

Delivery systems for nutraceuticals
Enhanced bioavailability and
improved functionality for lipophilic nutrients

Potential sales



Current sales



What is innovation in health?



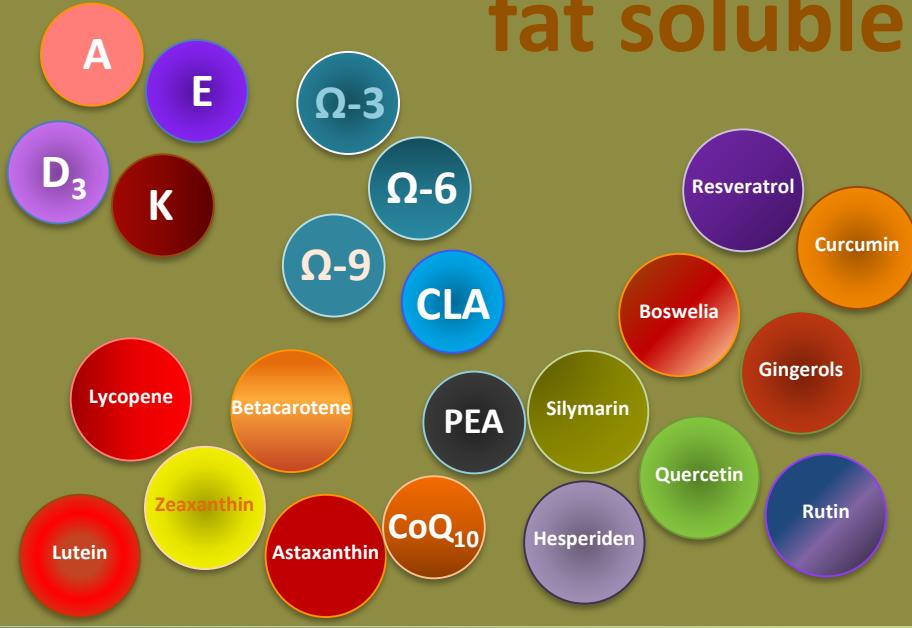
IMPROVED
HEALTH
OUTCOMES

Why do we need innovation?

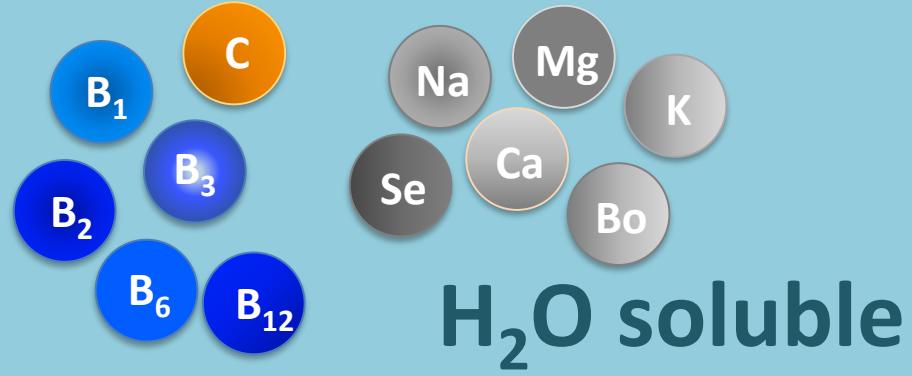




fat soluble

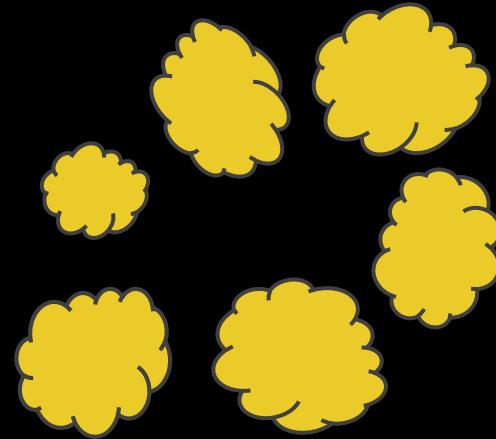


Poorly absorbed
Stored in the body



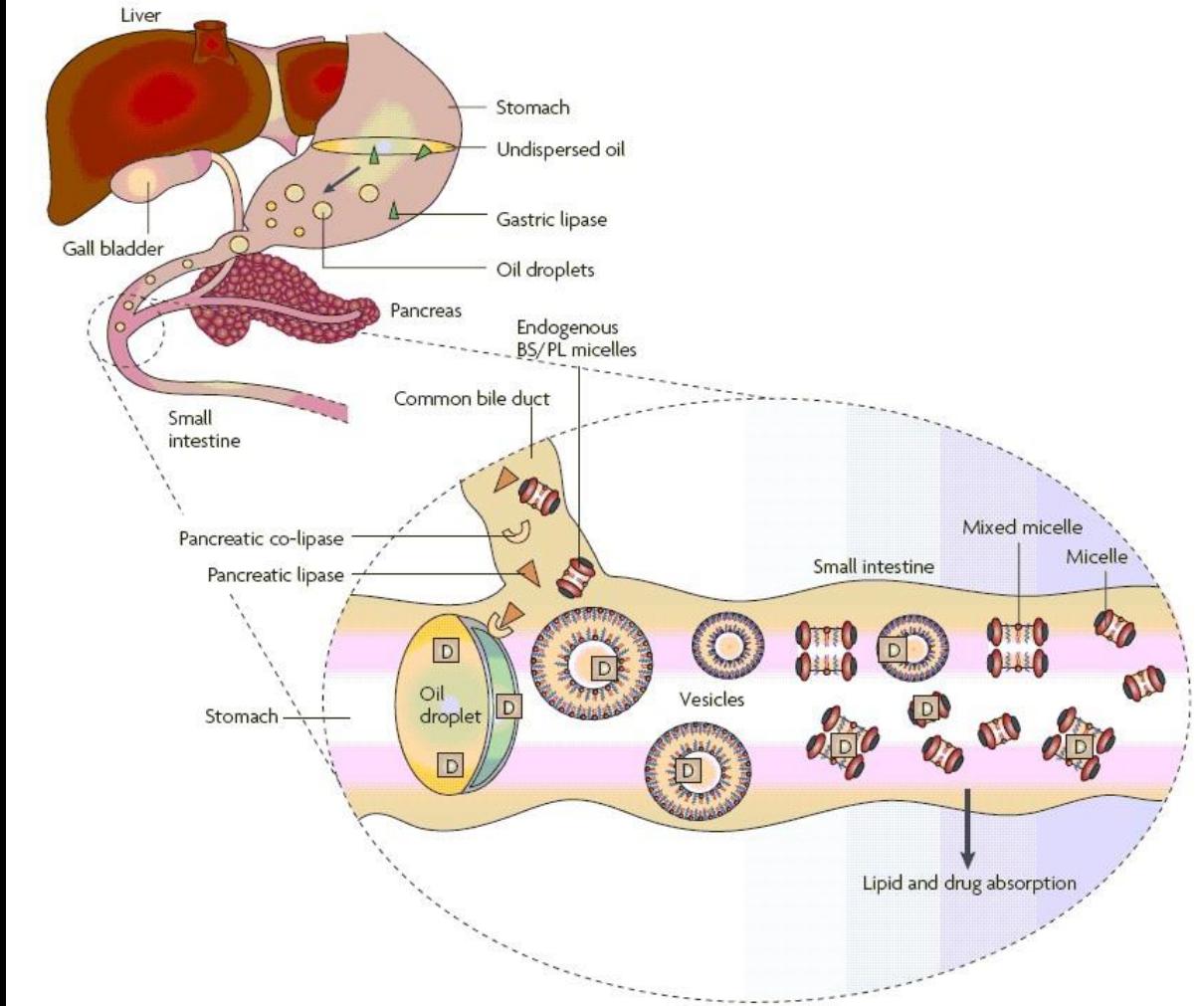
Well absorbed
Excreted in urine

Lipid:
a fat-like molecule that
does not have the ability
to dissolve in water



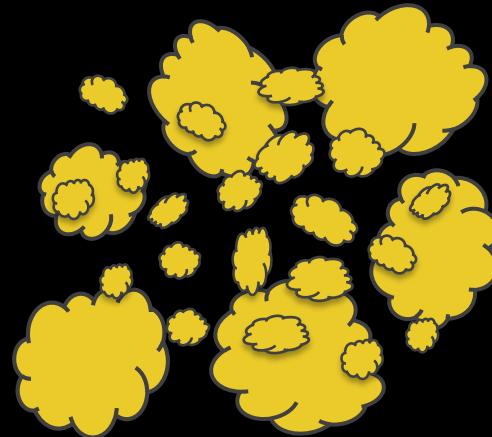
Digestion and solubilization of dietary oils:

Bile salts and Pancreatic lipase



Bile salts act as an emulsifier of lipids

Emulsify = break
large fat droplets
into small
droplets



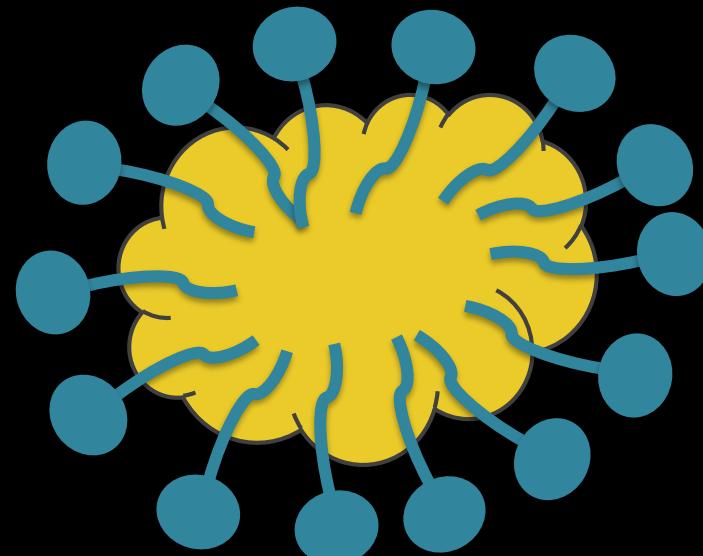
Bile salts act as an emulsifier of lipids

