Botanic® HEALTHCARE
Botanic Remedies For Good Health

LipsoBio®

Advances in Liposomal Technology
From Target to Market.

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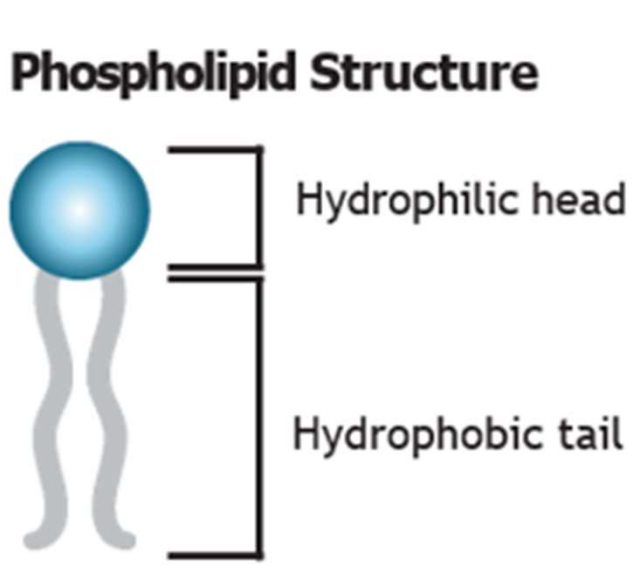
Director – Global Business
Botanic Healthcare, India

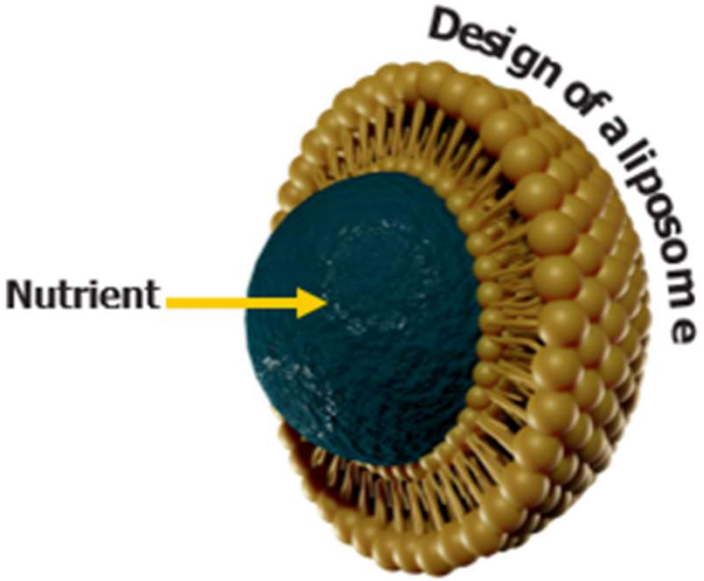
www.lipsobio.com

What are Liposomes?

Liposomes are microscopic vesicles composed of phospholipid bilayers. These bilayers can encapsulate both hydrophilic and lipophilic substances, making liposomes valuable for drug delivery systems.

