



**biozomal**<sup>™</sup>  
LIPOSOMAL TECHNOLOGY

LIEF  
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# Biozomal™ Liposomal Technology

Biozomal™ Liposomal Technology uses an advanced liposomal delivery technique relying on specific carriers (SC) to retain the core structure of the liposomal bilayer. The specific carriers help effectively encapsulate the bioactive molecules. Rather than a liquid format, Biozomal™ Liposomal Technology results in higher bio-availability, bio-efficacy, and potency of active ingredients by using liposomes in a uniquely stable powder form.

## Lief Evolutions

Lief Raws is a quality-driven and science-focused performance ingredient supplier providing forward thinking ingredients to the continuously adapting market. As a partner in product development, we will help transform ideas into reality.

# What is Biozomal™ Liposomal Technology?

## The Concept of Liposomes

Liposomes are self-assembled sphere-shaped “vesicles” consisting of a phospholipid bilayer. These phospholipid bilayers form when introduced to an aqueous solution due to their amphiphilic properties of hydrophobic tails and hydrophilic heads. The liposomes encapsulate material to form a barrier and can assist in transportation to a specific target while maintaining its content’s functionality.

Since its discovery in the 1960’s, liposomes have been studied for their potential to deliver active ingredients to target sites with maximum bio-efficacy. Liposomal encapsulation technology has progressed to several industries through different applications. Oral delivery formats have become a focus as ingredients vulnerable to decomposition from gastrointestinal enzymes may be protected by phospholipid formulations.



