



***Commercialization Initiated
UltraShear Platform for Nanoemulsion
Production***

Pressure BioSciences

**Commercializing the Gentle Giant of Thermodynamics
Focus: Ultra Shear Technology™ (UltraShear™)**

(OTCQB: PBIO)

**Investor Presentation
May 2023**

**Richard T. Schumacher
President and CEO**

FORWARD LOOKING STATEMENTS

This presentation may contain forward looking statements that reflect management's current views and opinions as to the status of the Company's products, technology and other future events and operations. These statements are neither a promise nor guarantee but involve risks and uncertainties that could cause actual results to differ materially from those anticipated or indicated. Investors are cautioned that any forward-looking statements should be considered in light of such risks and uncertainties including, without limitation, those detailed in the Company's filings with the Securities and Exchange Commission.

Company Management (OTCQB: PBIO)

Mr. Richard T. Schumacher: Founder, President, and CEO

Boston Biomedica, Inc. (NASDAQ: BBII): CEO, Founder; Panacos Pharma (NASDAQ: PANC): President, Co-founder; Trinity Biotech (NASDAQ: TRIB): Founding Group; Harvard Medical School (CBR Labs – GM, Scientist); UNH (BA)

Dr. Edmund Y. Ting:	Senior VP of Engineering
Dr. Alexander V. Lazarev:	Senior VP and CSO
Mr. John B. Hollister:	Director, Sales and Marketing
Mr. Kenneth F. Micciche:	Director, Business Development

Board

• Jeffrey N. Peterson, MSChemE	Board Chairman	Independent Member
• Kevin A. Pollack, Esq., MBA	Chairman: Audit Committee	Independent Member
• Vito J. Mangiardi, MBA	Chairman: Compensation Committee	Independent Member
• Mickey S. Urdea, Ph.D.	Chairman: SAB	Independent Member
• Richard T. Schumacher, BA	Treasurer, Clerk	Founder, CEO



Different Levels of Pressure...

Car Tire



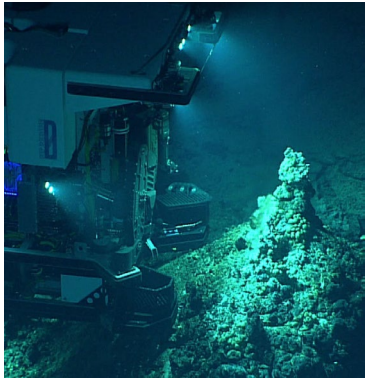
30 psi

Vice



500 psi

Marianas Trench



16,500 psi

PCT Barocycler™
2320EXT



45,000 psi
Over 350
Barocycler Systems
Installed Worldwide

Ultra Shear Technology (UST)



Combines UHP
(45,000 – 60,000 psi)
with Intense Shear Forces.
High Quality Nanoemulsions



Too Much Pressure?!!

Pressure BioSciences, Inc. (OTCQB: PBIO)

Three Enabling High Pressure Platforms (30 total patents) Driving Discovery & Quality Improvement in Critical Research & Manufacturing Areas of the Life Sciences, Food & Beverage, Cosmetics, Nutraceuticals, Agrochem, and Other Industries



PCT

Pressure Cycling Technology (PCT)

Alternating Cycles of Hydrostatic Pressure to Control Molecular Interactions

- Biomarker Discovery, Biotherapeutics Characterization & QC, Diagnostics
- 350 Instruments Installed WW, 225 Customers (Multiple KOLs), >200 Publications, 15 Patents



BaroFold

BaroFold™ Technology (BaroFold)

High Pressure Disaggregation and Controlled Refolding of Proteins to Desired Active Structures

- Bioprocess Development for Novel Protein Biotherapeutics, Rescue/Rework, Scalable for Mfg
- Contract Services Initiated, Six Customer Projects, 8 Patents



UST

Ultra Shear Technology™ (UltraShear™)

Intense Shear Forces from Ultra High Pressure Valve Discharge with Controlled Temperatures

- Nanoemulsification Processing – Makes Oil-Based Products Effectively Water-Soluble
- Q4 2022 Tolling Site (East Coast); Q2 2023 West Coast Tolling Site ; 2024 Lease/License Agmts
- Cosmetics ▪ Nutraceuticals ▪ Agrochem Initial Focus. Multiple \$B Markets, 7 Patents



Over 225 Customers (350+ PCT Systems) Worldwide

Industry, Academia, Government Clients & Key Opinion Leaders





Emulsions: *Mixtures of two or more liquids that are immiscible in each other (e.g., oil & water)*

- Thousands of products used everyday are oil & water emulsions /have oil-based actives
 - Pharmaceuticals (e.g., majority of all new drug candidates are hydrophobic)
 - Health & Wellness Products (e.g., vitamins, supplements, nutraceuticals like CBD/THC)
 - Cosmetics & Other Personal Care Products (e.g., anti-aging serums, creams, gels)
 - Agrochemicals (e.g., eco-friendly essential oils)
 - Food & Beverage (e.g., milk, juices, salad dressings)
- **PROBLEM:** *historically, most emulsions have been macro/micro, which typically show:*
 - Poor Water Solubility (oil & water don't mix)
 - Poor Stability (unstable & will separate over minutes/hours/days) – “mix well before using”
 - Poor Bioavailability (hard to dose, long onset time)...bioavailability reported to range from 6-20%
- **SOLUTION:** *Nanoemulsions*



Nanoemulsions

- Widely recognized to exhibit significant improvements over Macro/Microemulsions
 - High Water Solubility
 - Exceptional Bioavailability (rapid & complete absorption)
 - Excellent Long-term Stability
 - Translucent
- Current processing methods/equipment for NE production (non-UST)
 - Ultrasonic (high freq. sound waves: long treatment cycles, hot spots, poor reproducibility, cavitation erosion of sonic source, difficult to scale Standard Homogenizers/Blenders (can't reach nano, can't scale, inferior quality)
 - Pressure Homogenizers ("low" high-pressure limits, product enters pump (CIP issue), valves often clog, expensive to scale, real nano results in low output)
 - Vendors often offer mystery emulsifier cocktail, but effective NE can't be made with one recipe





Ultra Shear Technology™ (UST™) Platform:

