

Encapsulated CBD/Algae/Coffee Oil at 150um



RMANNCO, INC.

**Microencapsulated CBD,
Astaxanthin and Coffee
Oil in Matrix (CBD
Powder)**

CBD Extracts from Cannabis Sativa

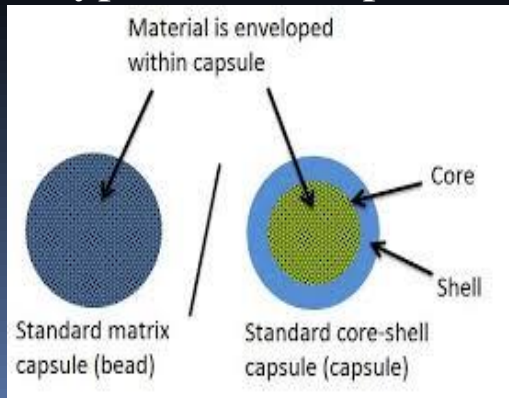
- **Introduction**

- In the United States and Canada the cannabis industry is experiencing explosive growth. Both recreational and medical markets are expanding at alarming rates and this growth of legal cannabis markets is driving rapid sophistication of processed products across multiple consumer areas. Users are increasingly discerning about the effectiveness, taste, smell, and texture of cannabis edibles and beverage products, as well as the reported benefits of making CBD part of the regular health maintenance routine. Additionally, a 'smarter consumer' is looking for a higher value for the dollar which occurs in products as 'value-added features'. An example of this can be found in the form of a popular brand of 'Vitamin Water' which contains trace amounts of selected vitamins, like B-12, at virtually no cost to the consumer. Development of new, high-energy sport drinks now contain CBD hemp oil, infused with algae. These have a range of potential health benefits and uses, including reducing pain, soothing anxiety, fighting cancer, improving mood, eliminating depression, preventing inflammatory arthritis, protecting the immune system, balancing the metabolism, aiding sleep disorders, and healing the skin, among others. CBD oil can also be used in many ways and has a variety of applications for natural health regimens.

How CBD from Hemp and Algae Works.....

- As the cannabis and health food markets developed so too did the need for a method to meter cannabinoids in edible products.
- Currently there is no production method standardized or mandated for use across the industry to ensure accurate measurement of CBD, THC, terpenes, and other essential oils from the cannabis plant used in processed products.
- Although this fact may raise concerns among some government agencies, because CBD is derived from natural plant material approved for human consumption by the US Department of Agriculture, CBD remains outside the purview of the FDA. The same holds true for algae which is very high in protein and vitamins. This fact opens multiple marketing avenues to virtually anyone who desires to market a product containing plant-derived compounds.

- **Typical Microcapsule**



- **Encapsulated strains of Algae**



How Cannabinoids Work

Please take a moment to view the video in this link

<https://www.facebook.com/mcwoods1986/videos/10103127797193257/?t=44> and familiarize yourself with the chemical pathway of CBD as shown in the rendering below.