bile salts coat the lipid to
form micelles

Structure of Micelles

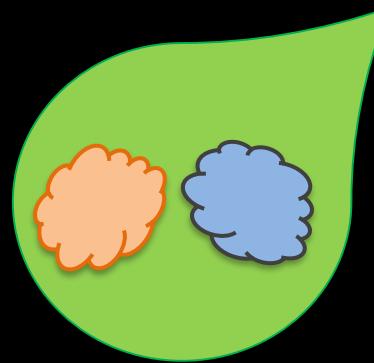
Hydrophilic head
= water loving

Lipophilic tail
= fat loving



Pancreatic Lipase - the fat digesting enzyme

Digestive
products of
lipids



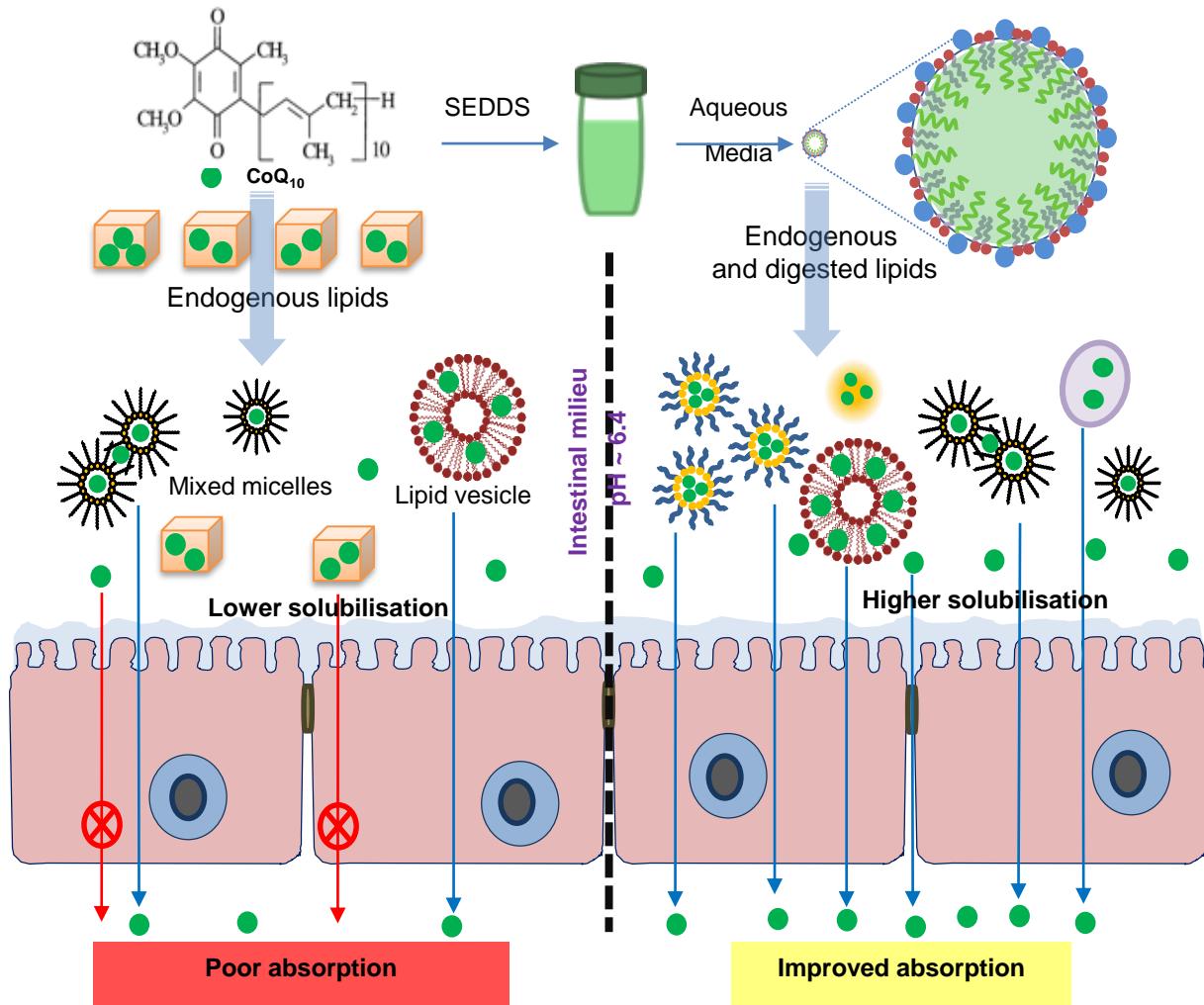
Free Fatty Acids

Monoglycerides

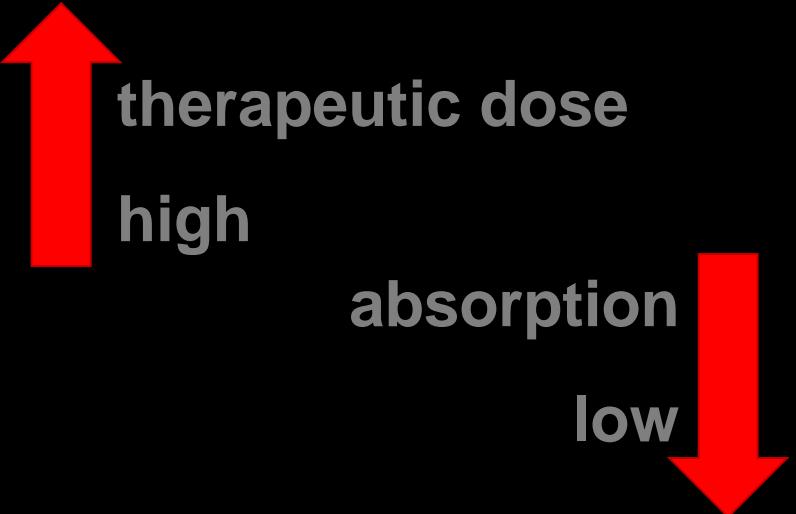
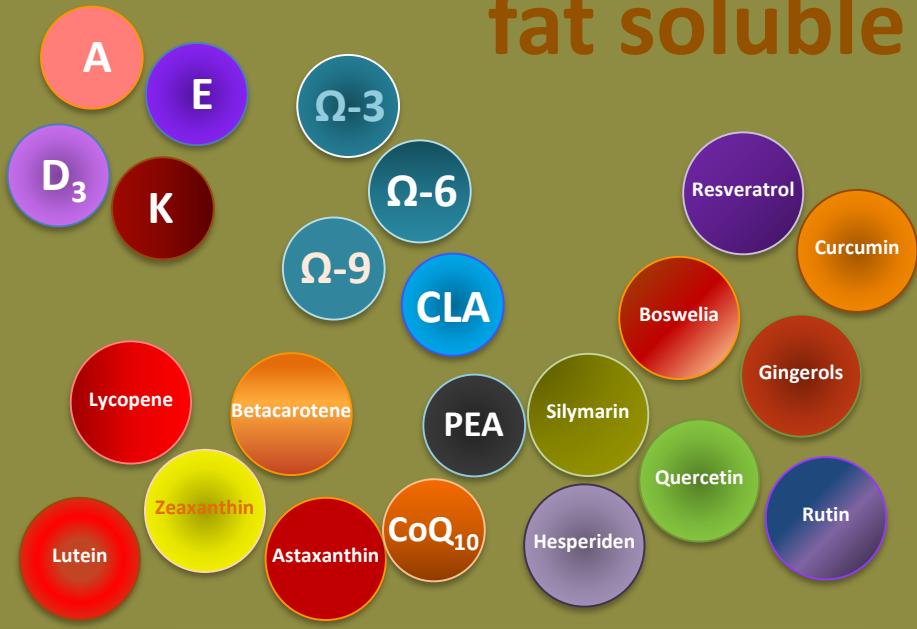
for absorption,
the lipids need:

- to adhere
- to be adsorbed

V. Bala et al., Mol.
Pharmaceutics, 2016,
13 (10), pp 3518–
3525

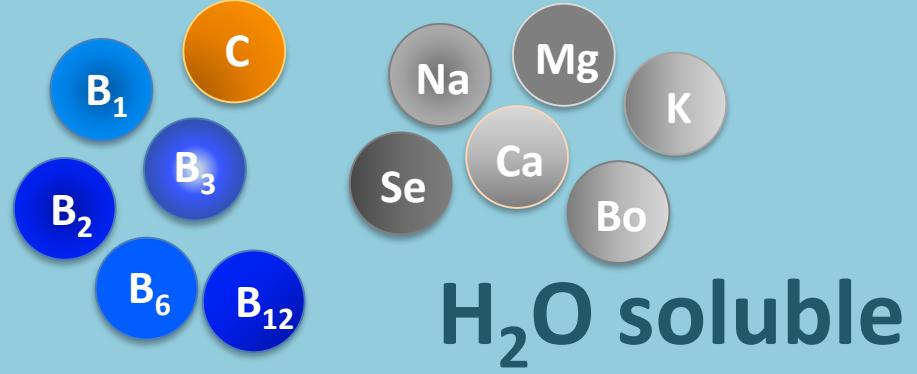


fat soluble



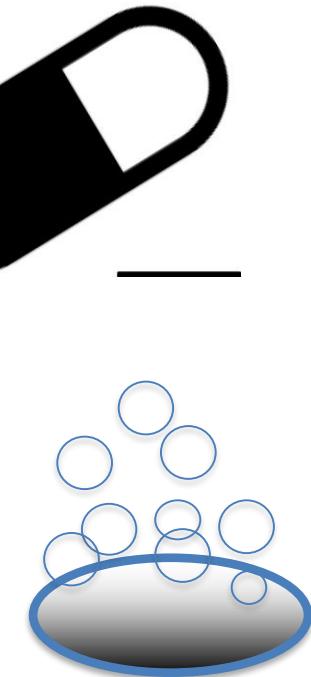
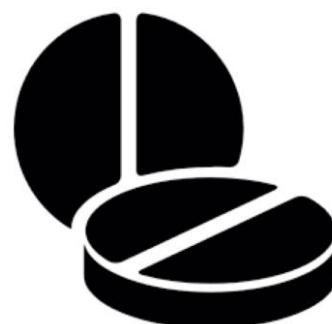
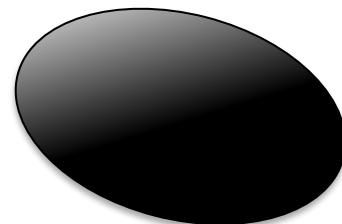
lower therapeutic doses

easily absorbed



H₂O soluble

... in any dosage format



AquaCelle®

MICELLAR TECHNOLOGY

LipiSperse®

DISPERSION TECHNOLOGY

SMEDDs

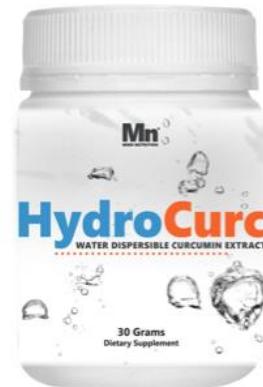
Self Micro-
Emulsifying
Drug Delivery
Systems
using AquaCelle®