Revolution in Nanoemulsion Processing – Better, Cheaper, Faster, & Smarter

- UST uniquely combines ultra-high pressures with intense shear at controlled temperatures
- UST produces highly-stable, water-soluble, oil-in-water Nanoemulsions
 - Selectable (“Dial In”) droplet size: 20 to 100 nm, low polydispersity
 - Optimizes absorption and bioavailability of oil-based components
 - Optimizes sensory profile: transparency, texture, taste, smell
 - Significantly extends shelf life (room temp stable/safe)
- Eight (8) issued patents; add’l pending patent applications worldwide
 - Barolsolator™: uniquely protects product from process equipment contamination. *Unique in the World!*
 - NanoGap™: innovative, dynamically-controlled valve design. *Unique in the World!*





Broad Market Potential

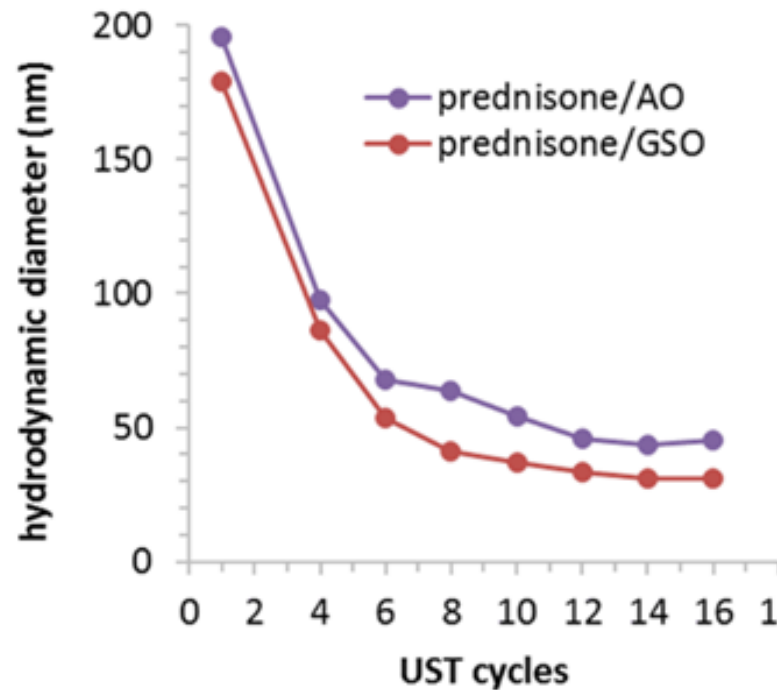
Shifting Our Focus (and Scale) from R&D to MANUFACTURING

- Pharmaceuticals / Vaccines (bioavailability, adjuvants, liposomes)
 - Cosmetics / Skin care
 - Eco-friendly Agrochemicals (essential oils)
 - Health & Wellness Products
 - Nanotechnology / Advanced materials
 - Lubricants / Coatings
 - Food / Beverages (OSU-Industry Consortium)
-
- **Customers in early access agreements**
 - **Actively engaging in partnerships and collaborations**
 - **UST Commercialization Planned for 2023**