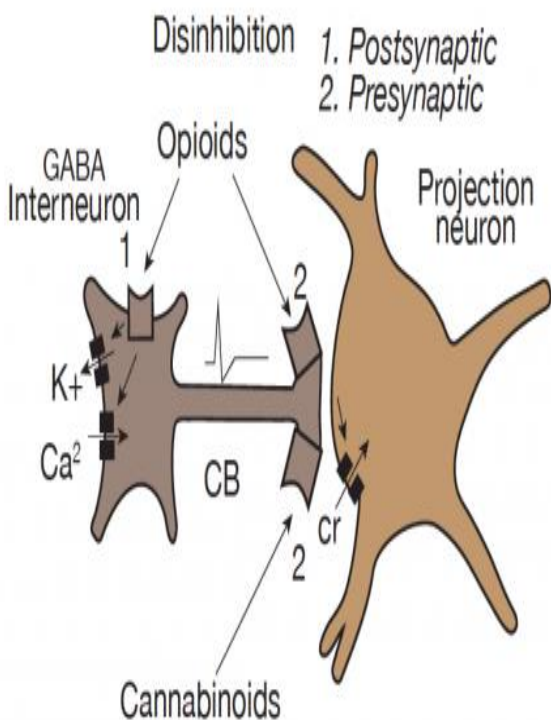


Figure 3. Opioids work by reducing the inhibition of the descending pathways. Opioids activate mu-opioid receptors (G-protein coupled receptor), which inhibit Ca²⁺ inflow (presynaptic) and enhance K⁺ outflow (postsynaptic). Overall, this reduces the firing of the GABA interneuron and reduced GABA release. Cannabinoids activate CB1 receptors presynaptically to also reduce firing of the GABA interneuron. Ca, calcium; CB1, cannabinoid receptor type 1; GABA, gamma-aminobutyric acid; K, potassium

How Cannabis Works



Endocannabinoids
(Brain Derived)

Foods: Omega-3s & Omega-6s

Anandamide (AEA)



Phytocannabinoids
(Plant Derived)

Buds, Tinctures, Extracts

THC, CBD, CBN, etc.



Synthetic Cannabinoids
(Pharmaceutical Lab)

Patented Synthesized Compound

THC-only (Marinol)

Endocannabinoid Receptors
(Brain Receptors)

CB1, CB2, etc.

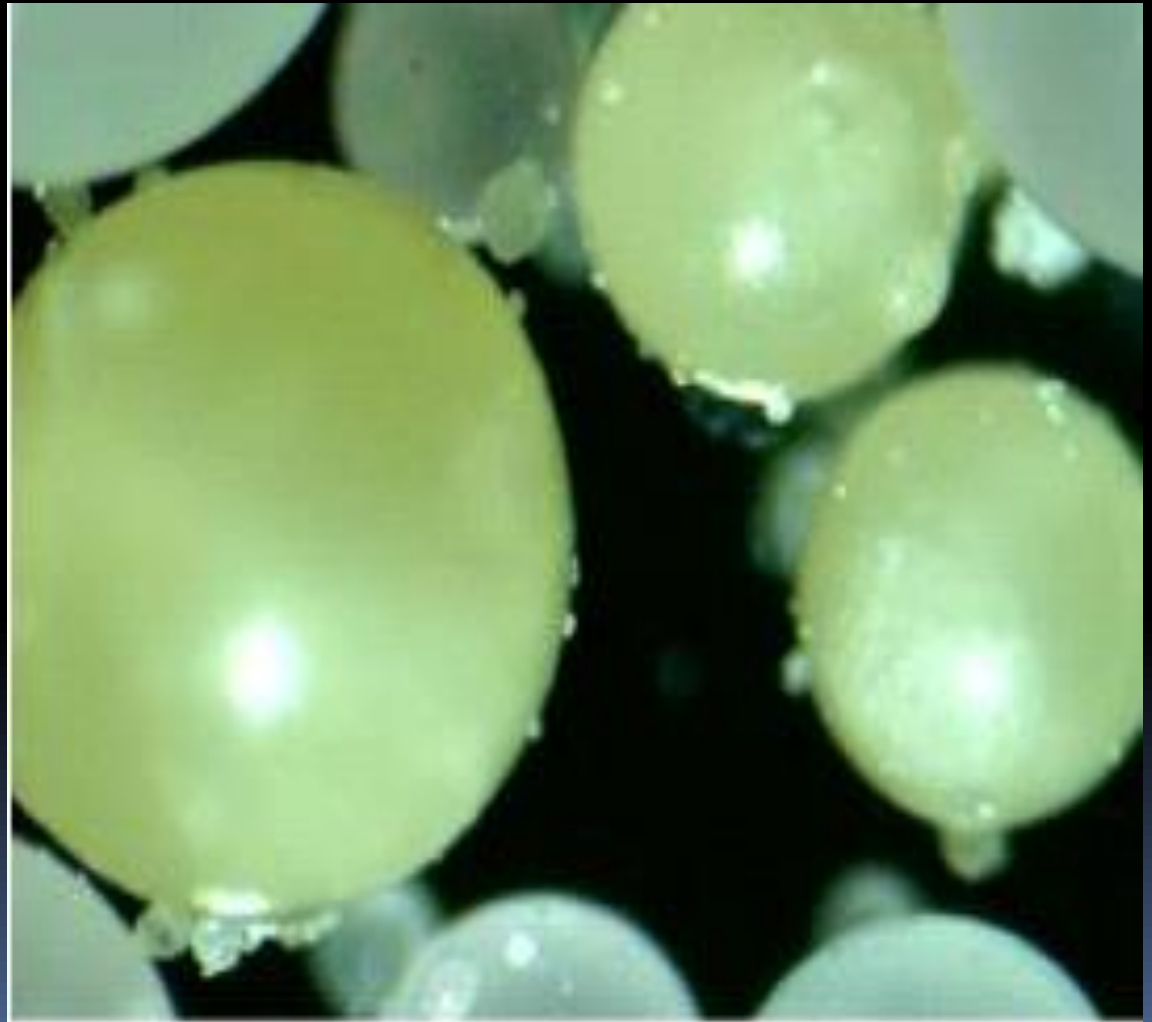
The endocannabinoid system (ECS) is involved in regulating a variety of physiological processes including appetite, pain and pleasure sensation, immune system, mood, and memory.