How We Design Liposomes

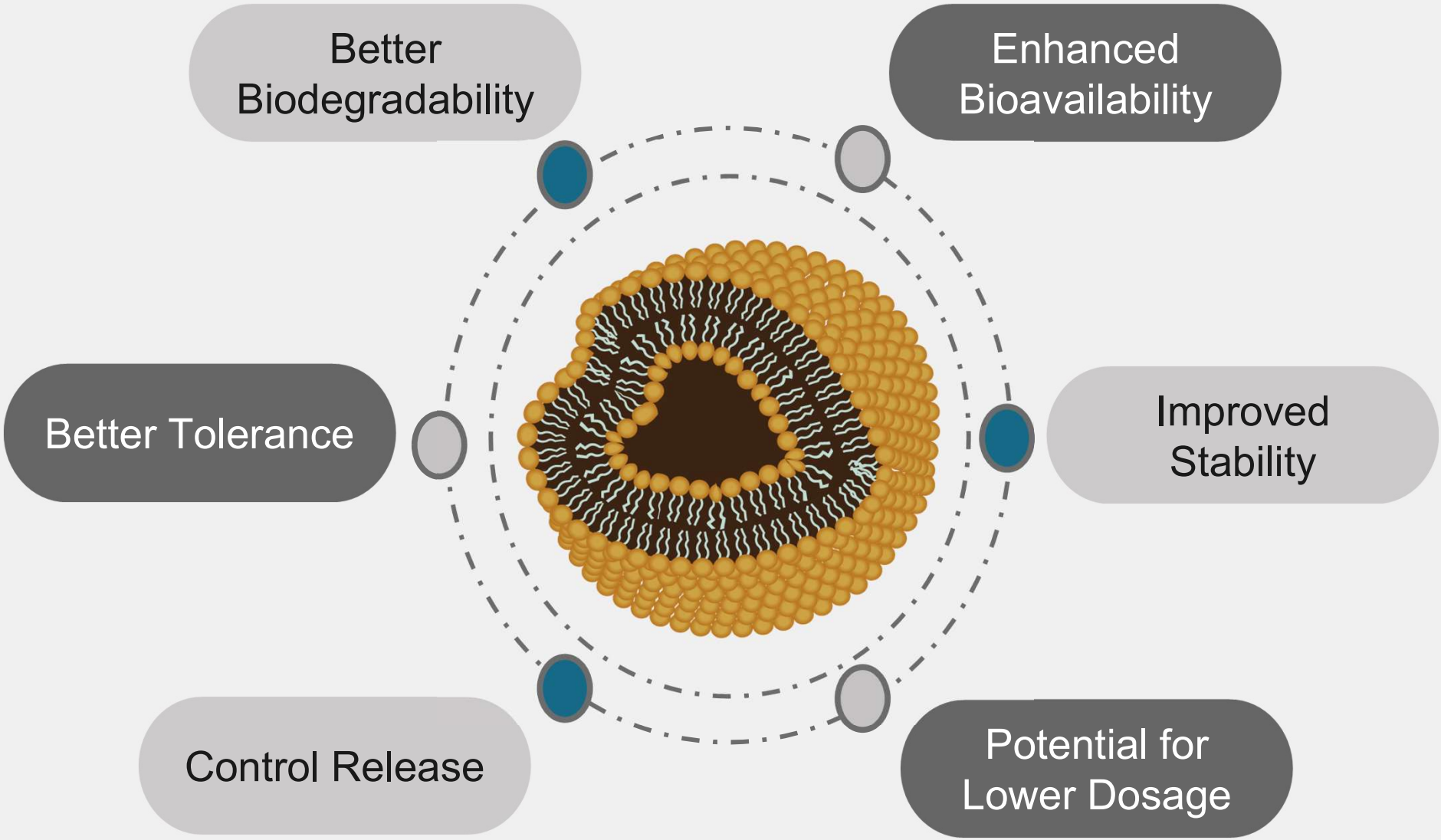




Liposomal vs. Conventional Supplements: What Makes Liposomes Superior?

- Liposomal formulations offer superior bioavailability, ensuring more effective absorption of nutrients compared to conventional supplements.
- They protect active ingredients from degradation in the digestive system, deliver them directly to cells, and provide sustained release for prolonged efficacy.
- Additionally, liposomal delivery reduces gastrointestinal discomfort and enhances overall nutrient stability.