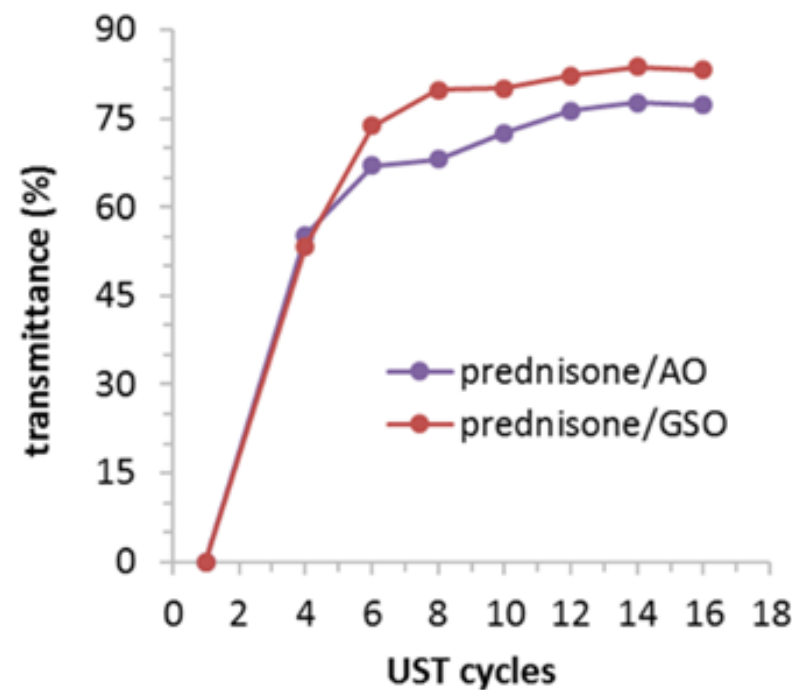


Applications in Pharmaceuticals: Prednisone Nanoemulsions

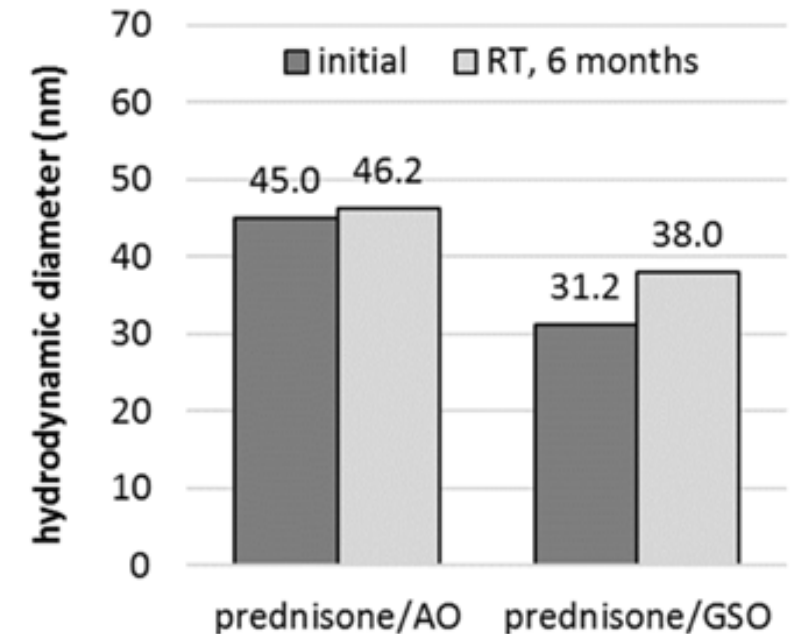
A. Oil droplet size



B. Clarity



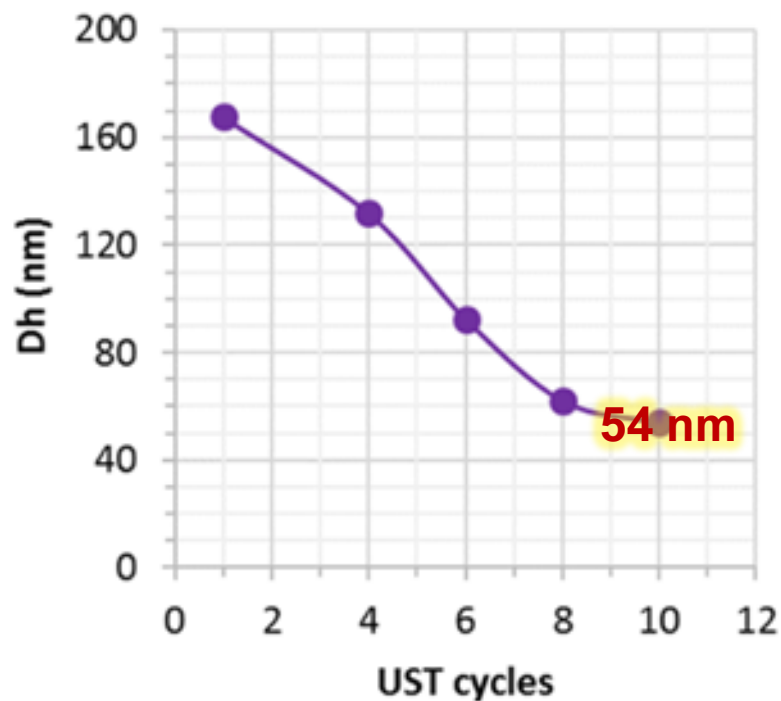
C. Stability



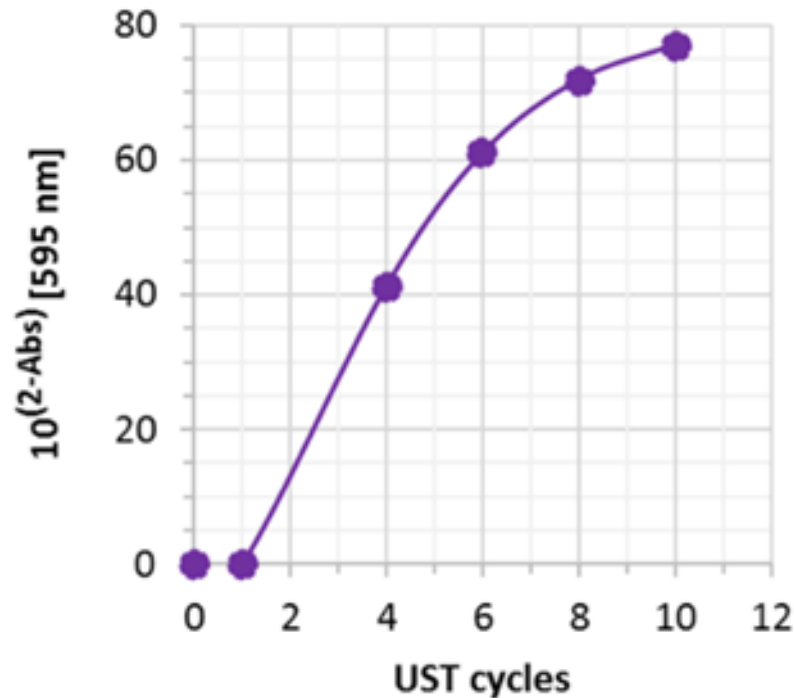
(A) Mean oil droplet size (nm) of prednisone AO and GSO nanoemulsions as a function of the number of UST cycles at 45,000 psi. (B) Optical clarity of prednisone AO and GSO formulations. (C) Stability of prednisone nanoemulsions stored at room temperature for six months.