High Stability



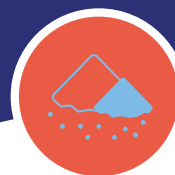
Max Bio-Availability  
& Bio Efficacy



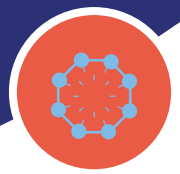
Easy To  
Handle



Sustained  
Release



Powder Formulation  
Support

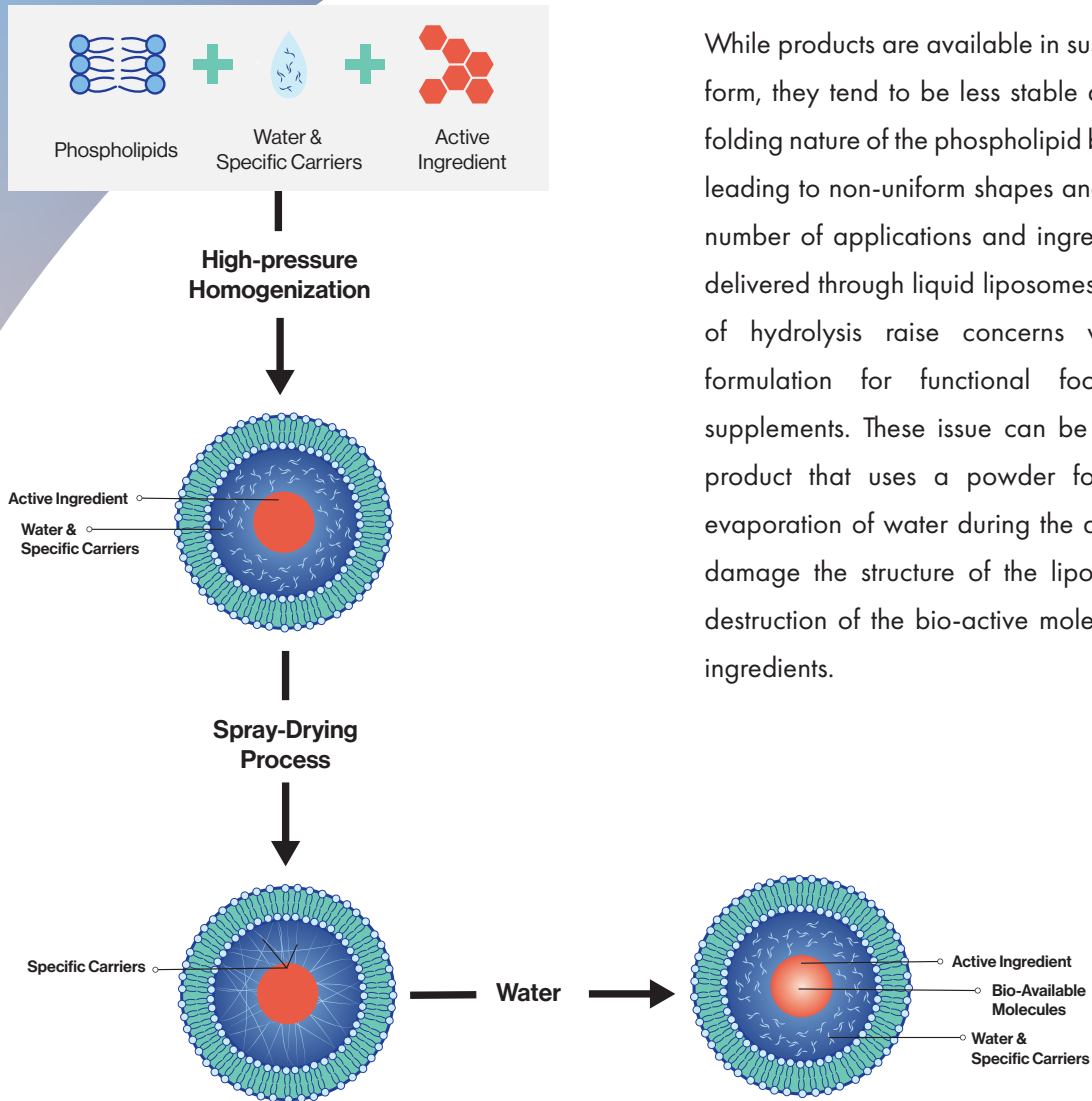


Structure  
Uniformity

**Liposomes are non-toxic, flexible, biocompatible, biodegradable,  
and non-immunogenic for systemic and non-systemic administrations.**

## Compared to Other Liposomal Products

While products are available in suspension, or liquid, form, they tend to be less stable due to the random folding nature of the phospholipid bilayers (lamellae), leading to non-uniform shapes and sizes. The limited number of applications and ingredients that can be delivered through liquid liposomes as well as the risk of hydrolysis raise concerns when considering formulation for functional foods and dietary supplements. These issues can be addressed with a product that uses a powder form; however, the evaporation of water during the drying process can damage the structure of the liposomes, risking the destruction of the bio-active molecules in the active ingredients.



## How Biozomal™ Liposomal Technology Works

Biozomal™ Liposomal Technology offers an innovative™ solution by utilizing specific carriers from plant materials to retain the structure of the liposomal bilayers in a powder format. The specific carriers are woven under high-pressure homogenization and a spray-drying process. The result is an active ingredient that is uniform in shape and size, highly stable and bio-available.