Advantages of Liposomes



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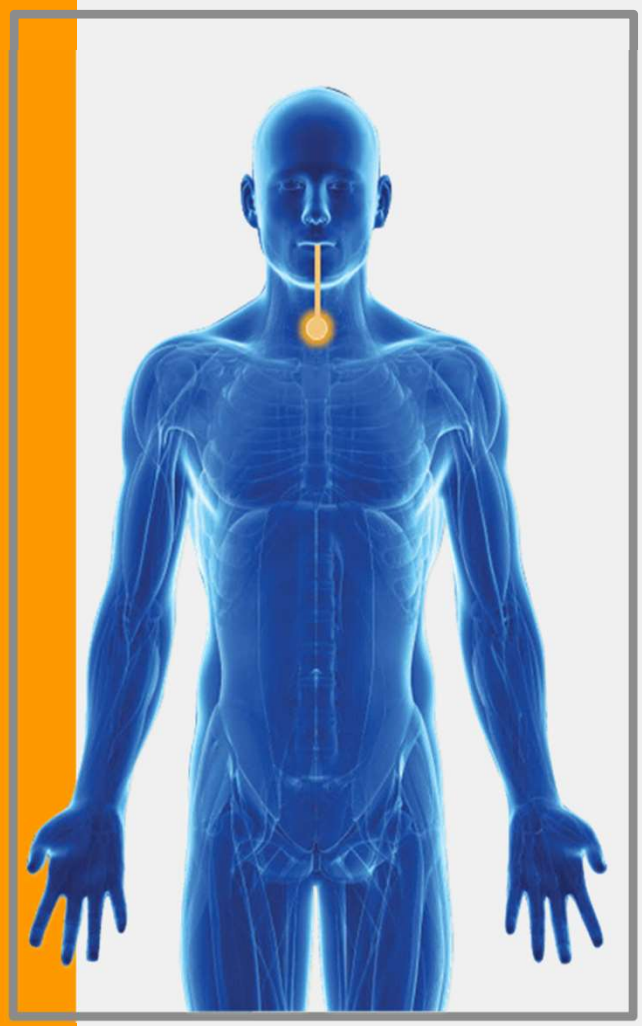
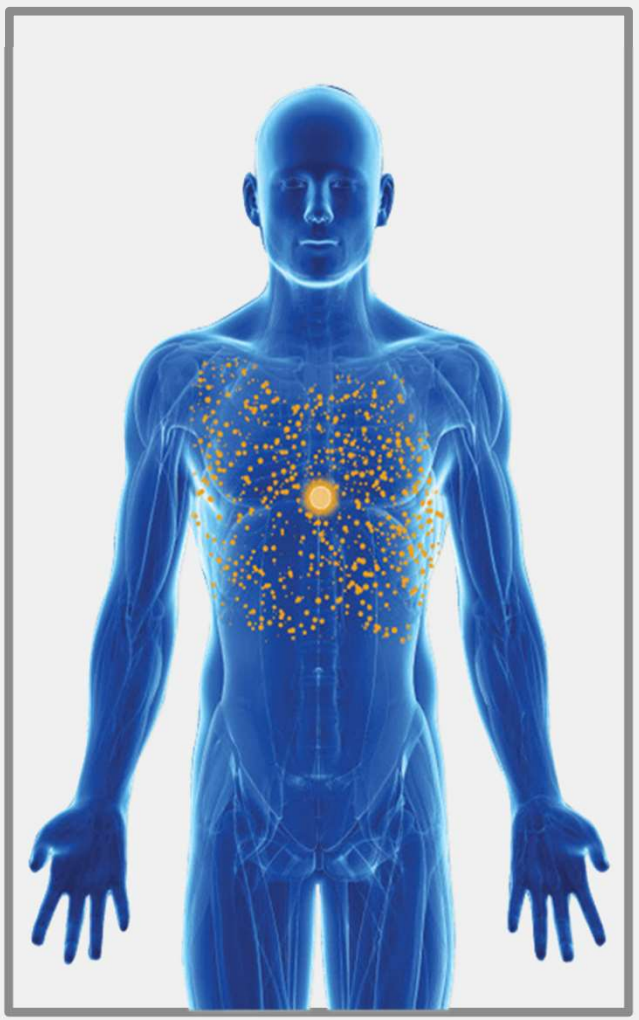
"ABSORPTION EXCELLENCE, OUR PROMISE"

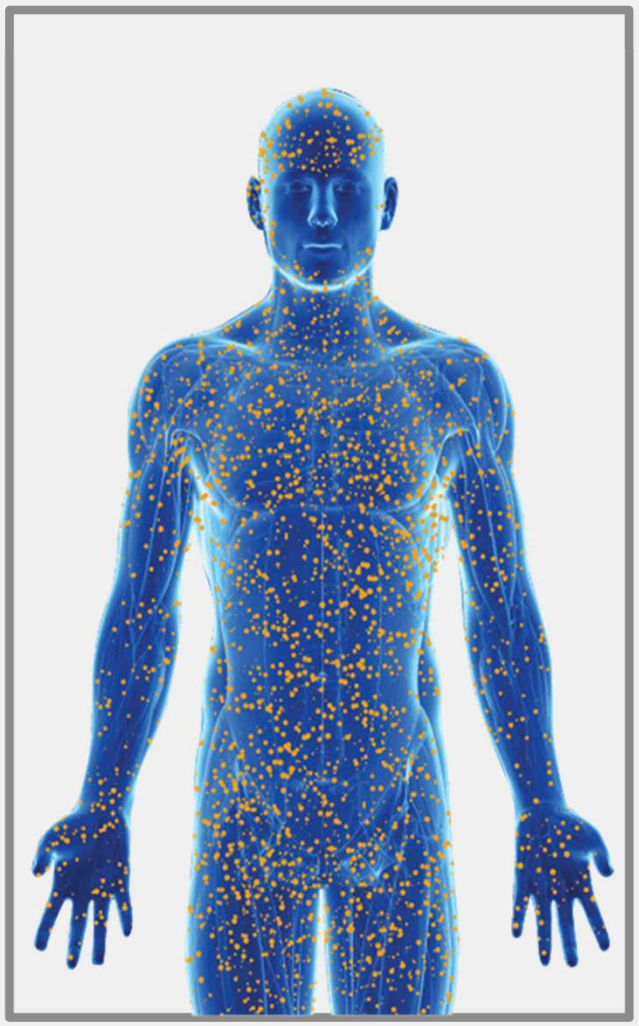
Liposomal encapsulation could speed up the absorption of slow-absorbing supplements.