Applications in Cosmeceuticals: Retinol Nanoemulsions

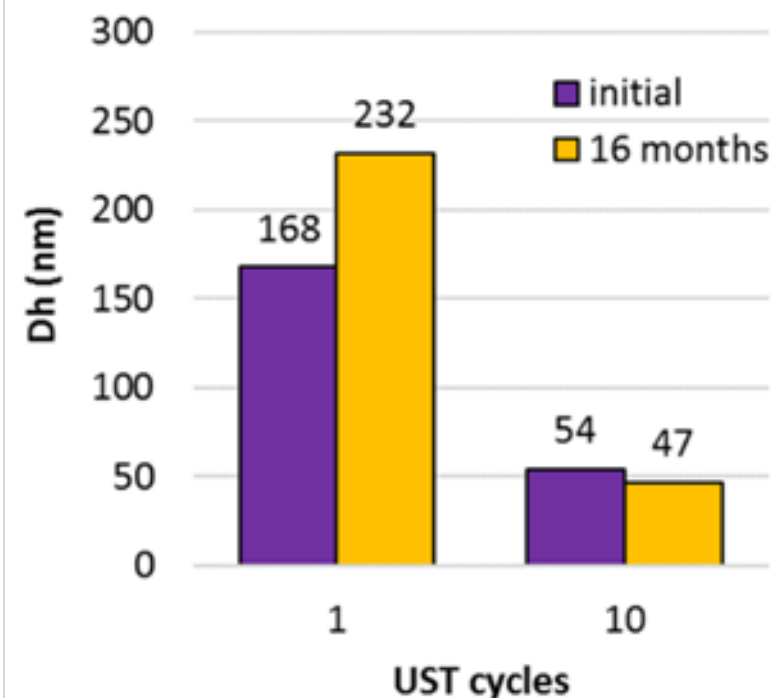
A. Oil droplet size



B. Clarity

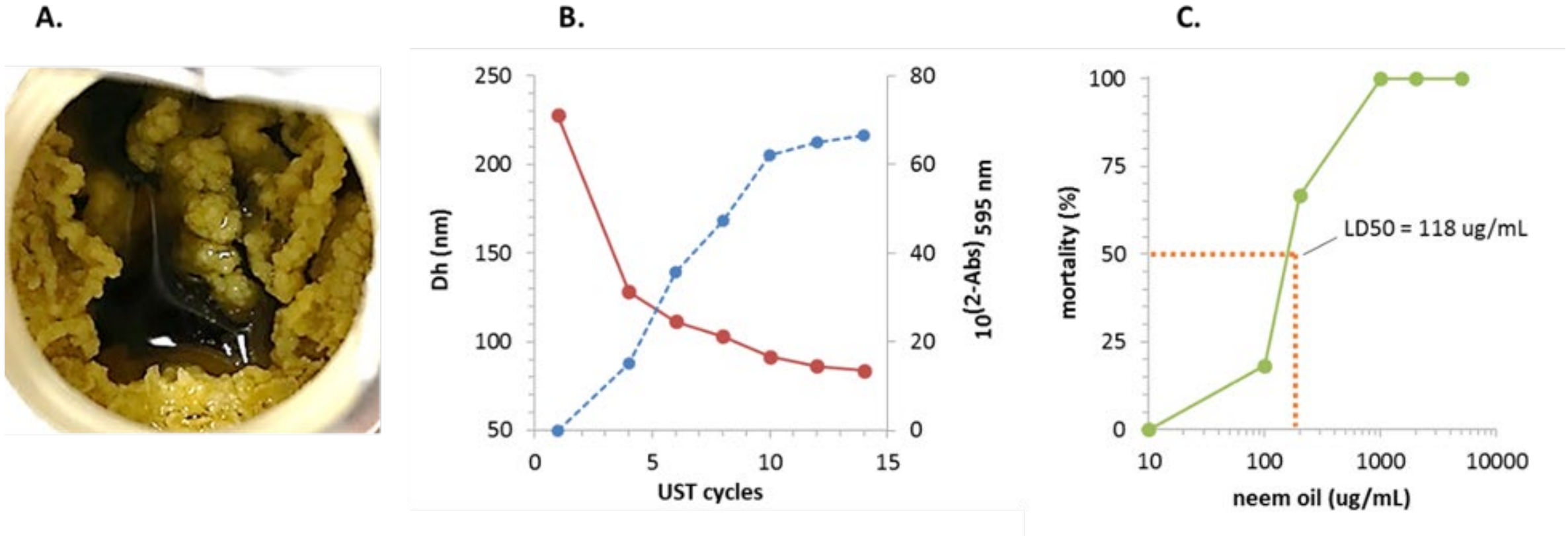


C. Stability



(A) Progressive reduction of mean hydrodynamic diameter (Dh) of oil droplets as a function of the number of UST cycles reaching a minimum particle size of 54 nm. (B) Increasing clarification was commensurate with decreasing particle size. Optical clarity was quantified from turbidity measurements at 595 nm and expressed as transmittance. (C) Stability of retinol nanoemulsion following 16 months storage at 4°C protected from light.

Applications in Agrochemicals: Neem Oil Nanoemulsions



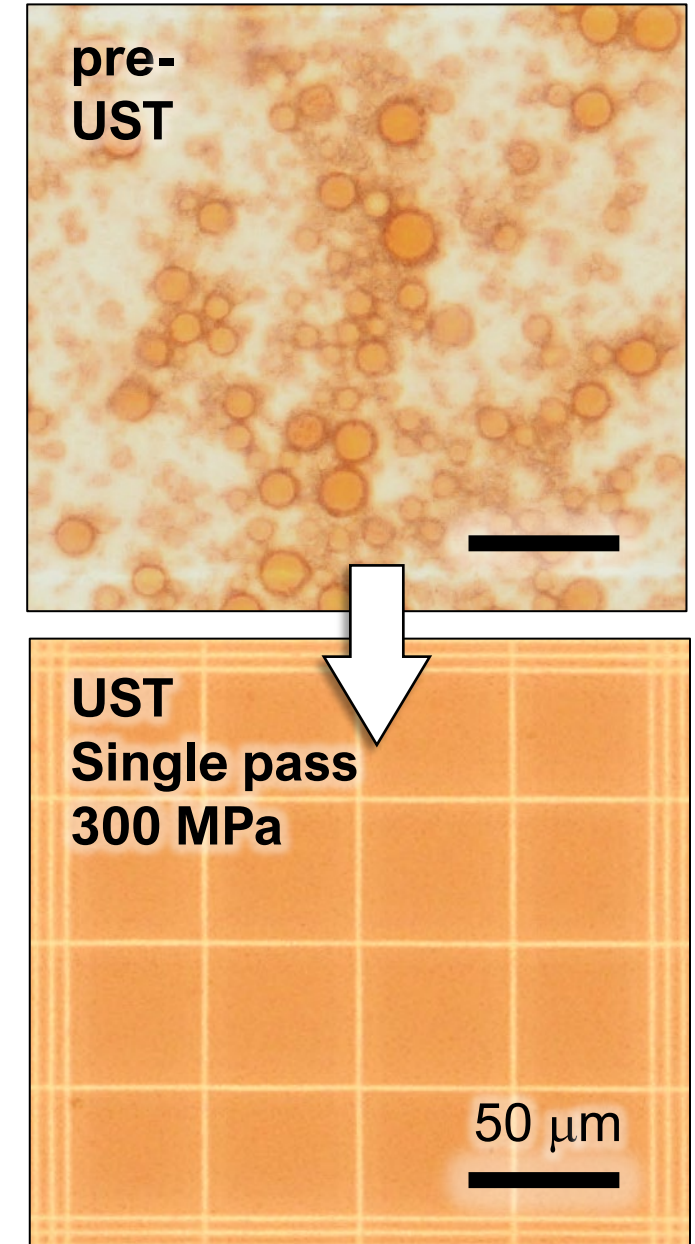
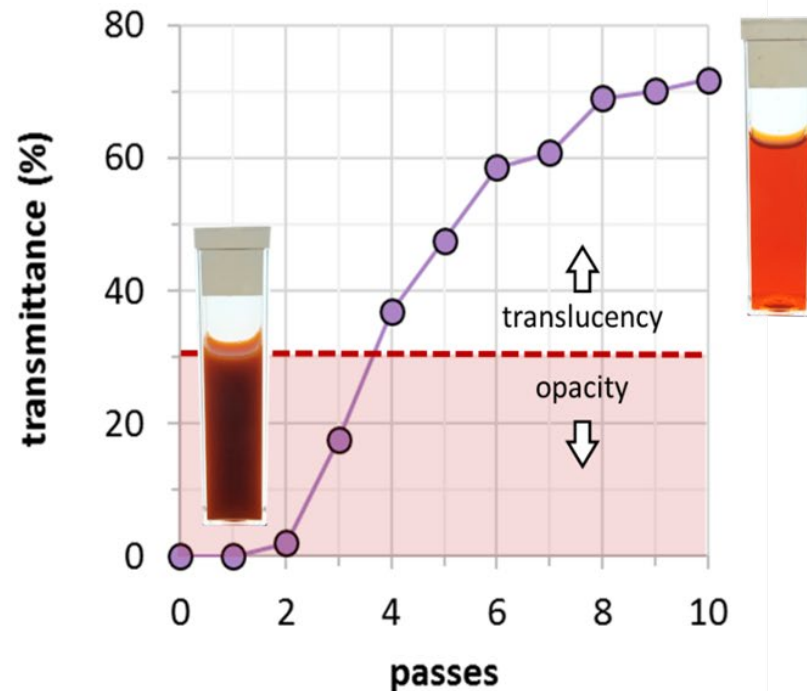
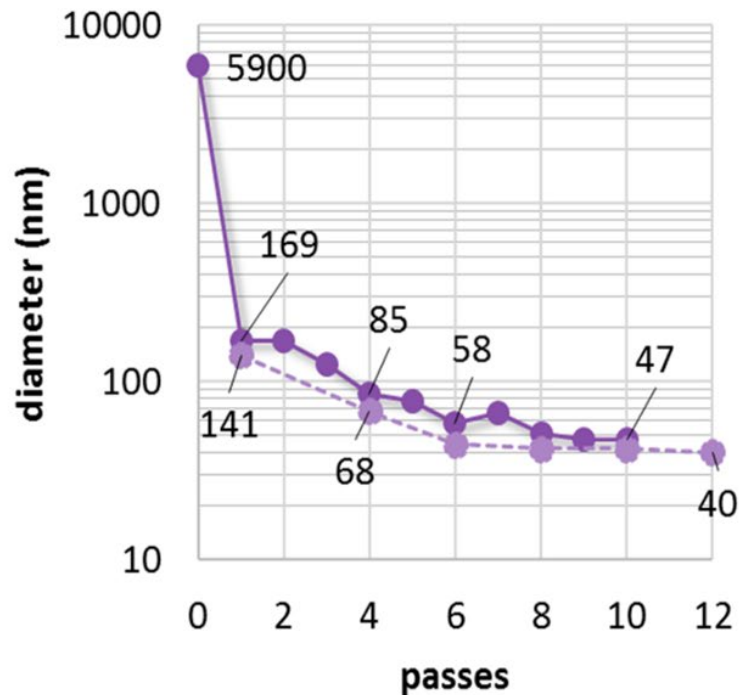
(A) 100% neem oil congealed at room temperature.