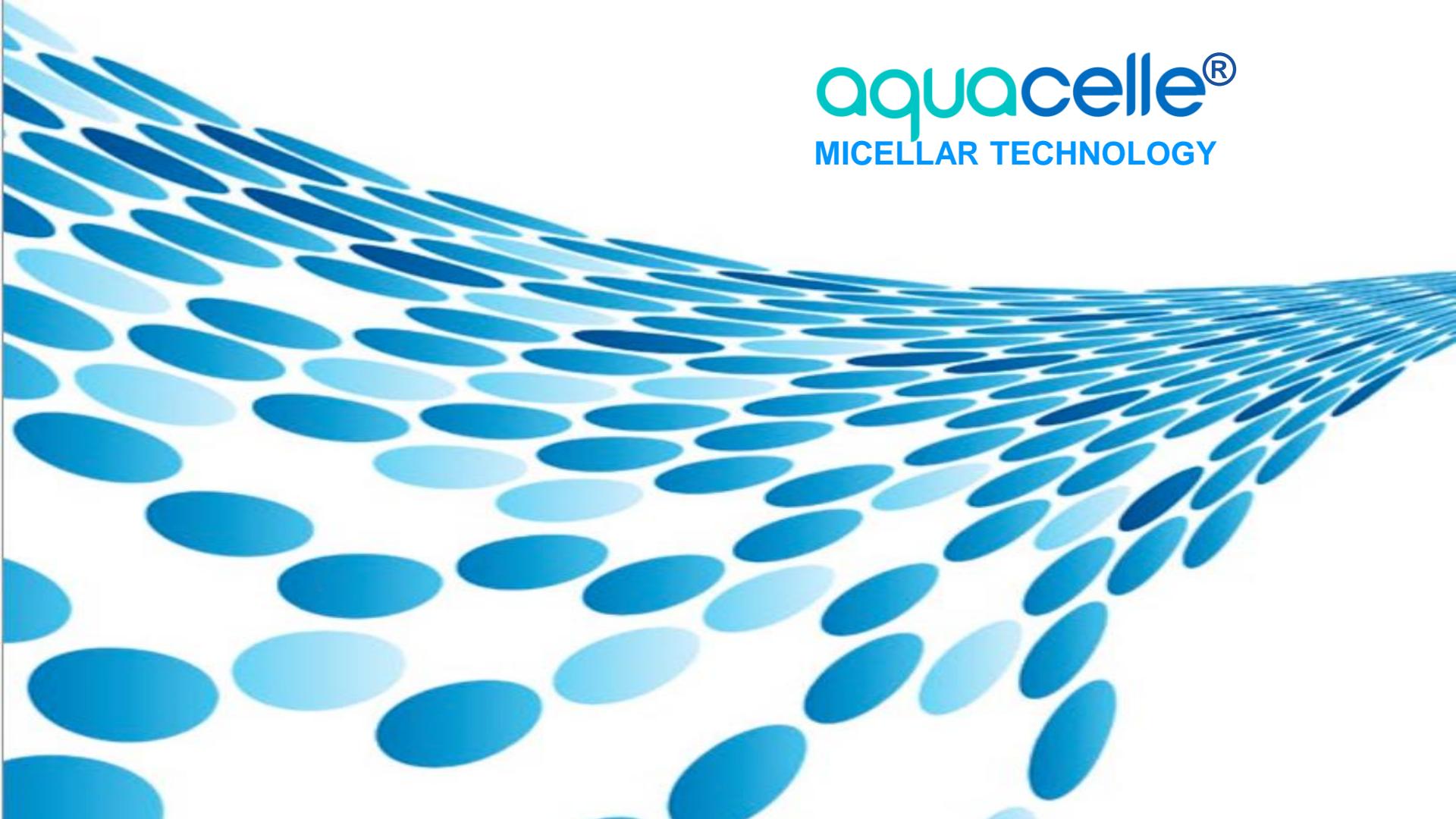
CPOs

Compressible
Powdered Oils
using AquaCelle®

CWDs

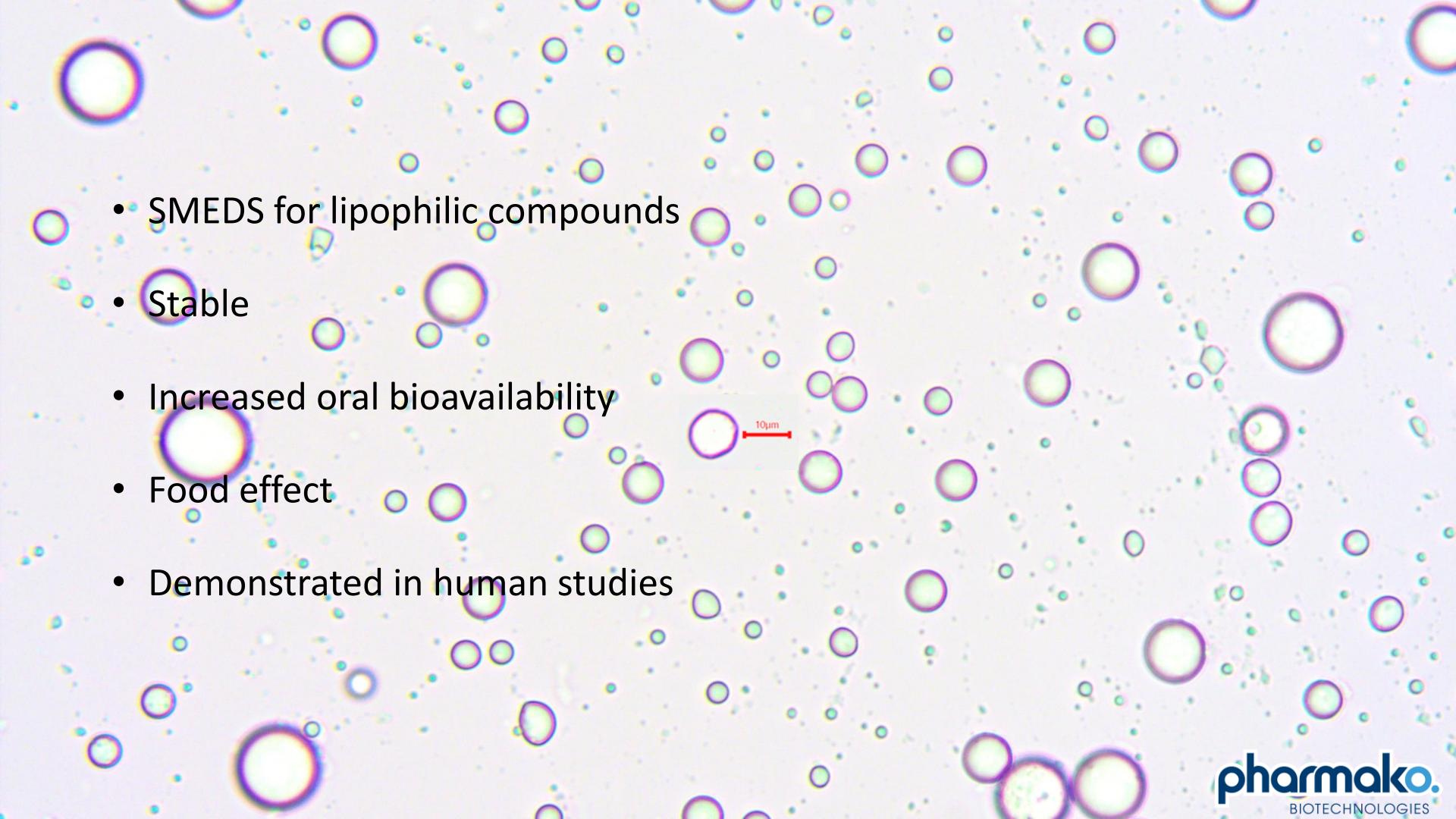
Cold Water
Dispersible
Powders
using LipiSperse®



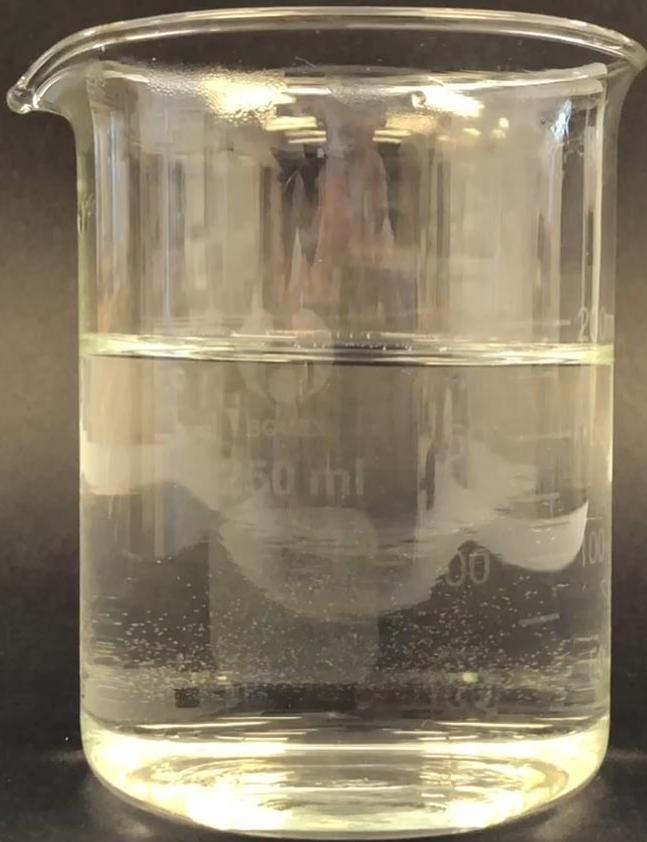


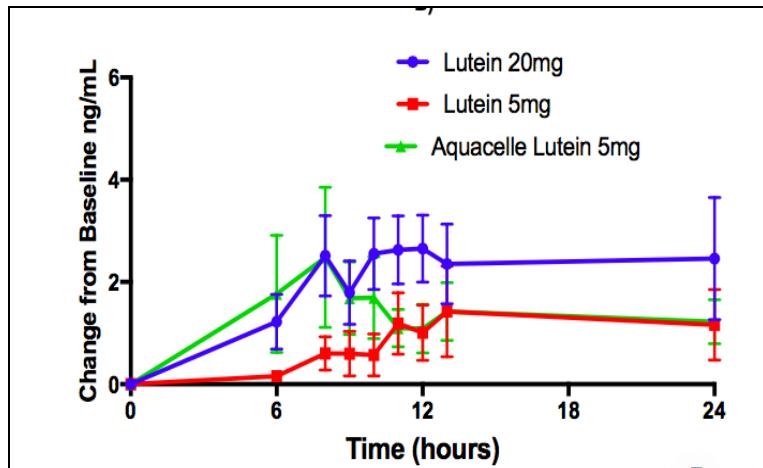
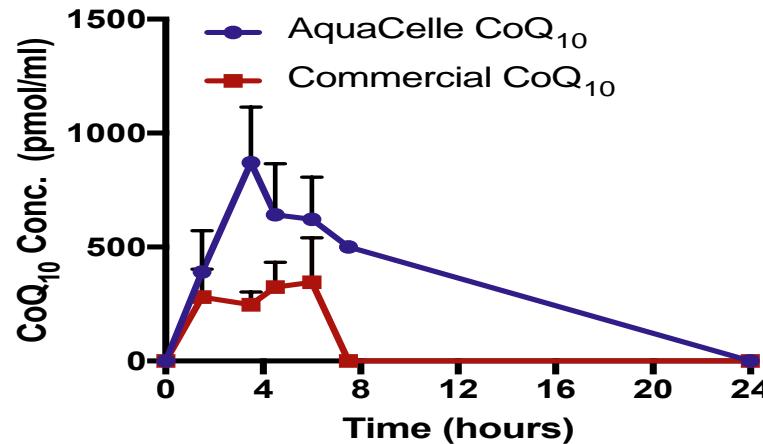
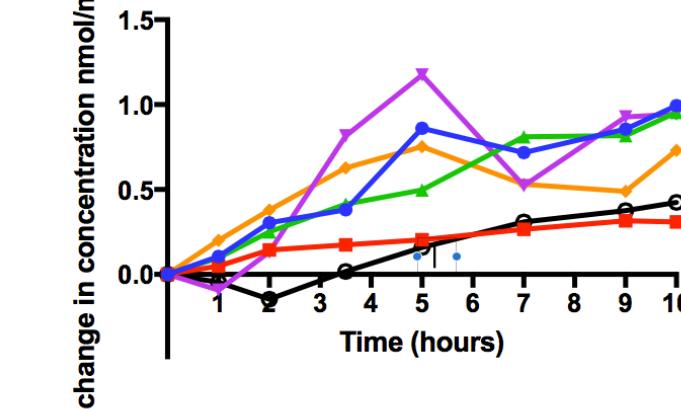
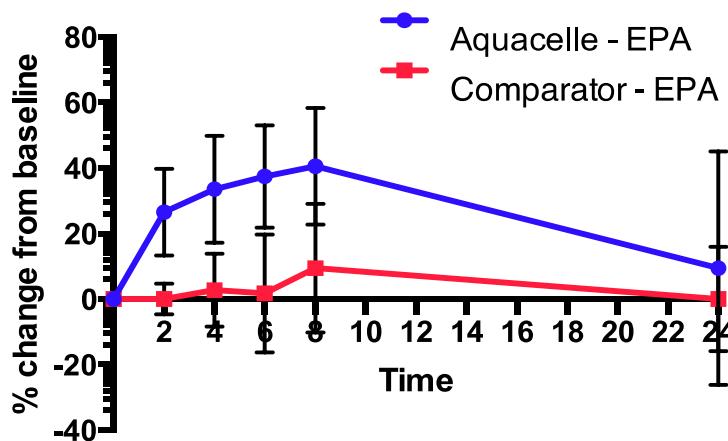
aquacelle®
MICELLAR TECHNOLOGY