NOT BIOAVAILABLE



POORLY BIOAVAILABLE



BIOAVAILABLE

In-vitro Caco-2 Permeability Study

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Sl. No	Sample	% Vitamin C content	Apparent Permeability (Papp) in cm/sec.	% Percentage permeability*
1	Liposomal Vitamin C **Lipomac™**	70%	5.98×10^{-2}	41.40
2	Non- Liposomal Vitamin C	70%	4.21×10^{-2}	29.16

- In this *in-vitro* Caco-2 study, the % permeability of Lipomac™ (41.40) was 1.42-fold higher than that of 70% non-liposomal vitamin C (29.16)
- Lipomac™ exhibited significantly higher membrane permeability compared to 70% non-liposomal vitamin C.

Evaluating the Clinical Impact of Lipomac™ (Liposomal Vitamin C):

Insights into Bioavailability

LIPOMAC™-CLINICAL STUDY

To assess the bioavailability of Lipomac™ – Liposomal Vitamin C and non-liposomal Vitamin-C formulations in healthy, adult, human volunteers.

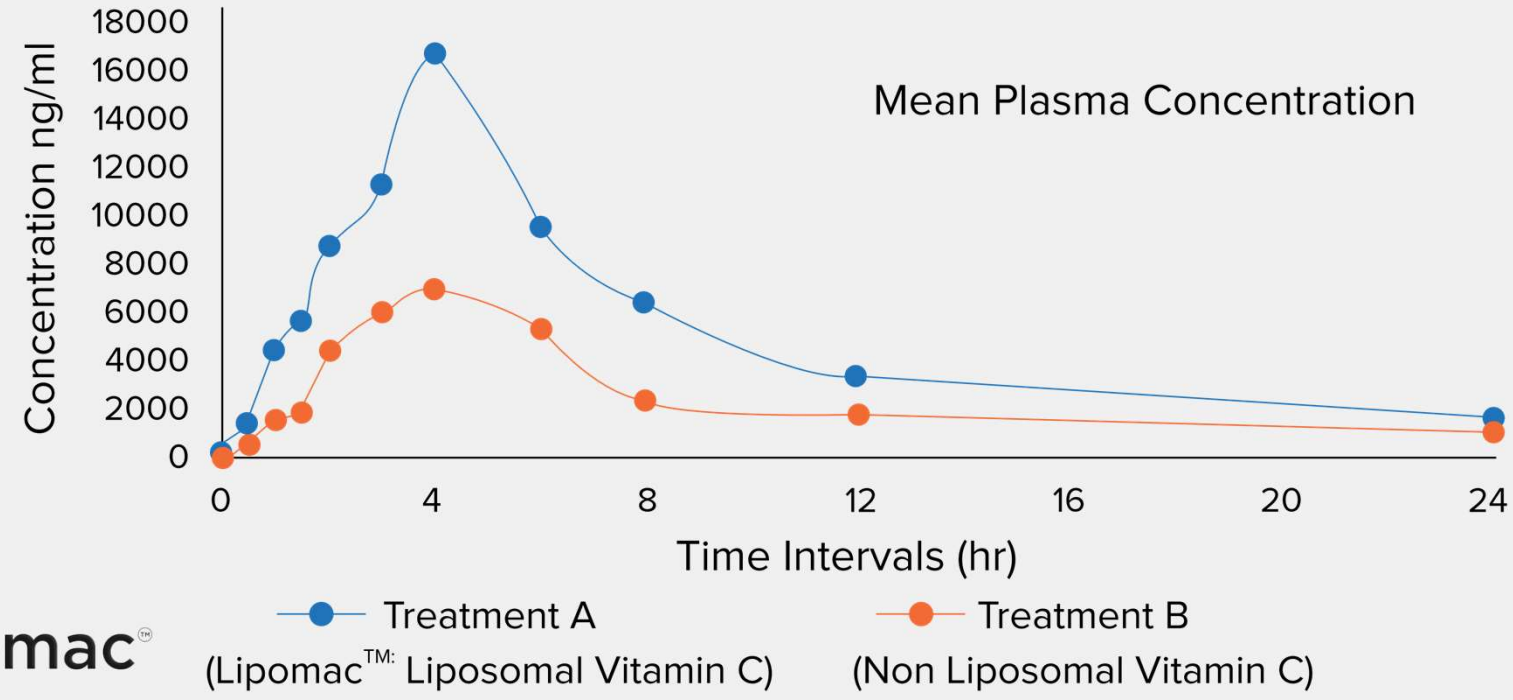
- **Number of Subjects planned:** 12
- **Number of Subjects completed the study:** 12

After overnight fasting for at least 10 hours, 500mg (2 capsules/day) of both the study products will be administered orally to each subject. A washout period of 5 days from day 0 was maintained.