(B) Progressive decrease in hydrodynamic diameter (Dh) of oil droplets produced over 1-14 UST cycles (red) corresponding to decreased light scattering and increased clarity (blue dashed line).

(C) LD₅₀ in *D. pulex* measured over six hours for serial dilutions of Neem-O that was stored at room temperature for four months.

Astaxanthin Nanoemulsions Prepared by UST

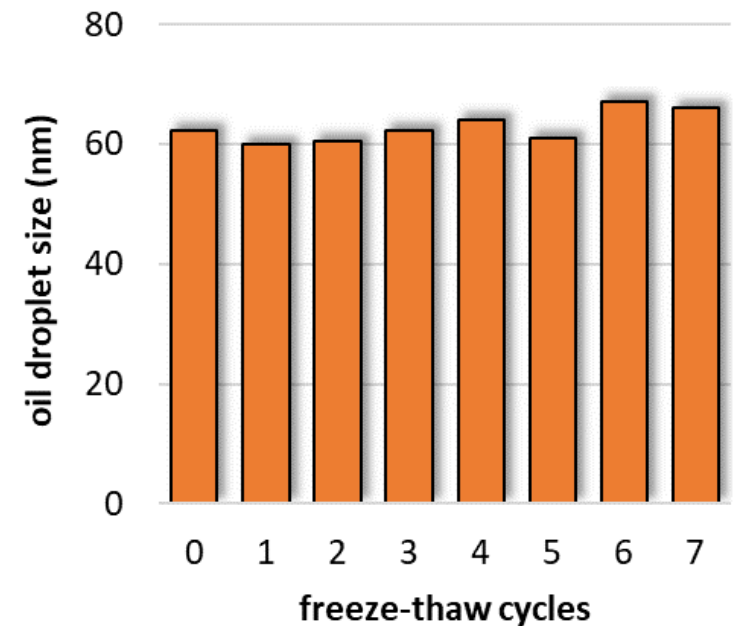
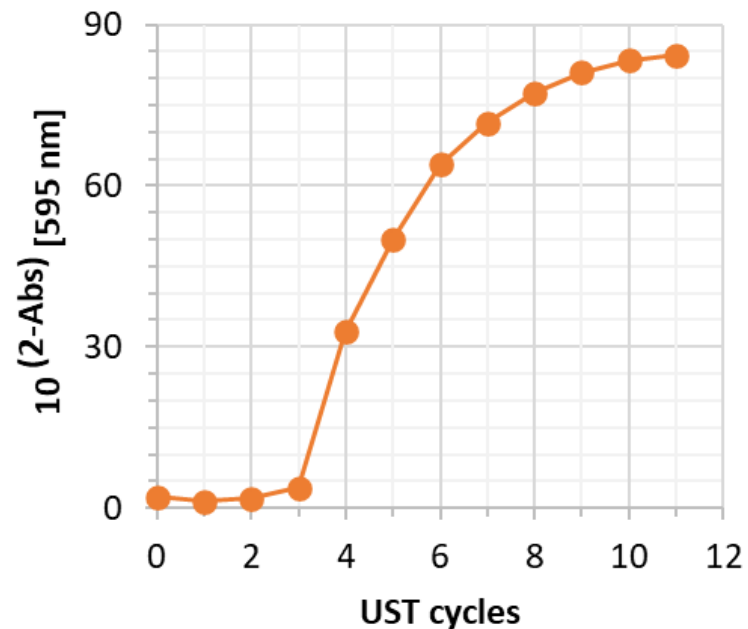
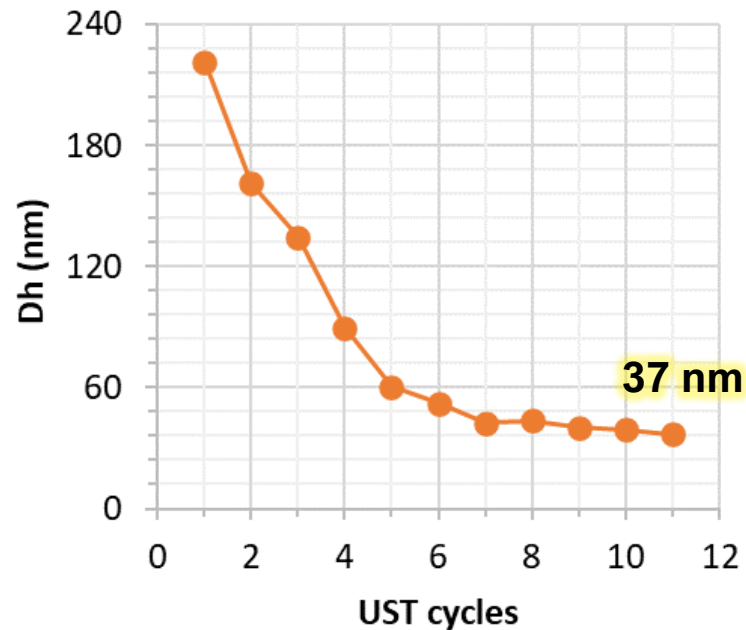
Rapid size reduction and clarification