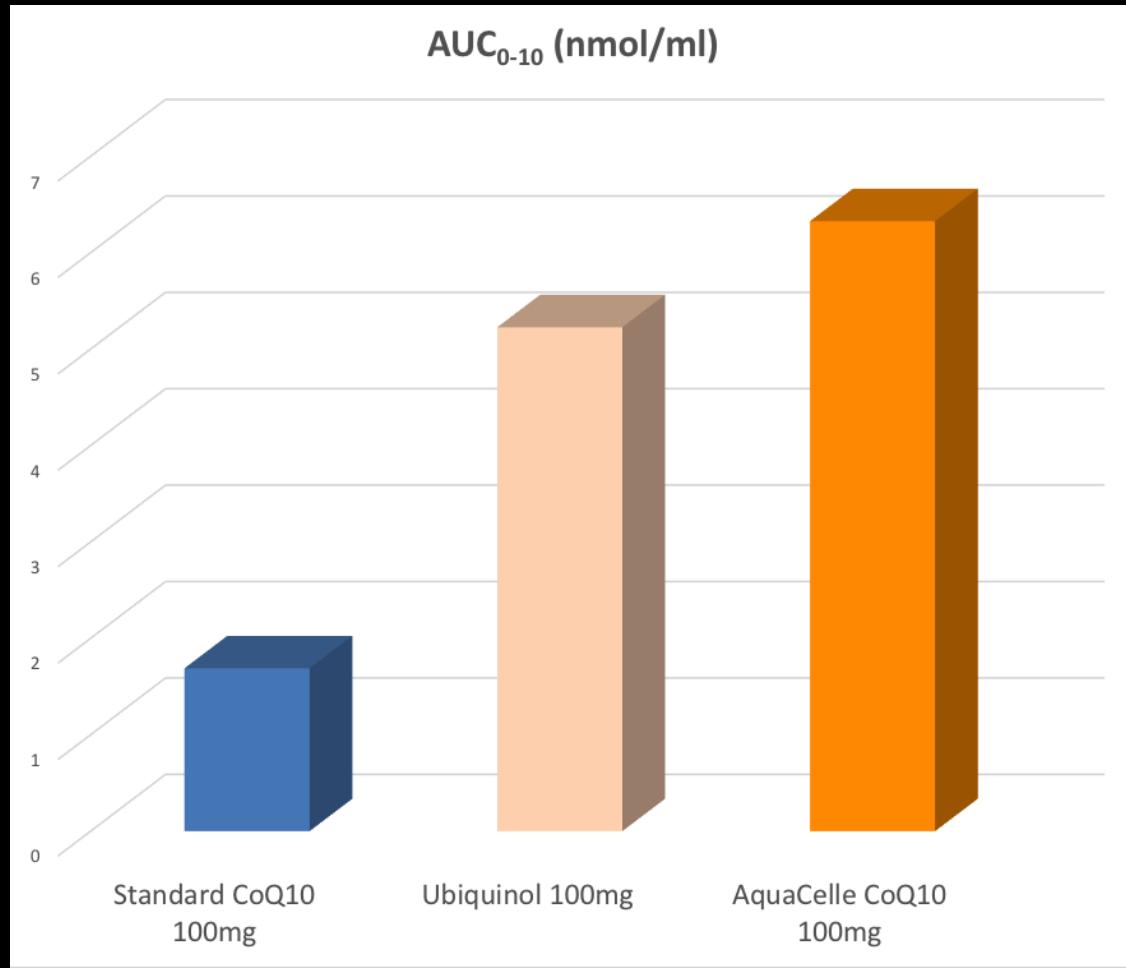
- SMEDS for lipophilic compounds
- Stable
- Increased oral bioavailability
- Food effect
- Demonstrated in human studies

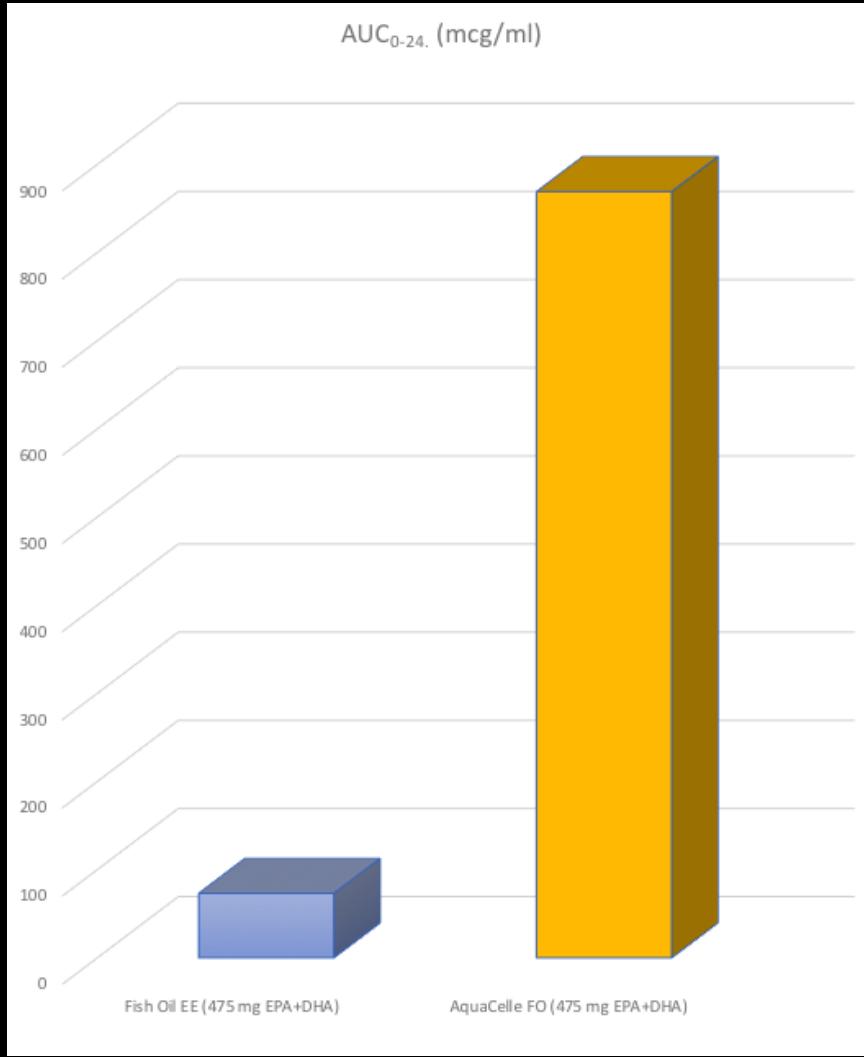
A microscopic image showing numerous small, clear, circular lipid droplets of varying sizes scattered across a light blue background. A single droplet in the center is highlighted with a red circle and a red arrow pointing to the text '10µm' above it, indicating the scale of the particles.

10µm

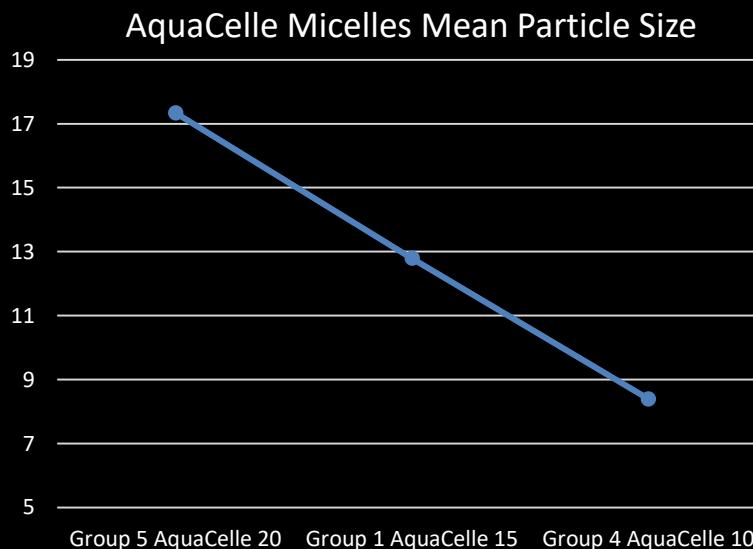
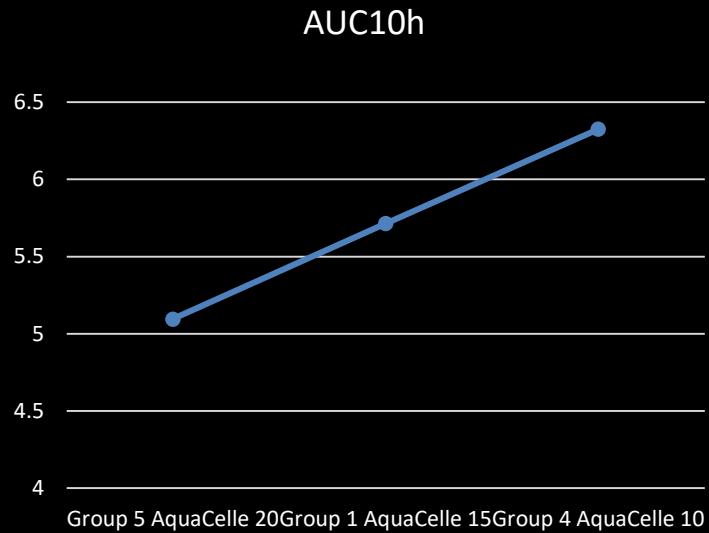




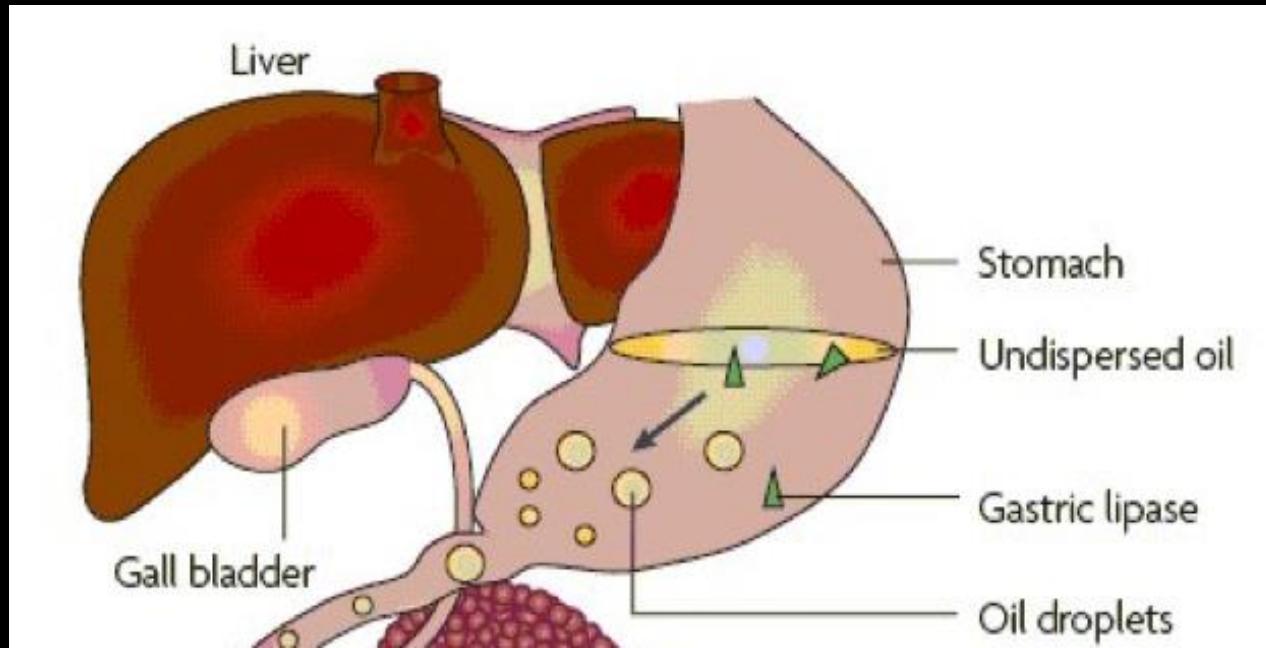




Correlation between micelle size and enhanced bioavailability.



