade encapsulation vehicles for active bio-molecules to enhance the bio-availability and stability of the molecules. A schematic representation of the process of **Zeal Technology™** is depicted in Fig. 1.

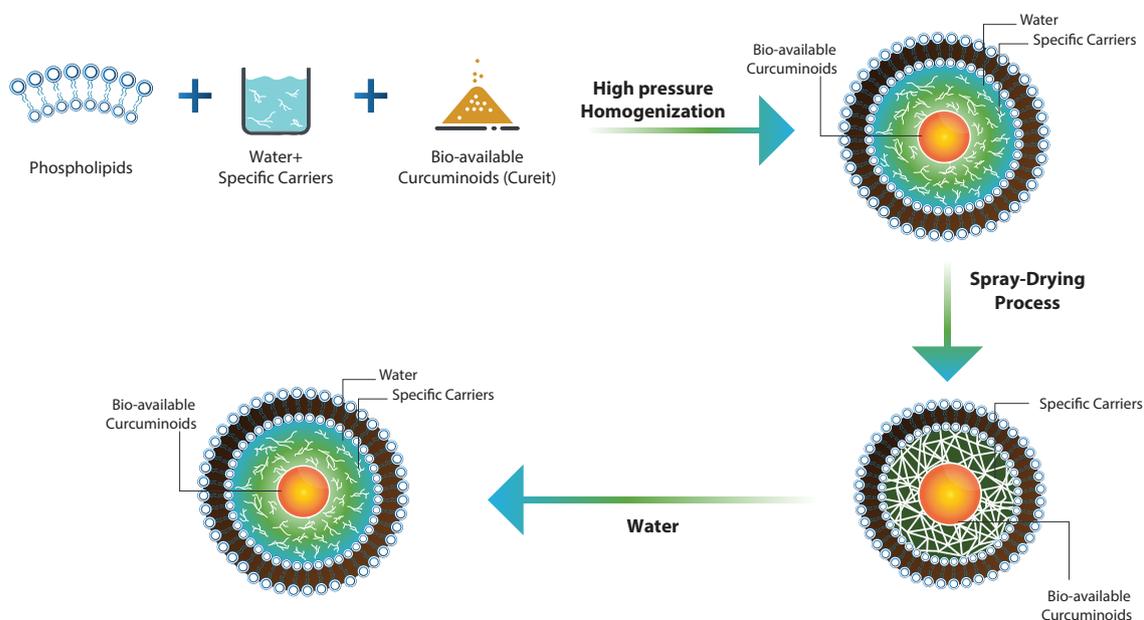


Fig. 1. Preparation of a phospholipid vesicle for the encapsulation of bio-ingredients with specific carriers, using high pressure homogenization and a spray drying process.



Advantages of Liposomal Powder Formulations

The powder form of liposomal products can help achieve long-term stability with a well-defined structure and overcome the issues of degradation through hydrolysis or oxidation and sedimentation, drug leakage, aggregation or fusion of liposomes, commonly seen in liposomes in a suspension form.

Liposomal powder formulations have shown many promising features for drug administration, such as:

- Selective localisation of the drug within the body
- Controlled drug release
- Reduced local and systemic toxicities
- High-dose carrying capacity and stability

On the other hand, the commercialization of fine powder nutraceutical ingredients by **Zeal Technology™** is cost-effective and significantly more suitable than managing liquid ingredients (such as liposome dispersions). Dried powders are easier to handle and preserve from contamination during storage and moreover, they engage reduced storage volumes. Liposomes contain phospholipid molecules that protect the active nutrients from digestive enzymes and help carry them into the bloodstream for targeted delivery to the cells. With **Zeal Technology™**, for the first time ever, active molecules can be delivered by a stable liposomal powder formulation. This powder-based encapsulation ensures maximum bio-efficacy, potency and bio-availability for myriad applications with the targeted delivery of active ingredients.

What makes Zeal Technology™ different from other Liposomal Products?