Applications in Nutraceuticals:

Curcumin nanoemulsions

- Oil droplet size <40 nm
- High optical clarity
- Stability over seven freeze-thaw cycles



CBD Nanoemulsions in Camelina Oil Formulations

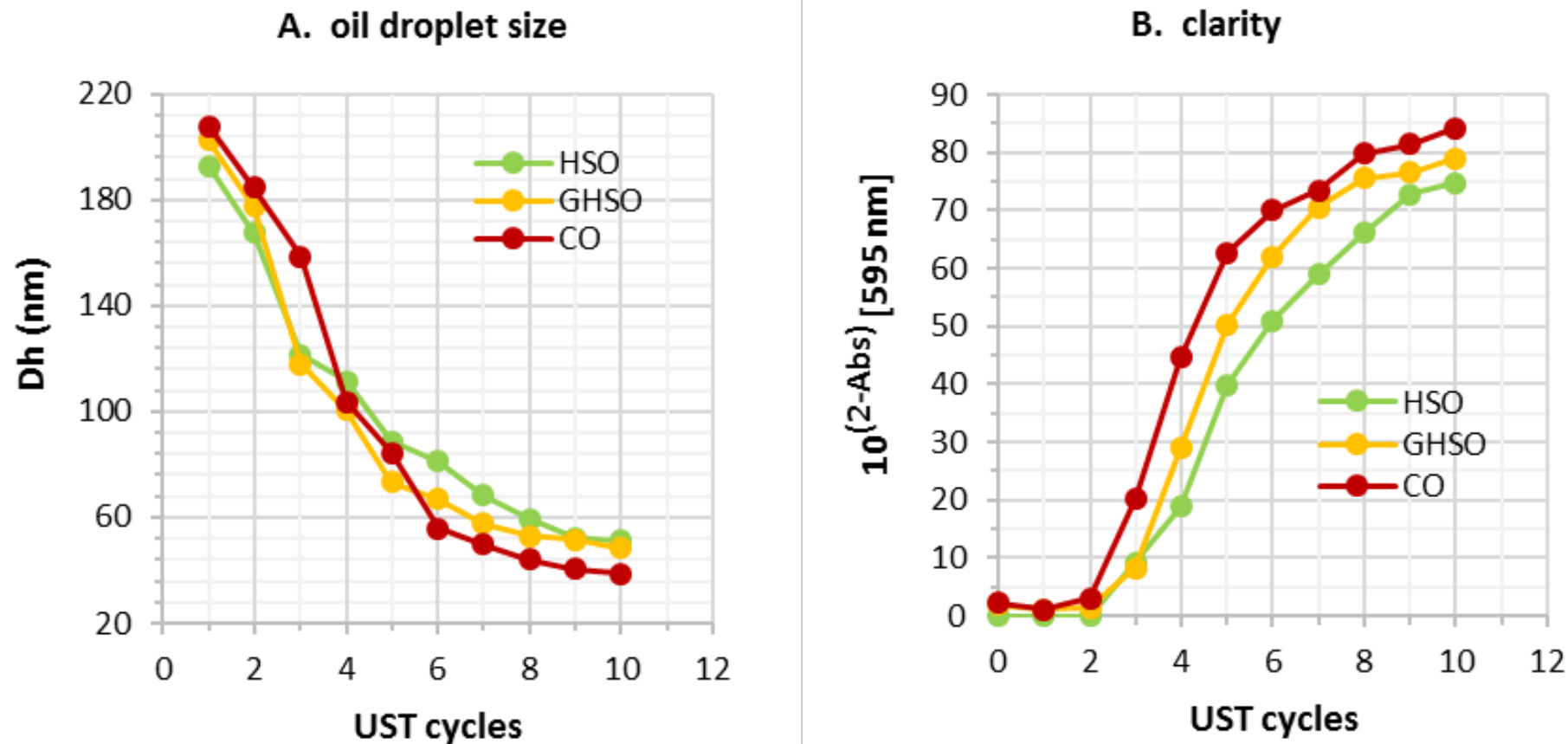


Figure 1. Characterization of CBD nanoemulsions formed using camelina oil (CO), hempseed oil (HSO), and golden hemp seed oil (GHSO). **(A)** Mean hydrodynamic diameter (Dh) of oil droplets measured by DLS. Camelina oil (red) produced the smallest oil droplet size in the fewest UST cycles and had the highest clarity. **(B)** Clarity of CBD nanoemulsions quantified by UV/Vis spectroscopy.