AquaCelle not only increases bioavailability – it also removes “fishy” reflux.



Regular fish oil, from oil or Powder, “floats” on top of stomach contents

AquaCelle micelles disperse in the aqueous environment of the gut

CPOs

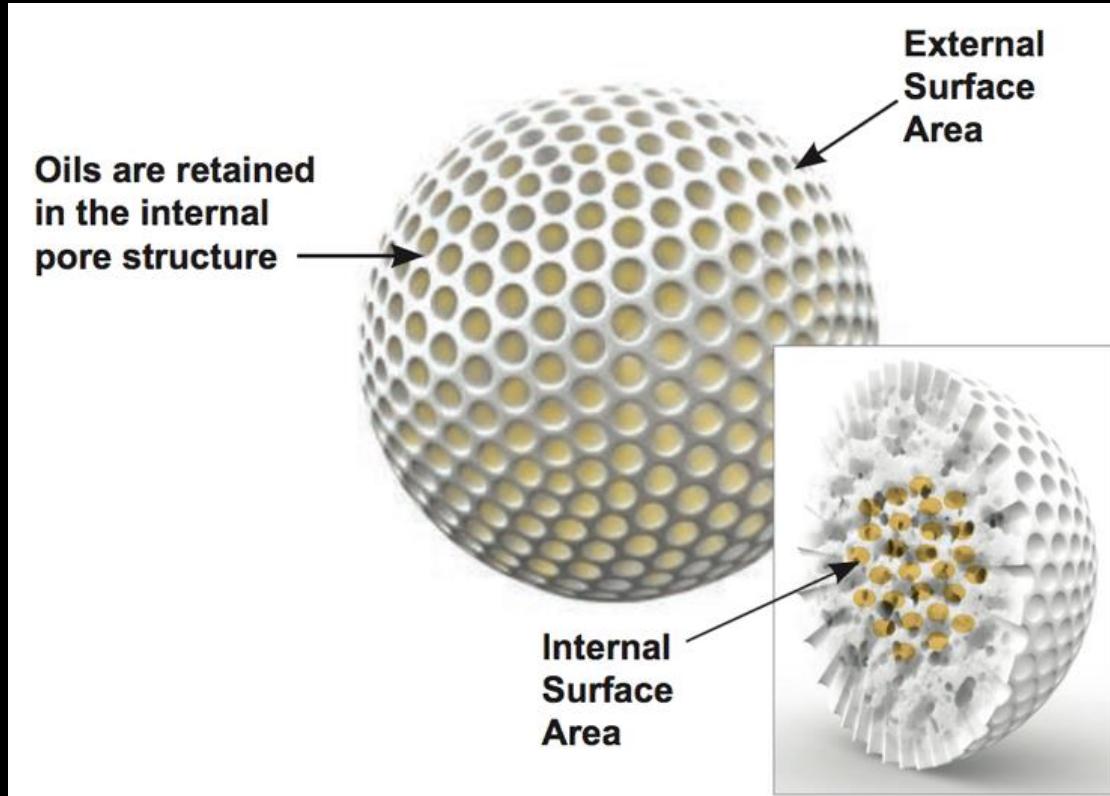
Compressible Powdered oils

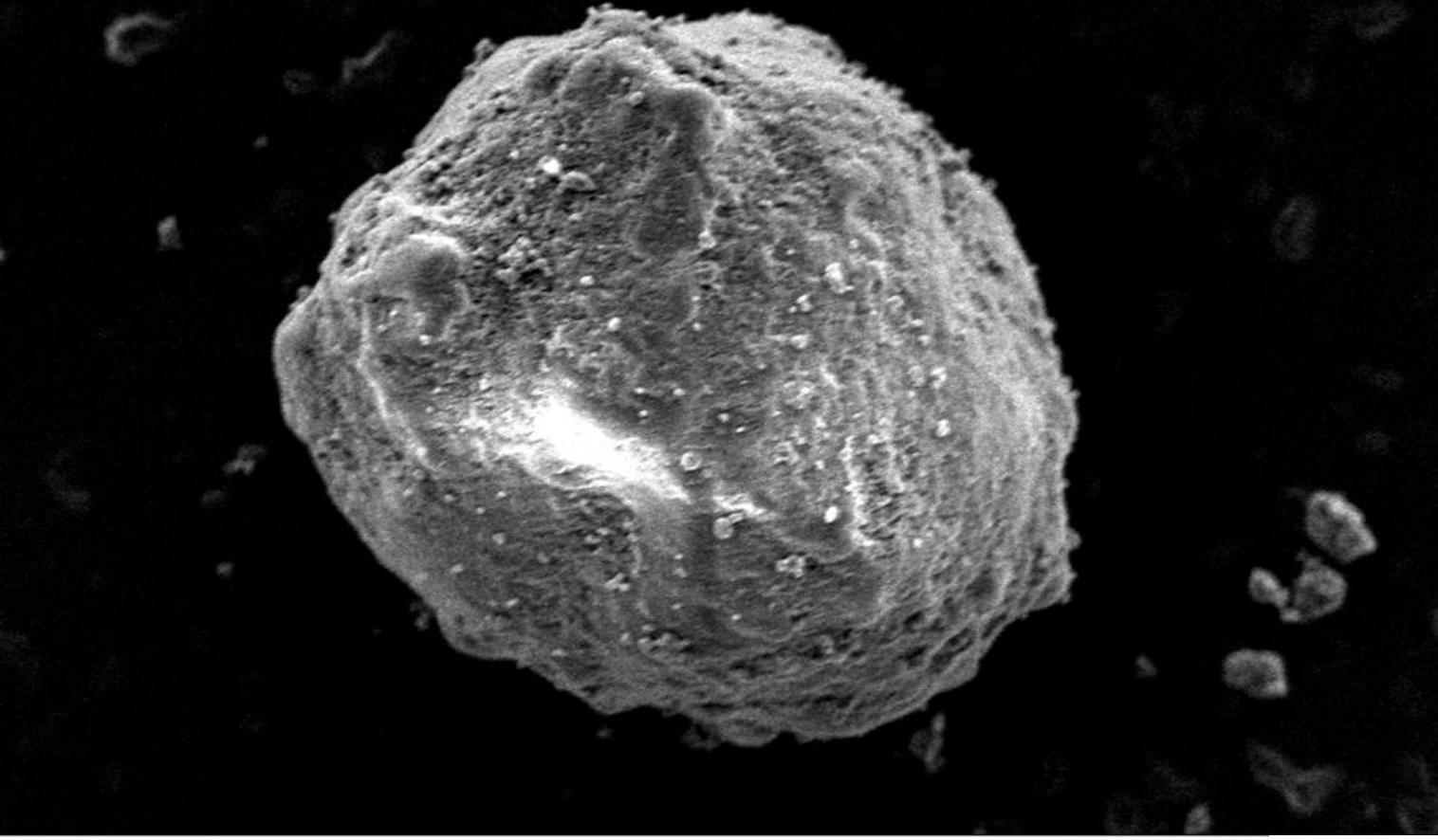


AquaCelle®

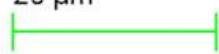
Compressible Powdered Oils

Specifically designed for
lipids / oils
Wide variety of active
ingredients
Customisation





20 μ m



EHT = 5.00 kV
WD = 7.6 mm

Signal A = SE2
Photo No. = 15520

Date :20 Sep 2016
Time :12:11:40

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CPOs

Compressible Powdered oils

Overcoming Tabletting Challenges



CPOs

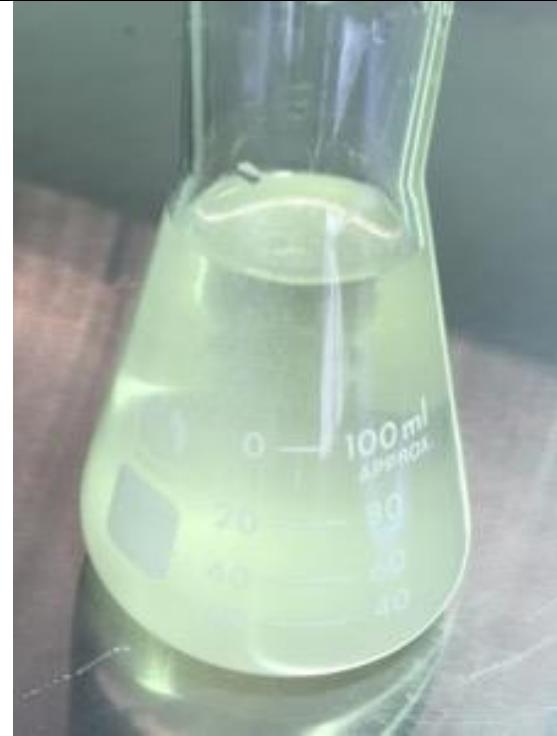
Compressible Powdered oils

Enable a broad range of potential applications:

- tablets
- hard capsules
- beverages
- foods
- protein shakes
- infant formula
- meal replacements
- Fish oils
- Algal oil
- Krill oil
- Chia oil
- CLA
- EPO
- Lavender oil

CWD

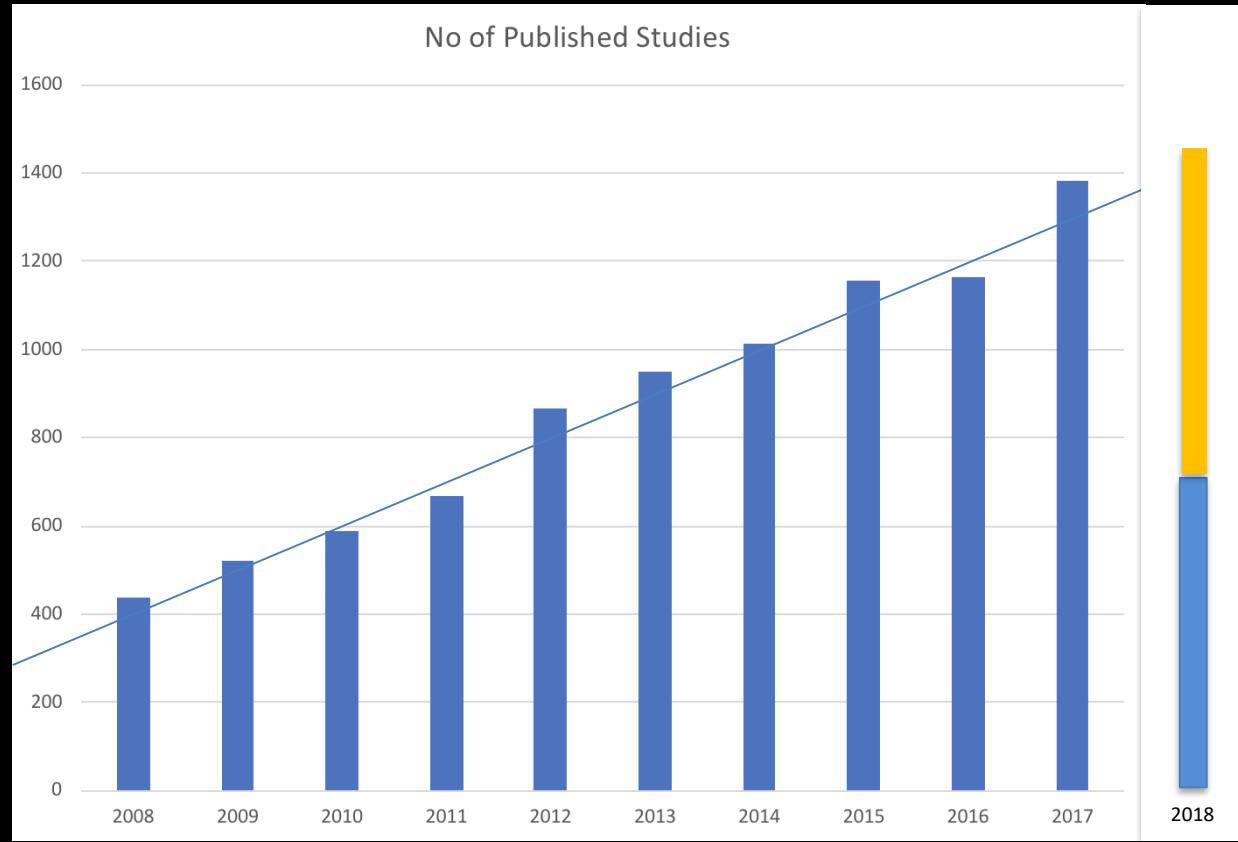
Cold Water Dispersible
Powders using LipiSperse®





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Why curcumin? The most researched ingredient!