RMANNCO's Proprietary Formulations

- RMANNCO has developed a revolutionary method to stabilize oil and water in a variety of functional matrixes. In doing so we place, preserve, stabilize, and allow for pharmaceutical grade measurement of cannabinoids. These can be combined with Algae.
- The method RMANNCO uses is called 'Coplanar/Coaxial Microencapsulation'. Manufactures are produced along two distinctly different planes and along two different axes. This allows creation of manufactures with multiple layers/matrixes.
- We use edible waxes in combination with other food-grade, FDA-approved OTC compounds, including sugars, starches, fats, and phase-change materials, to encase and encapsulate insoluble oils and water in order to preserve the product by isolating it from oxygen, increase effectiveness (or bioavailability), and to allow for the accurate measurement of CBD content (mg/ug) by weight.
- Our encapsulation process allows a manufacturer to produce a consistent product year after year with no variation in taste, effect, or texture while improving shelf life by preserving actives and protecting same from oxidation.

CBD oil does not contain the psychoactive compound, *tetrahydrocannabinol*, called, “THC”

We prefer to use 100%, all-natural, Non-GMO, Certified-Organic Beeswax which contains 22% natural plant protein, with anti-microbial properties, that extends shelf life for more than two years. The body utilizes manufactures more efficiently due to improved bioavailability a benefit of smaller size. Also, our product contains Pinembrocic, a cancer-fighting antioxidant not found in any other natural food product.



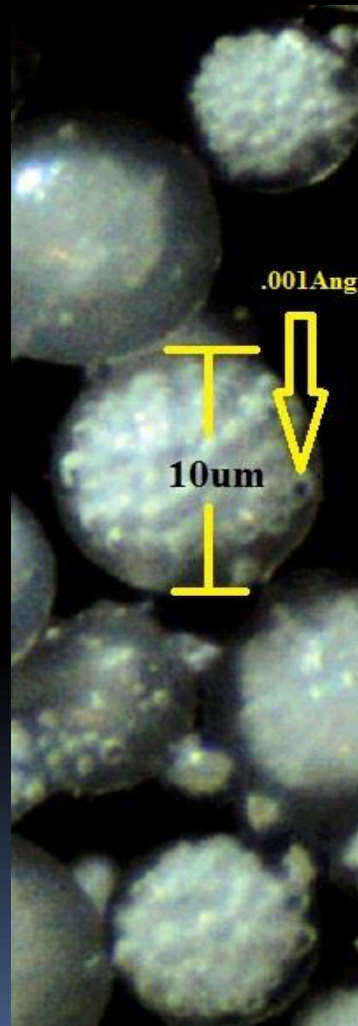
Benefits of Microencapsulation

- *Encapsulation of active ingredients affords important and highly desirable product properties:*
- Product stability results in prolonged shelf life
- Pharmaceutical precision in measurement of Encapsulated active ingredients/products
- Consistency across product batches
- Improved bioavailability (of encapsulated cannabinoids and other nutraceuticals)
- Simplifies formulations (mixing of oils, resins, solids, distillates, flavorings, and crystalline compounds)
- Encapsulation materials can be specified to create desired product parameters e.g., 1~10,000 micron capsule sizes
- Odors are enrobed in the product matrix sic, "masking"
- Oils and water can be 'made to mix' in a stabilized dry-powder matrix resulting in a product that '*Pours like Sugar™*' and can be made to any flavor desired (even Mint or 'Cool-Mint'!)