Cont..

Results

- The bioavailability of Lipomac™ is 2.36 times higher than that of traditional vitamin C formulations.
- The study demonstrated improved pharmacokinetic parameters, specifically higher maximum concentration (C_{max}) and area under the curve (AUC) values.



Lipomac™

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Geometric Mean of Reference product (R) and Test product (T)

Pharmacokinetic Parameter	N	Reference Product (R)	Test Product (T)
Cmax (mg/dL)	12	6934.21	16461.20
AUC0-t (mg*hr/dL)	12	60382.88	12291.12
AUC0-∞ (mg*hr/dL)	12	74364.01	139236.10
tmax (hr)	12	4	4
Kel (1/hr)	12	0.081	0.103
t1/2 (hr)	12	8.31	6.80

- **Test product (T) : Lipomac™ (Liposomal Vitamin C)**
- **Reference product (R) : Non Liposomal Vitamin C**

Statistical Results of Test product (T) versus Reference product (R)

Pharmacokinetic Parameter	Geometric Least Square Mean		Intra Subject CV (%) (T Vs. R)	T/R Ratio (%)
	Test Product (T)	Reference Product (R)		
Cmax (mg/dL)	16111.20	6387.15	1.497 Vs 7.32	**252.24%**
AUC0-t (mg*hr/dL)	113601.10	53897.10	4.38 Vs 6.70	**210.77%**
AUC0-∞ (mg*hr/dL)	**127006.32**	**62793.13**	**4.44 Vs 9.15**	**202.26%**

- **Test product (T) : Lipomac™ (Liposomal Vitamin C)**
- **Reference product (R) : Non Liposomal Vitamin C**

Oral Bioavailability Value for Lipomac™-Liposomal Vitamin C

- **Test product (T) : Lipomac™ (Liposomal Vitamin C)**
- **Reference product (R) : Non Liposomal Vitamin C**

Pharmacokinetic Parameter	Test Product (Mean ± Standard Deviation)	Reference Product (Mean ± Standard Deviation)	Oral bioavailability value (AUC0-t of Test / AUC0-t of Reference)
AUC0-t (mg.hr/dL)	122399.15 ± 5366.56	60506.06 ± 4058.56	2.0229

Lipomac™ (Liposomal Vitamin C) demonstrated higher bioavailability than the Non-Liposomal Vitamin C in the study.


lipomac™
Liposomal Vitamin C
Lipomac™ offers 2.36 times better bioavailability compared to Non-Liposomal Vitamin C

Why Choose Botanic Healthcare Liposomes?

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Higher Phosphatidylcholine Content:

Our liposomes boast a total phosphatidylcholine content that is higher ensuring superior performance.

Optimal Drug-to-Lipid Ratio:

Formulation ensures an optimal active ingredient-lipid ratio, improving encapsulation efficiency, drug loading capacity, & release kinetics.

Gentle Processing Methods:

No harsh solvents, extra heat, or additional pressure are used in the manufacturing process, preserving the integrity of the liposomes.

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Enhanced Stability:

Our process ensures the stability of liposomes, effectively addressing the common issue of phospholipid bilayer thinning.

Non-GMO and cGMP Certified:

Our products meet non-GMO standards and are manufactured following current Good Manufacturing Practices (cGMP).