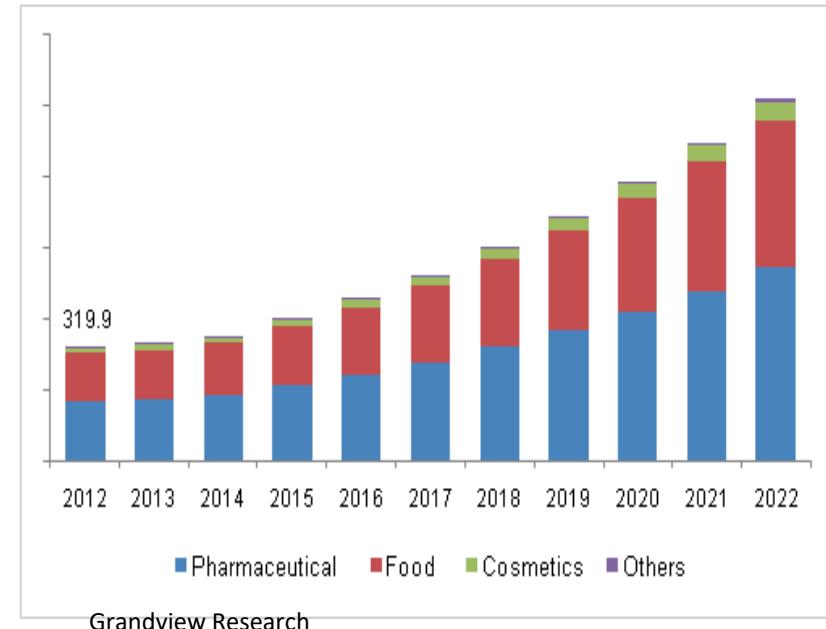
Curcumin is hot



Google classified turmeric (curcumin) as the “breakout star” of the functional food movement of the past five years.

300% increase in searches

Global curcumin market, by application, 2012 - 2022 (Tons)

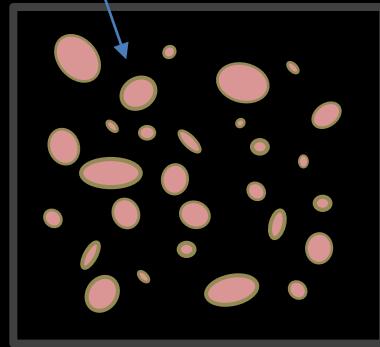




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DISPERSION TECHNOLOGY

Primary particle

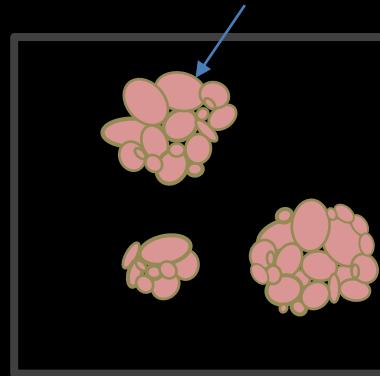


Perfect Dispersion:

Effective Specific Surface Area Large

= ENHANCED BIOAVAILABILITY

Agglomerate behaving as one single large particle



Poor Dispersion:

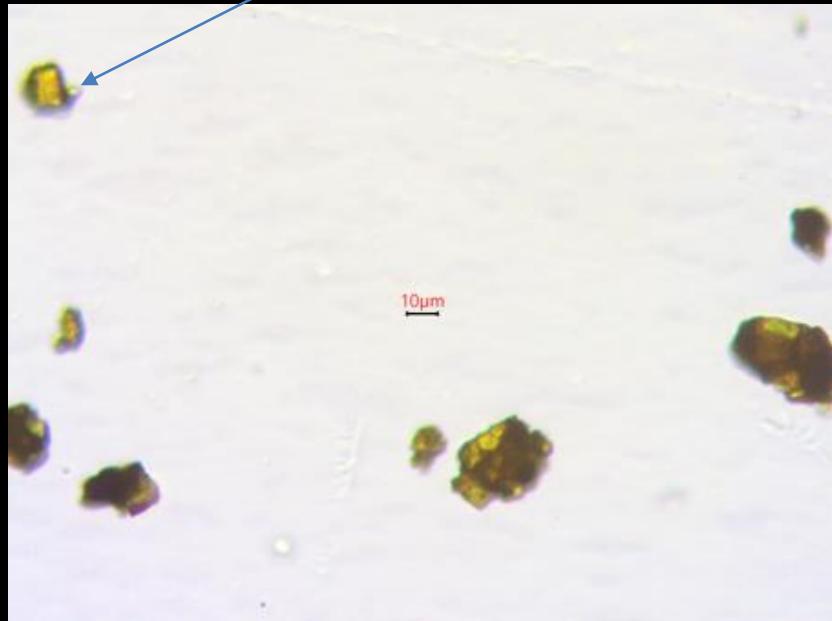
Effective Specific Surface Area Small

= POOR BIOAVAILABILITY

LipiSperse®

DISPERSION TECHNOLOGY

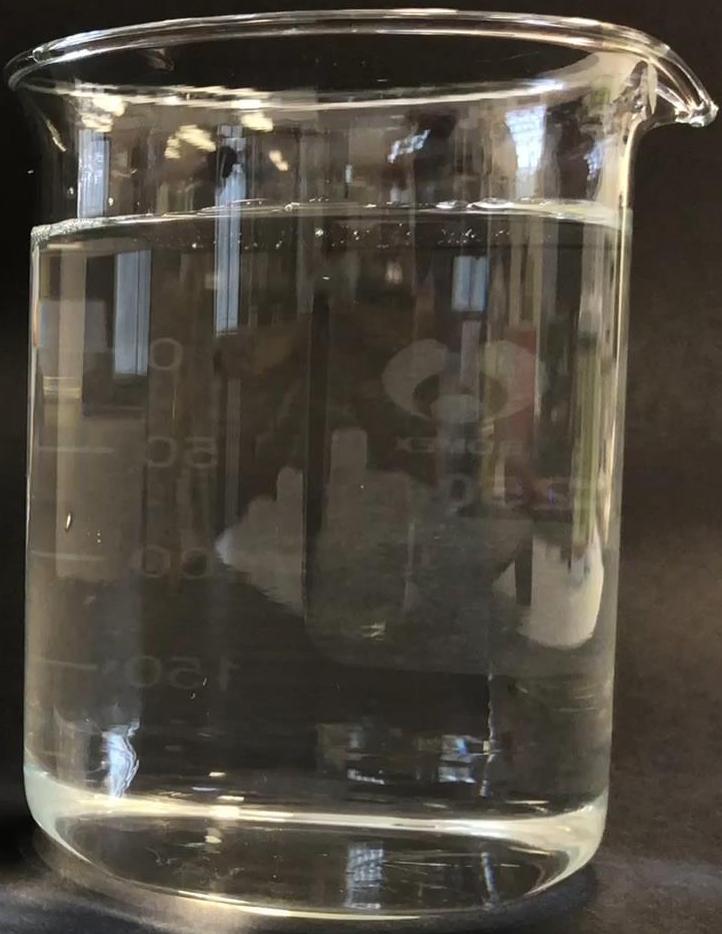
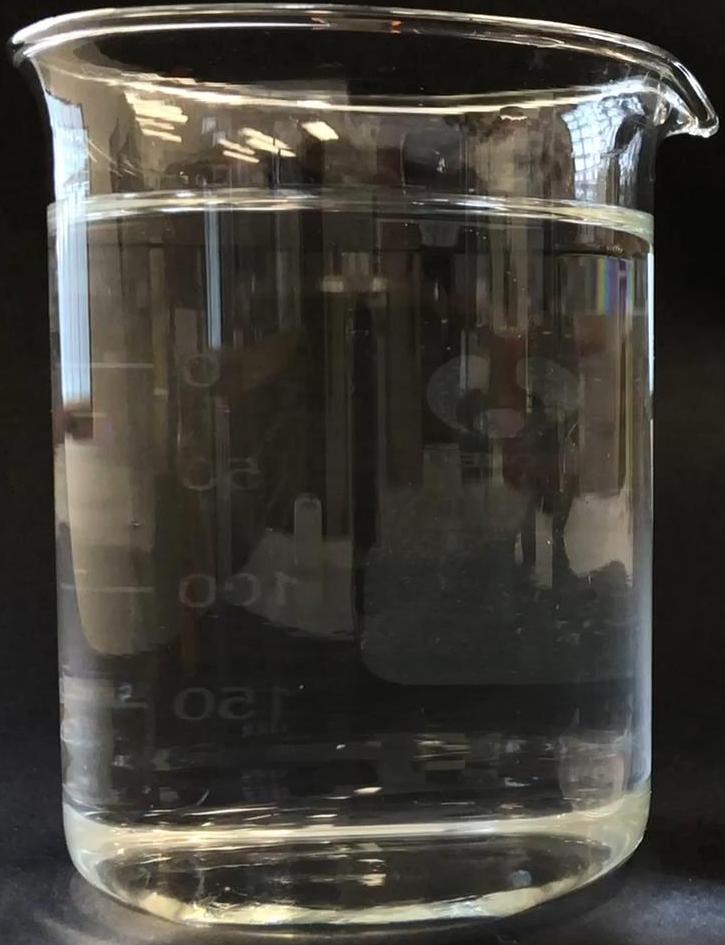
Primary particles



Agglomerate behaving as one single large particle



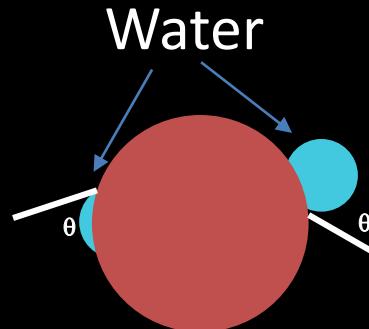
Scale is the same (10 microns) in both pictures