Most liposomal products are available in a liquid or suspension form because phospholipids are stabilized by a water-in-oil emulsion as a vehicle-like compartment for encapsulation. The presence of water, however, can lead to non-uniform phospholipid structures and lower the stability of Liposomes. **Zeal Technology™**, which makes liposomes available in a stable powder form, has been proven to increase encapsulation efficiency, loading capacity and release of the encapsulated bio-ingredients.

How Zeal Technology™ Works

Zeal Technology™ utilizes specific carriers from plant materials to formulate a powder form of phospholipid encapsulation. These specific carriers are woven under high-pressure homogenization, followed by the removal of the aqueous phase. Aurea Biolabs has successfully designed and developed a stable Liposomal Curcumin Powder (LCP) using **Zeal Technology™**, to enhance the bio-availability of less bio-available molecules like Curcumin and improve the stability of LCP. The resulting Liposomal Curcumin Powder formulation is uniform in shape and size, stable and highly bio-available. Curcumin is an excellent bio-active constituent for the development of various formulations, on account of its well-documented range of biological properties. The new formulation using Curcumin in liposomes and specific carriers could be beneficial for the delivery and release of bio-active molecules like Curcumin, for sustained release with good stability. The slower, more sustained release of Curcumin from Liposomal Curcumin Powder is mainly due to the linkage of specific carriers by **Zeal Technology™** with phospholipids and a highly bio-available form of Curcumin, which increases drug permeability.

The morphological appearance of the LCP was examined by Transmission Electron Microscope (TEM), as shown in Figure 2 below. The LCP is present as nano-sized, spherical shapes, without any aggregation, demonstrating the stability of the formulation. TEM photographs Fig. 2 (b and c) revealed a well-formed transparent phospholipid layer, while the internal part is seen to be denser, which is accredited to molecular interactions of Curcumin with specific carriers through **Zeal Technology™**. The smooth surface of the LCP was observed with good encapsulation of spherical shaped bio-available Curcumin. The particle sizes of the LCP are shown in the range of 50-90 nm, in good agreement with the particle size analysis results.

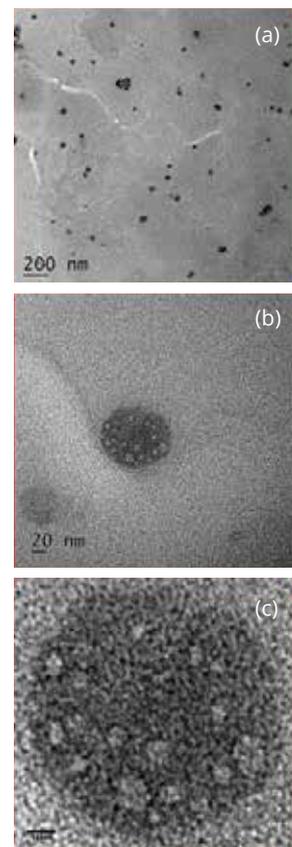


Fig. 2
Transmission Electron Microscopic photographs of Liposomal Curcumin Powder.

Applications of Zeal Technology™

Zeal Technology™'s unique powder delivery capabilities allow the active bio-molecules contained in the protective encapsulation to arrive at the target sites with their active ingredients intact. This advanced technology opens up a wide array of opportunities.

-  Carrier for a wide range of medications, vitamins, minerals, plant and bio-molecules across medicine, pharmaceutical and nutraceutical products.
-  With active ingredients delivered in a sealed form through Liposomal Powder Technology, one can consume less than the normal dose with uncompromised bio-availability.
-  Easier to handle compared to liquid liposomes, which offers a wide range of opportunities in its application, storage and uses.
-  In other sciences: Dermato-Cosmetology and Cosmetology.





AUREA[®]
Innovation for Good

You're invited to the unveiling of



The World's First
Liposomal
Powder Technology



Learn how Zeal Technology™ can enhance your product line.

Visit Aurea Biolabs at SupplySide West, Las Vegas from 6th - 10th November

(Stall # 2236)

Register and be a part of the official unveiling of
Zeal Technology™ at SupplySide West, Booth # 1381,
on 9th November from 12 PM – 12:20 PM.