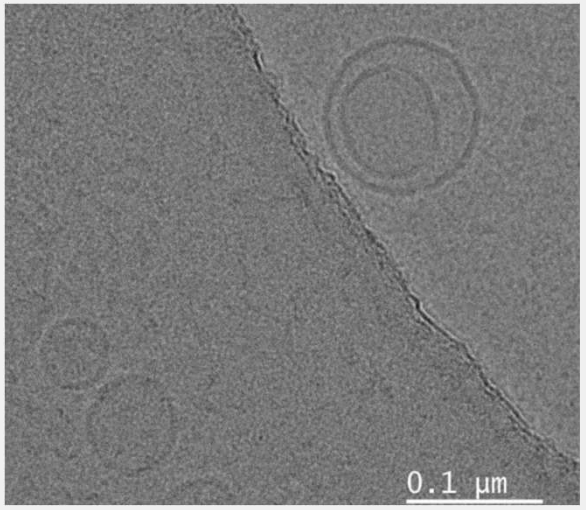
Advanced Analytical Characterization

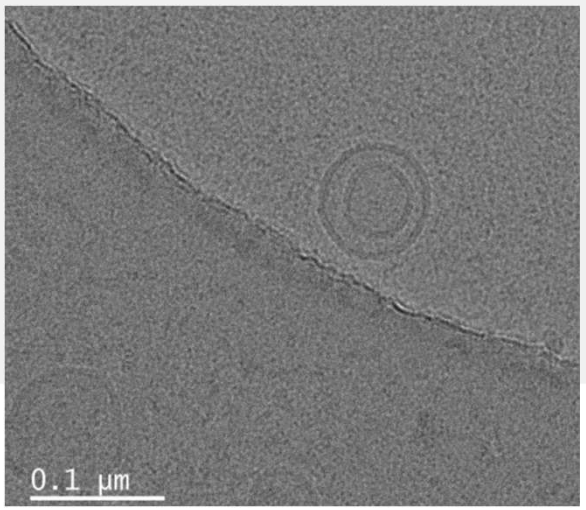
Cryo-EM Analysis:

Molecular-Level Insights:

This cutting-edge technique allows us to observe liposomes in their native state, providing crucial insights into their structure and morphology.

Cryo-EM Images of our samples





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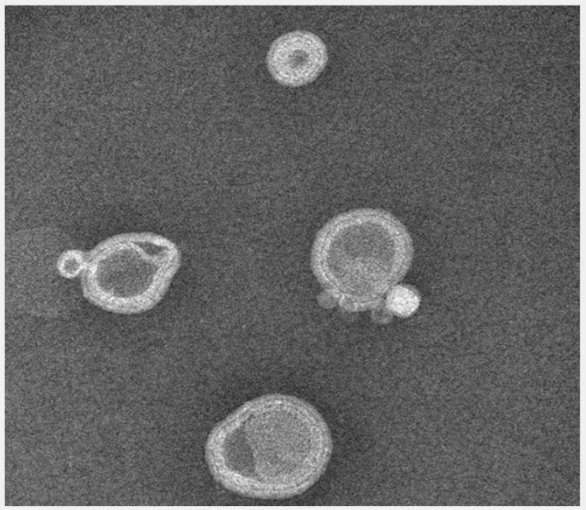
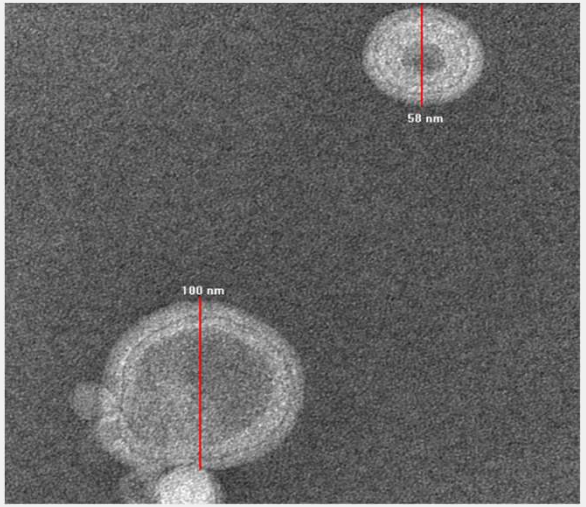
TEM Images of our samples

TEM Analysis: Visualizing and Ensuring Quality

We utilize TEM to visually confirm liposome structure and size distribution, ensuring consistent quality across batches.