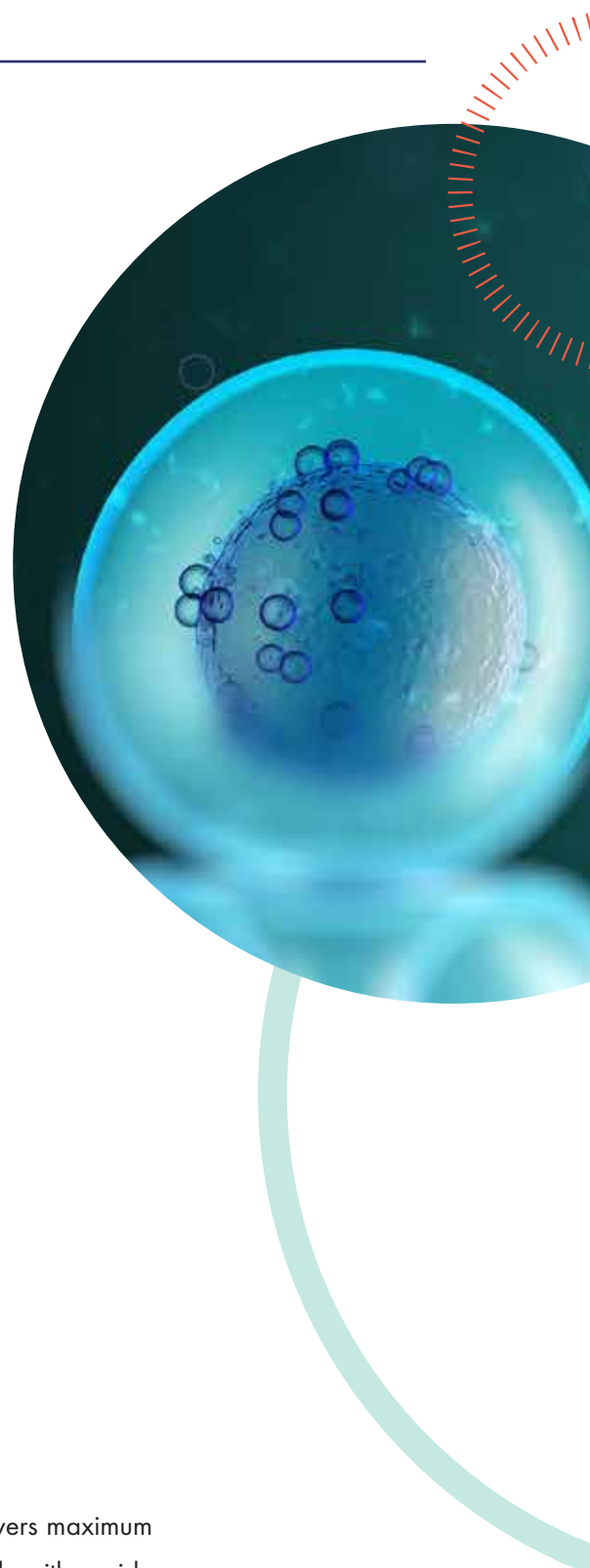
# Why use Biozomal™ Liposomal Technology?

## Advantages of Biozomal™ Liposomal Powder Formulations

Nutraceutical products using liposomal powder formulations have demonstrated several beneficial features, including:

- Controlled and sustained release of the active ingredient
- Selective localization of the active ingredient to targeted cells within the body
- Reduction in local and systemic toxicities
- High carrying capacity of the active ingredient
- Long-term stability with a solid structure
- Overcoming issues of degradation from hydrolysis or oxidation and risk of sedimentation, ingredient leakage, and agglomeration or fusion of liposomes, all commonly seen in liposomes in a suspension form
- More cost-effective than suspension/liquid form
- Less demanding handling, preservation, and storage requirements

Powder-based encapsulation using Biozomal™ Liposomal Technology delivers maximum bio-efficacy and bio-availability of the active ingredient. Because it is suitable with a wide range of applications, liposomal powder-formulated products can distinguish brands and products on the market while still delivering on the integrity and quality of the ingredients.



## Applications for Biozomal™ Liposomal Technology

The unique powder delivery capabilities of Biozomal™ Liposomal Technology transports active bio-molecules protected by the liposomal encapsulation structure to be transported to target cells. With the advanced properties of Biozomal™ Liposomal Technology, brands and products can elevate their product offerings and expand their opportunities.

Acts as a vesicle for a variety of vitamins, minerals, and bio-molecules across different nutraceutical products

Products require smaller dosages due to the uncompromised bio-availability of the active ingredient

Easier to manage compared to liquid liposomes, which opens opportunities for application, storage, and usage

Brought to you by



## See how your brand and nutraceutical products can be elevated through Biozomal™ Liposomal Technology.

Offering targeted delivery with maximum bio-efficacy and bio-availability of the active ingredients, this liposomal encapsulation technology overcomes the obstacles of cellular uptake. Biozomal™ Liposomal Technology can be applied to a range of ingredients, including caffeine, zinc, vitamin C, and iron, among others. Caffeine is the first ingredient of Biozomal™.

Learn more at [www.liefraws.com](http://www.liefraws.com) or contact us at [info@liefraws.com](mailto:info@liefraws.com).

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