LipiSperse®

DISPERSION TECHNOLOGY

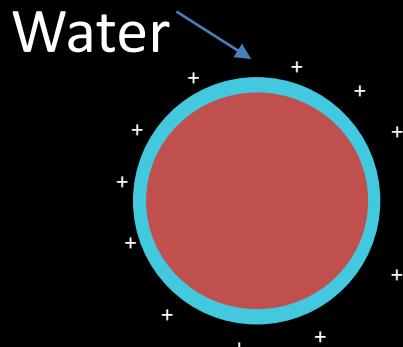
Small Contact Angle = Good Wetting



Large Contact Angle = Bad Wetting

With LipiSperse, surface tension is lowered, so water will adhere to particles

Goal is to allow water to engulf the lipophilic crystal

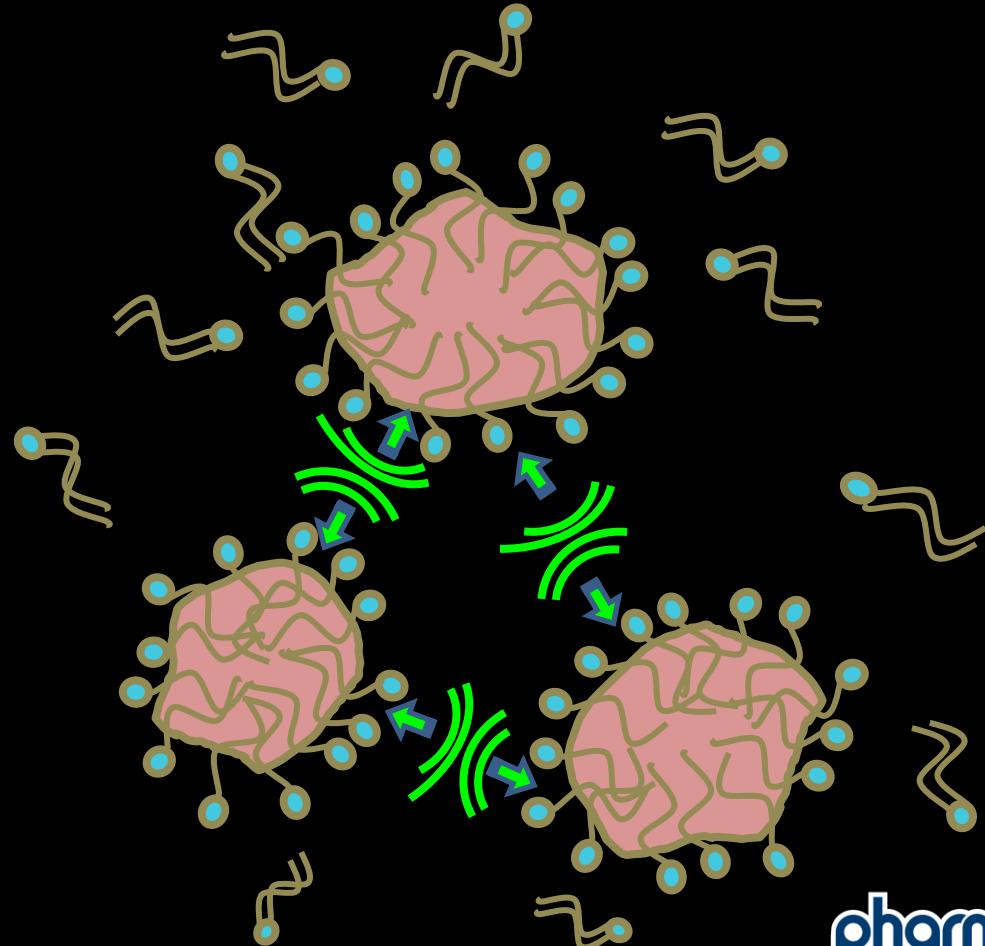


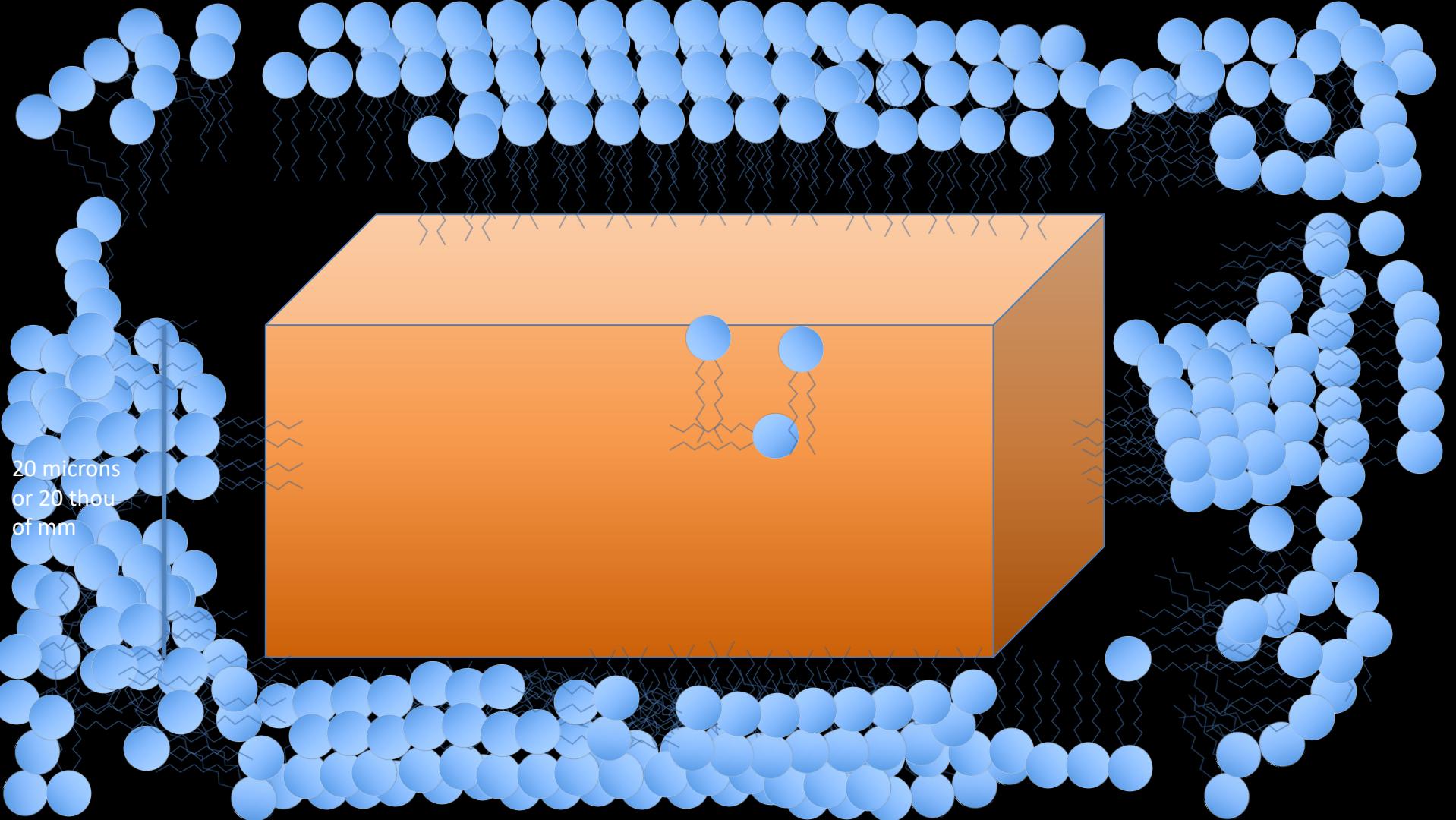
LipiSperse®

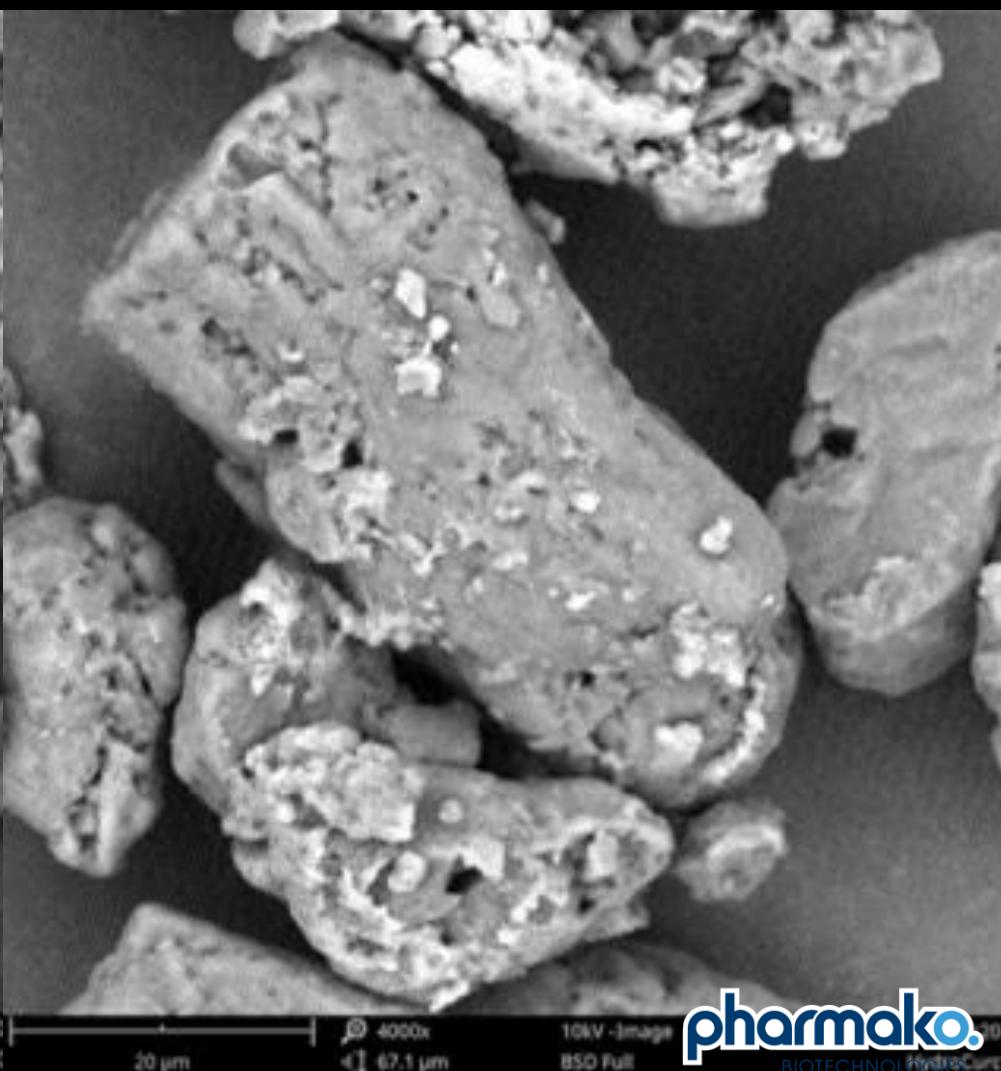
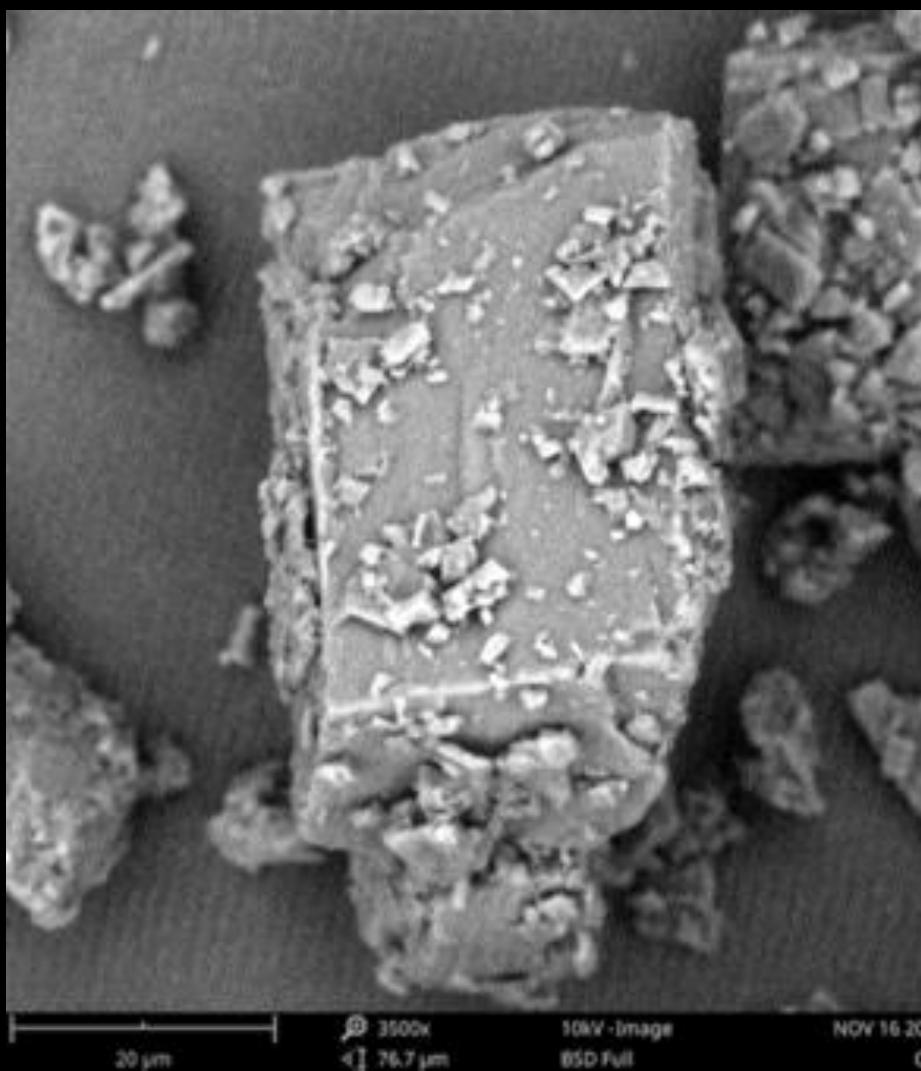
DISPERSION TECHNOLOGY