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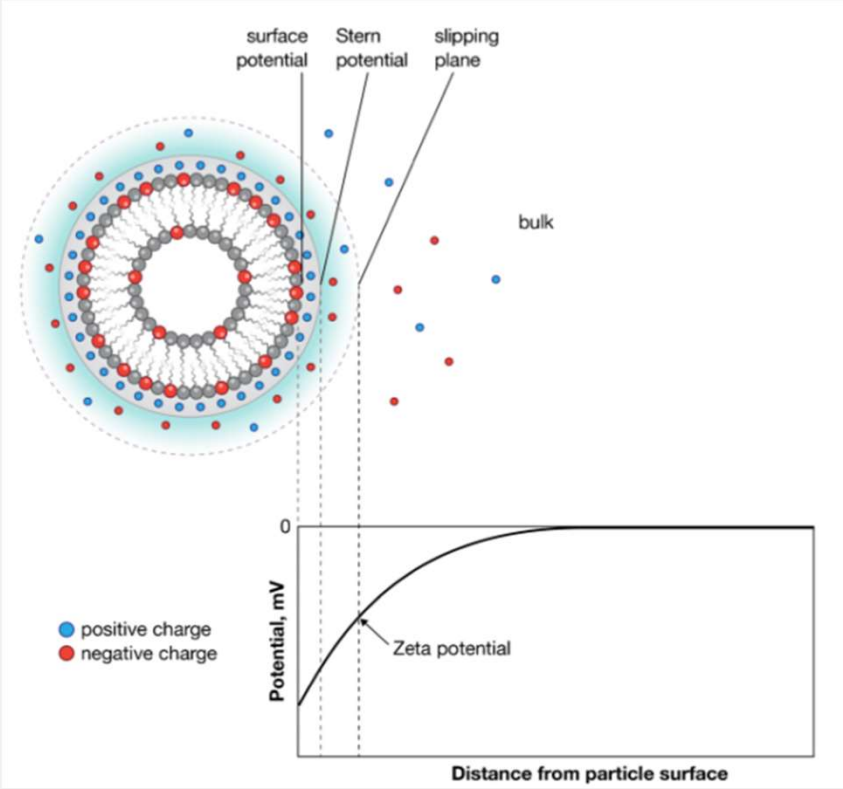
Zeta Potential Analysis: Ensuring Stability and Efficacy

Liposomes with a zeta potential between -30 mV and -50 mV exhibit optimal stability. This range prevents aggregation and ensures long-term product quality. We conduct zeta potential analysis to maintain these standards.



Sample Details

Sample Name: Lipomac™ – Liposomal Vitamin C 70% – BHCIM1175/012/24 – Botanic Healthcare.
SOP Name: mansettings.nano
General Notes: Average result created from record number(s): 181 182 183

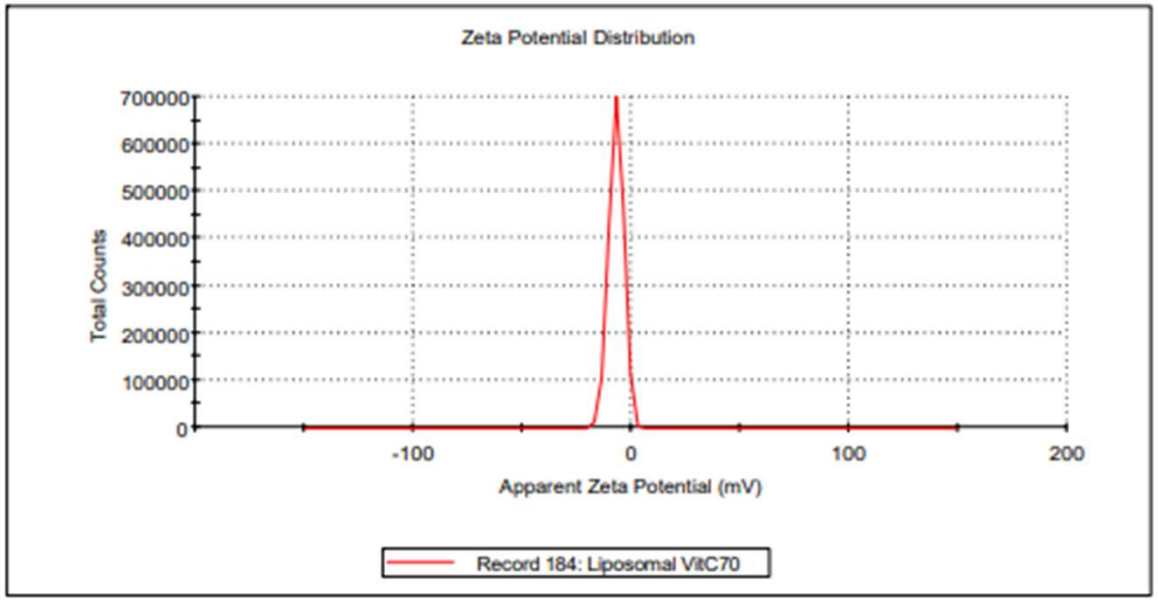
File Name: Bharati Gawade B3 ZP.dts
Record Number: 184
Date and Time: 16 August 2024 13:14:50
Dispersant Name: Water
Dispersant RI: 1.330
Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

System

Temperature (°C): 25.0
Count Rate (kcps): 72.2
Cell Description: Clear disposable zeta cell
Zeta Runs: 12
Measurement Position (mm): 2.00
Attenuator: 7

Results

			Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-6.94	Peak 1:	-6.88	100.0	3.44
Zeta Deviation (mV):	3.34	Peak 2:	0.00	0.0	0.00
Conductivity (mS/cm):	0.0564	Peak 3:	0.00	0.0	0.00
Result quality :	Good				



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Lipomac™

Liposomes with a zeta potential between -30 mV and -50 mV exhibit optimal stability. This range prevents aggregation and ensures long-term product quality.