UST CBD Nanoemulsions

A revolution in blending oil and water

Conventional Emulsion

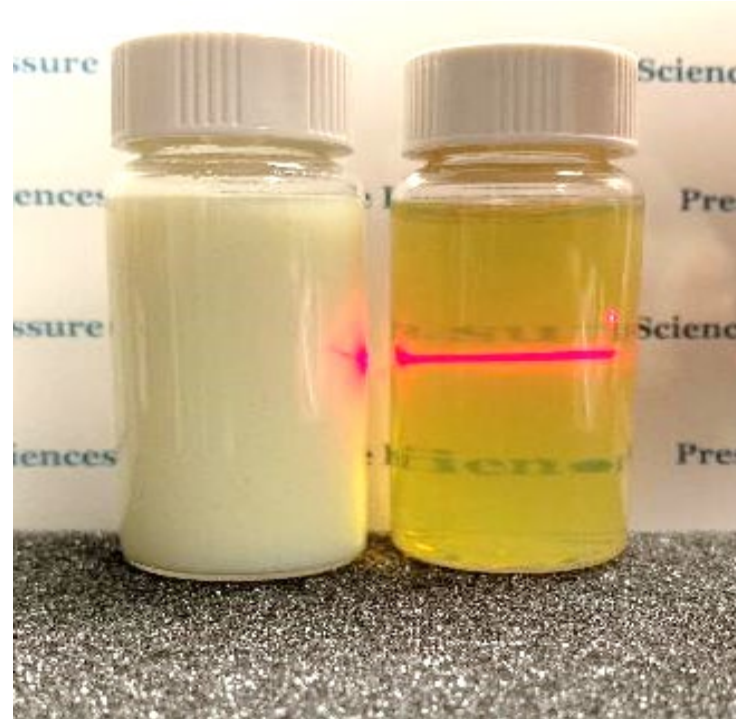
10% oil in deionized water
9% Polysorbate 80 (emulsifier)
20 passes @ 40 kpsi
Typical homogenizer (~200 nm)

Poor:

- Absorption
- Bioavailability
- Stability

Conventional
Process
CBD Oil

UST Process
CBD Oil
Day 0



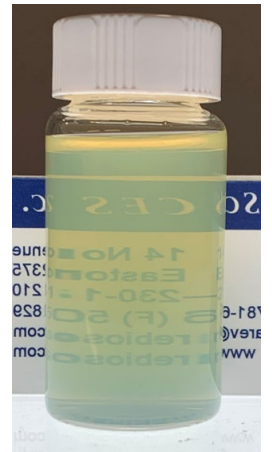
UST Nanoemulsion

Identical formulation
6 UST passes @ 40,000 psi

RESULT:
Transparent suspension
~50 nm droplets

Greatly increased:

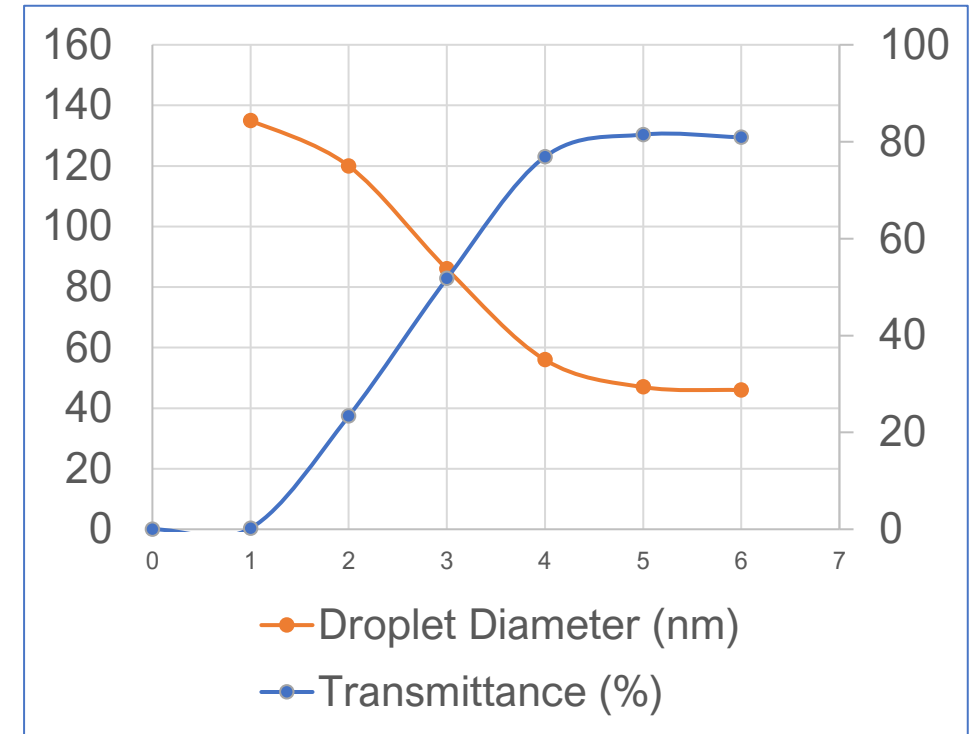
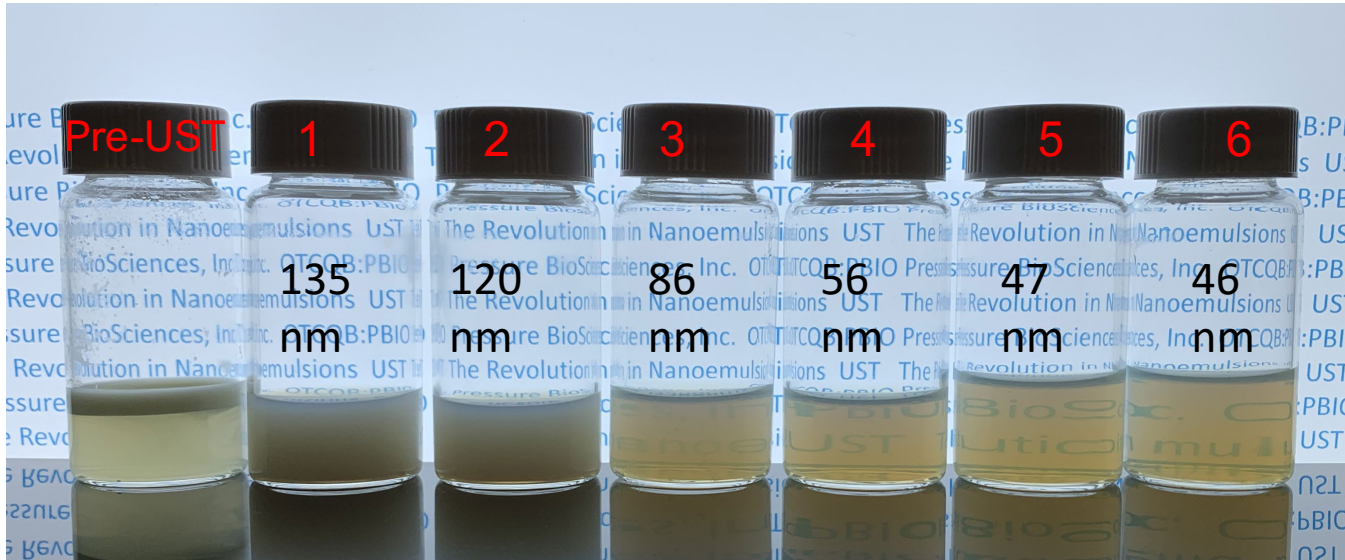
- Absorption
- Bioavailability
- Stability*



Day 730!