We provide microencapsulation services customized to your product requirements, liquid, solid, crystals, or gas

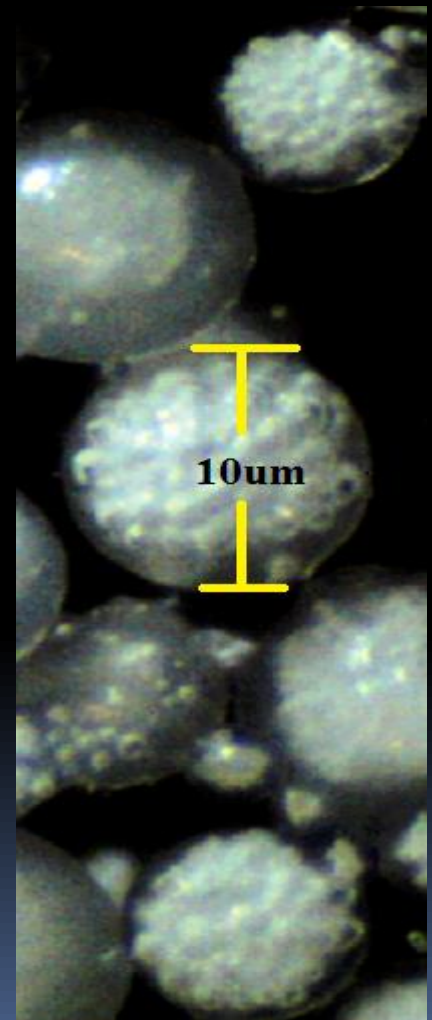
Beeswax micro-capsules @ 150 microns

Our pioneering proprietary process provides precise quantification of the actives material, once encapsulated, resulting in precise dosing capability per industry standards. The matrix of manufactures, comprising the shell wall, meso-matrix, and core, can be structured to enable other product features, e.g., adding flavors, masking strong odors (for delivering probiotics, terpenes or fish oil), or by adding enrobed vitamins (A, B, C, D3, etc.) with unlimited combination options.



10um Microsphere containing + or - 200 Nanospheres that are .001 Angstrom Units in Diameter

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If RMANNCO develops a new product for the Vendor, the Vendor owns all rights to the new IP!

Quick Reference Guide to RMANNCO's Powdered CBD (Oil)

RMANNCO can create particles as small as one micron, or as large as a paintball. We formulate a variety of FDA approved components, used to create edible waxes, comprising the phase-change medium used to create microspheres, that are matched to your specific product specifications. RMANNCO welcomes the opportunity to collaborate with companies to develop new IP products based on its proprietary, trade-secretive microencapsulation process.

| Wax | Use |
|------------------|--|
| Natural beeswax | Rapid bioavailability for ingestion, sublingual, or topical |
| Time release | Consistent delivery over periods up to 12 hours, or target release in the intestines, so that deliverables are not degraded by stomach acids |
| High temperature | Protects cannabinoids baked in edibles from burning or degrading, by shielding deliverables until baking is finished; assures consistent, effective dosing |
| Large format | Creates large spheres with a specific dose; this is an alternative to gel caps, capsules, and tablets or in beverages in 'powdered form' |

See how we make CBD Powder:

<https://youtu.be/ad97Rl5RKmU>

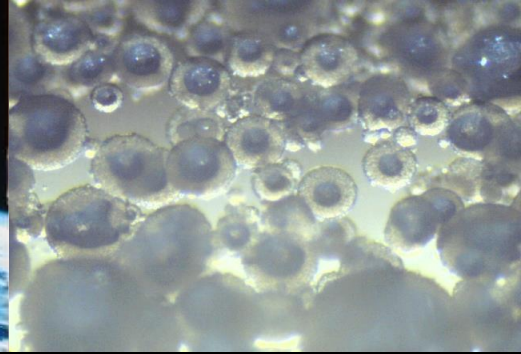
- Regardless of the complexity of desired formulations, any combination of cannabinoid, algae strains and nutraceuticals can be configured precisely to meet product parameters and delivery specifications.
- Product appearance, color, taste, smell, are maintained, as well as consistent, reliable potency of actives (CBD/THC/Nutritional).



Algae Biofloculation Unit



Cannabis Crop and Honeybees



Products can be custom packaged for adding to medical products, sports nutrition food and beverages, and for cooking (as with spices/ flavorings), eliminating problems associated with oils, distillates and product potency breakdown due to heat encountered during cooking processes.

RMANNCO's microencapsulated manufactures are not recommended for inhalation use, e.g., in 'Vape-Pens', etc.

RMANNCO's proprietary method of microencapsulation is well suited for encapsulating biologicals, pharmas, flavorings, probiotics, pigments, paints, etc., and can be engaged at any point along the production line to reduce production costs (sieving, drying, etc.), eliminating costly processing steps, and help to increase product quality and profitability.



Microencapsulation: The Optimal Delivery System for Cannabis Extracts


*Abstract

Recent advancements in extraction and purification methods have resulted in the production of cannabinoids with higher purity indexes for use in both medical research and the cannabis edibles and beverage industries. Once CBD/THC compounds have been extracted these must be stabilized and protected from oxidation, Uv corruption and from environmental conditions that breakdown compounds preventing prolonged shelf life. A novel method of producing CBD/THC nanospheres and nano-emulsions containing algae, using starches, sugars or fats and water so that powdered CBD/THC/Algae can be used to create unique food and beverage products and to control dosing in beverages and edibles.

*Excerpt from Paper presented by Dr. Resnick at Controlled Release Society Proceedings, Boston, MA, July 2017

*Cannabinoids, like THC or CBD, are encapsulated using sugars, or starch with modified lignin, carbohydrates, fats or oils, and become very stable. Likewise, selected algae strains with zero carbon footprint are formulated. As a result, nanoscopic-sized cannabinoid droplets bond (during manufacture) and become stable. Sugar-starch-oil nanospheres can then function to dissolve in liquids and deliver actives, e.g., vitamins, phytochemicals, etc.

Nanosopic sugar-starch-oil cannabinoid droplets can melt in liquids or be released in food matrixes to create special foods or flavors. In one configuration sugar-starch-oil nanospheres can dissolve in liquids while another configuration allows active release at specific temperatures or altitudes. A novel method of microencapsulating CBD and TCH compounds has been reduced to practice utilizing the coplanar, coaxial microencapsulation methodology first reduced to practice as a “NASA Spinoff” technology during space shuttle mission’s STS-41 and STS 43 resulting in production of the first commercial microspheres in space. Unlike conventional, costly and complicated mechanical methods of microencapsulation, e.g., fluid bed deposition, ion/cation production, phase-pulsed and coascervative spray methods that result in production of



asymmetrical (xenophobic) manufactures in a perpendicular drop column, the coplanar/coaxial process is based on Astrophysics and employs all-natural phase change materials, e.g., waxes, sugars, starches, which are dispersed along coplanar/coaxial elliptical pathways to create uniformly-shaped, near-perfectly rounded excipient manufactures in sizes ranging from $<1\mu\text{m}$ to $>5000\mu\text{m}$ in the gravity conditions on earth. Results of experiments to date are discussed demonstrating successful nano-encapsulation of CBD oils using starches/sugars/fats. CBD/THC extracts can be formed into nanoparticles for use in creating nano-emulsions which can be used to create new dose-controlled components for foods, beverages adjuvants, tinctures and higher quality edibles.

End

*Paper presented by Dr. Resnick at Controlled Release Society Proceedings, Boston, MA, July 2017

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