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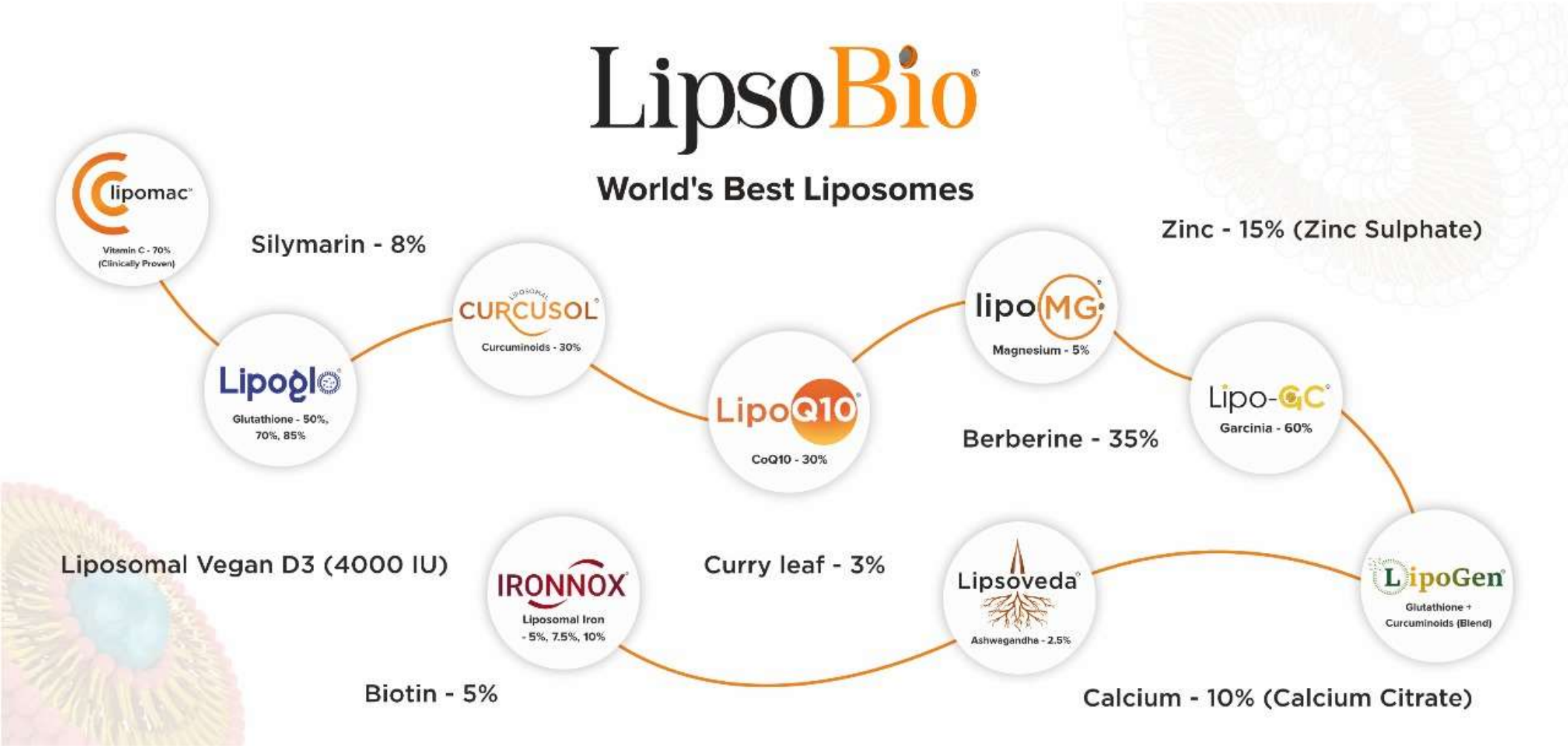
Our Best Liposomal Offerings



Liposomal Technology for Cutting-Edge Applications

Powder

Capsules

Stick pack

Gummies

Chewables

Beadlets

www.lipsobio.com

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THANKS!

Do you have any question?

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www.botanichealthcare.net

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