**UST nanoemulsion of CBD Oil remains stable after 24 months of room temperature storage*

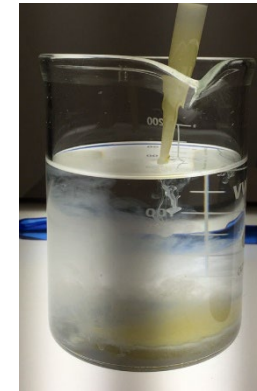
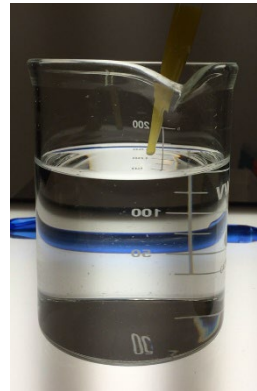
UST Process allows to “dial in” desired droplet size and clarity.





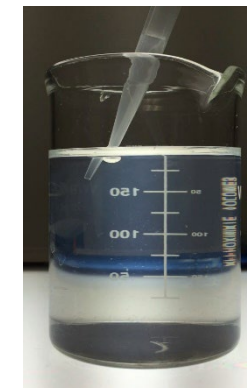
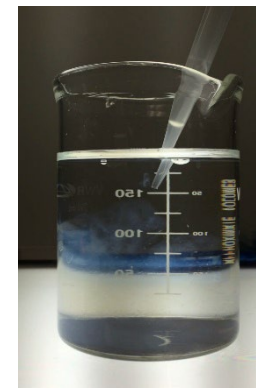
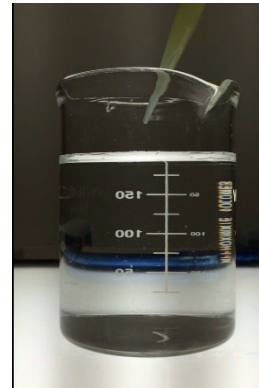
Oil & Water DO Mix – with UST Processing!

**“Water
Soluble?!?”
CBD*
Formula
Commercially
Obtained**



“-” UST

**UST-
Processed
CBD*
Formula:
PBI**



“+” UST

**same amount of CBD*

UST Platform: Unique, Patented, Revolutionary & Commercially Available (Q4 2022)

During 2022, we have successfully nanoemulsified the following oil-based active ingredients.

- | | | | |
|---|--------------------|---|---------------------------|
| ● | CBD | ● | THC |
| ● | Astaxanthin | ● | Curcumin |
| ● | Algae Oil | ● | Neem Oil |
| ● | Prednisone | ● | Vitamin C (lipid soluble) |
| ● | Retinol (Vit. A-1) | ● | Retinoate |

We have yet to find an oil-based molecule that we could not successfully nanoemulsify.

Pivotal Change in Business Strategy (2023): UltraShear 90% of PBIO's Effort

- Toll Processing Center for UltraShear Nano CBD/nutraceuticals/cosmeceuticals bulk
- Partners to vial, label, sell, and distribute final material from PBIO's bulk – their product
- *First nano-CBD product: 100% plant-based reagents used to process the nanoemulsion*
- Global “Best-in-Class” Nano-CBD – as determined by academic KOL (manuscript pending)
- PBIO expected to close 6-plus UltraShear contracts in 2023 (total revenue forecast of \$4M)
- PBIO partnering with Dr. Denese Skin Science, QVC icon with \$500M sold over 20 years
- PBIO to mfg. & Dr. Denese to sell (QVC) next generation skincare products by/before Q4 2023

Long-Term Collaboration Between PBI & Dr. Denese Skin Science

December 4, 2022
Personal Correspondence

“I have NEVER encountered such a profound tightening and wrinkle reducing effect as I found with the PBI nanoemulsified Retinoate serum...even compared to my best, already effective serums, the PBI product far exceeded anything I have ever seen. Nanosizing with UltraShear™ really works!”



DR.
DENESE
SKINSCIENCE®

Dr. Adrienne Denese, M.D., Ph.D., President

Long-Term Collaboration Between PBI & Dr. Denese Skin Science

October 26, 2022
PBI Press Release

"The most-requested addition to our product line is an effective intervention for age-related hair loss in men and especially in women. I believe that UltraShear will enable us to introduce our first-ever hair loss prevention/hair restoration product line within a year!"



DR.
DENESE
SKINSCIENCE®

Dr. Adrienne Denese, M.D., Ph.D., President

UST News - 2023

April 26	PBIO Updates Rapid Progress on Limited Offering of Exclusive THC Licenses
April 21	PBIO Unveils Powerful THC Market Exclusive Licensing Opportunity
April 14	(i) Add'l THC Marketing Study; (ii) Academic Publication Due Soon - "Best-in-Class"
April 18	Expansion into Strategic Mfg. Space with Premier Process Tech Company
April 6	PBIO & NutraLife Biosciences to Partner: Next Generation Nutraceuticals
March 22	PBIO Receives \$1.5 Million Contract for UltraShear™ Nano-CBD
Jan 27	PBIO & One World Pharma to Develop CBD-Nano Sports Perf/Recovery Drink
Jan 19	Dramatic Consumer Testing Results Reported for UltraShear Nano-THC Oral Spray



PCT

Pressure Cycling Technology

Biomarker Discovery and
Diagnostics Products



**Baro
Fold**

BaroFold Technology

Bioprocess Development Products & Services



UST

Ultra Shear Technology

Nanoemulsion Technology | Equipment and
Formulation Services

Thank You!

PBI has announced its intention to up-list in 2023. Under NDA, the Company would be pleased to discuss plans already in place to achieve this goal.