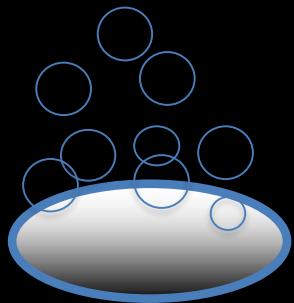
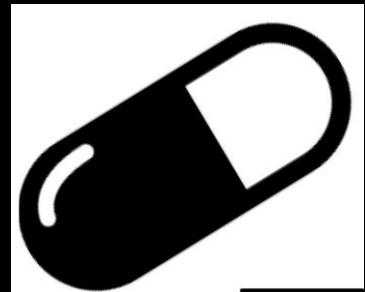
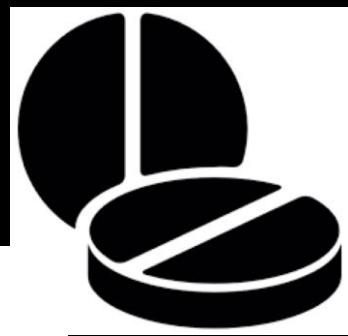
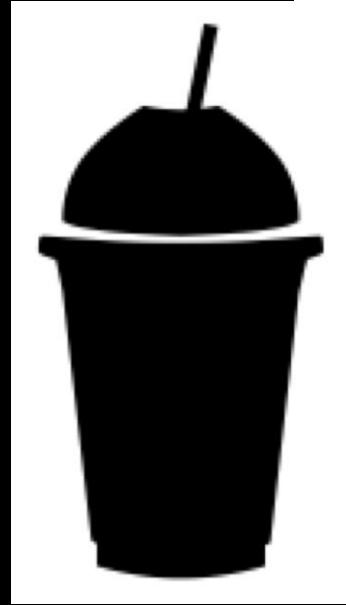
Repulsive forces between the particles prevent agglomeration or aggregation: allowing CWD Powders to have proper particle dispersion







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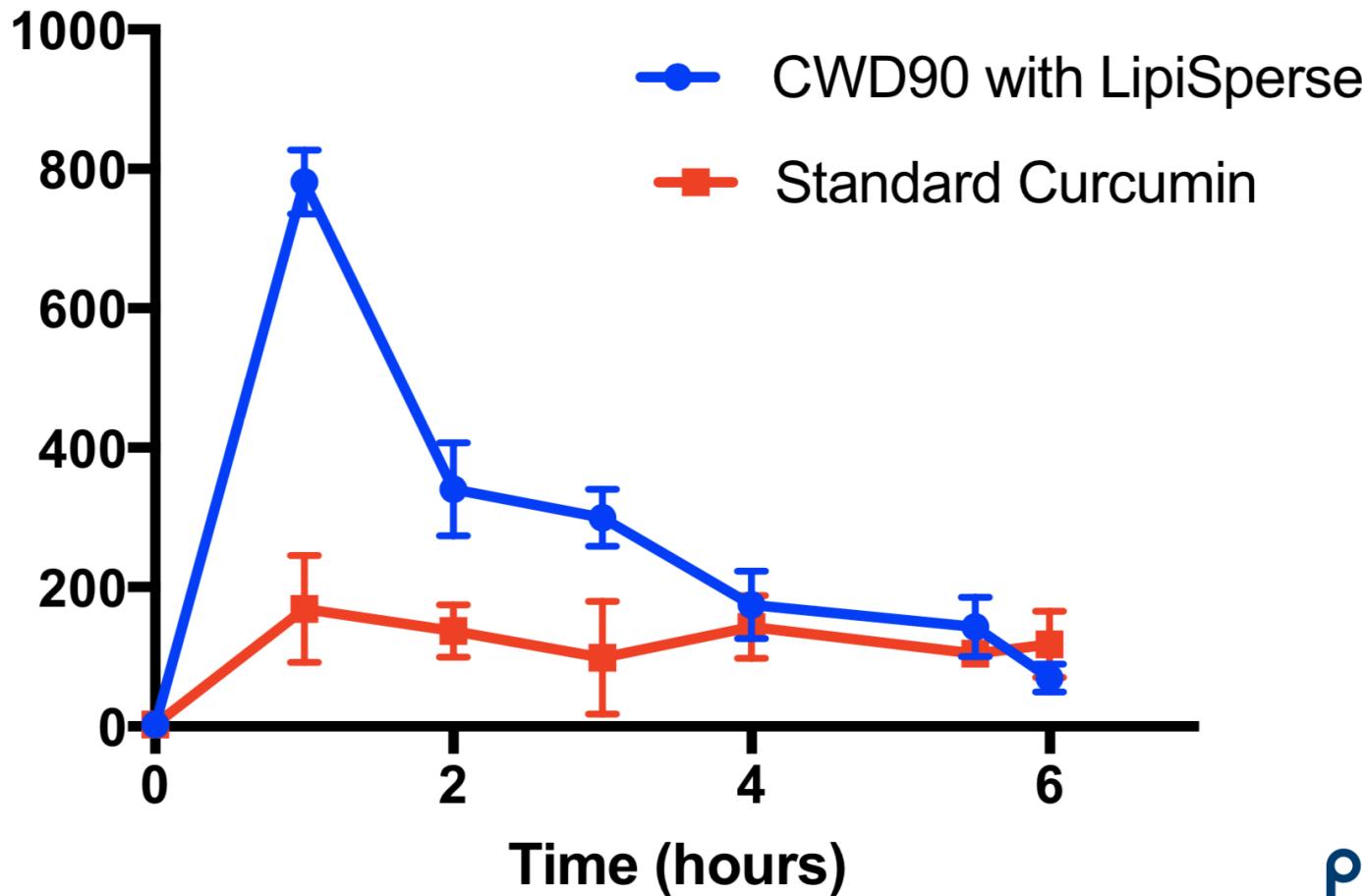
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Pharmacokinetic Study

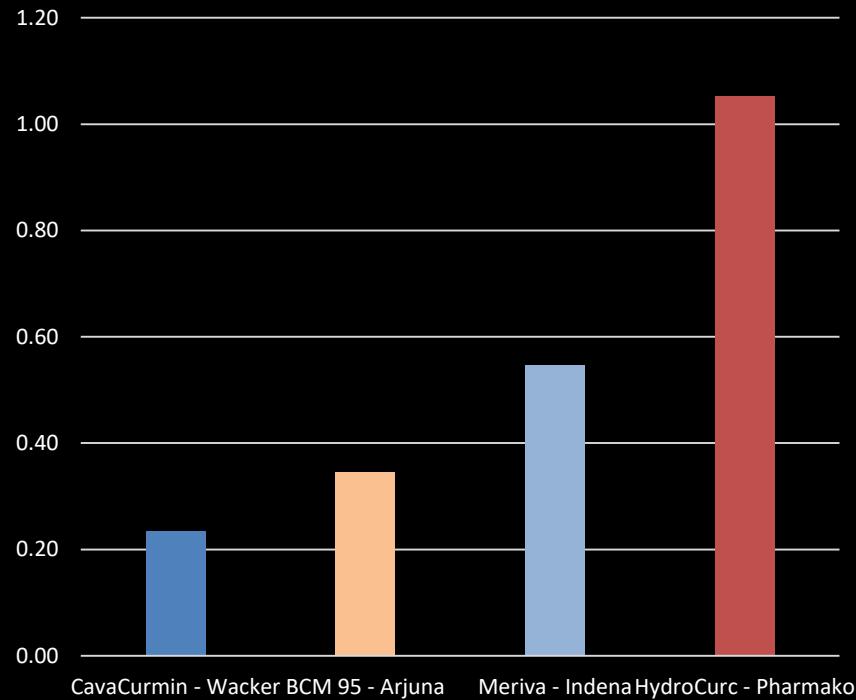
- 18 healthy male and female volunteers
- Single dose
- Randomised
- Double blinded study
- Crossover - Seven volunteers

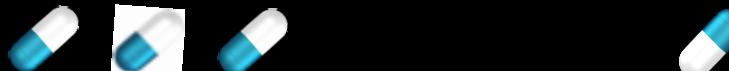
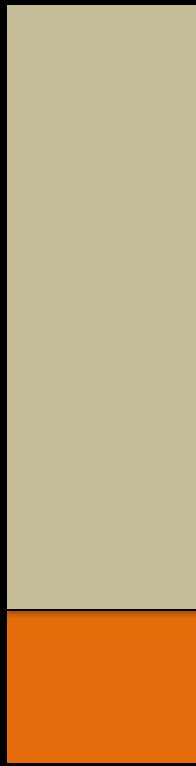
Plasma concentrations were determined at baseline and at regular intervals over a 24-hour period following curcuminoid ingestion.

Total Curcuminoids (parallel)



Plasma levels per mg of curcuminoids
ingested (based on published Cmax) (ng/ml)







Vitanatur

Vitanatur Cúrcuma Collagen Sport

Vitanatur Cúrcuma Collagen Sport es un complemento alimenticio a base de cúrcuma, colágeno hidrolizado, vitaminas A, C, D y E, magnesio, selenio y zinc especialmente indicado para personas que realizan actividad física de manera frecuente e intensa.

Código nacional: 185412.4



Presentación:

Bote metálico con 360g de polvo y con cacito dosificador de 12g.



Ingredientes Principales:

Cúrcuma, colágeno hidrolizado, vitaminas (A, C, D, E) y minerales (MC, Se, Zn).



Modo de empleo:

Disolver 1 dosificador (12 g) en 1 vaso de agua. Tomar 1 vez al día. Se recomienda tomar durante 2-3 meses. Descansar 1 mes y repetir en caso necesario.

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SUPPLEMENT, POWERED BY SCIENCE TO DELIVER ULTIMATE
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HydroCurc™ Curcumin Extract Powder

HydroCurc™ Cold Water Dispersable Extract

★★★★★

30 Grams

£35.95
tax incl.

 [Add to Bag](#)

1

HydroCurc™ Curcumin Extract Powder

85% Curcuminoids. Cold Water Dispersable 25:1 Extract



enquiries@pharmako.com.au Bronwen.Kerr@ingredients-plus.com philip@ingredients-plus.com