



**Avantex**

**A Nanotechnology Platform  
for Applications in Cannabis  
Recreational and Medical  
Products**

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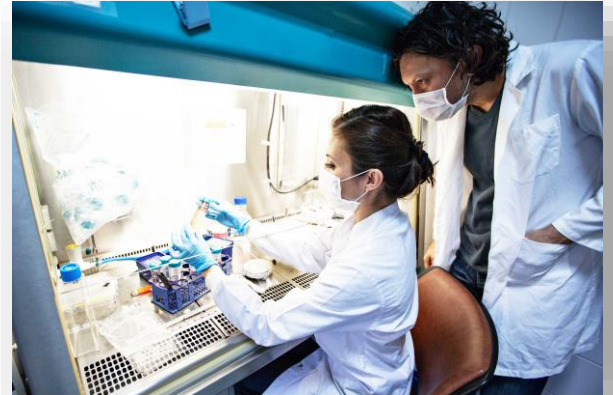
# Introduction to Avantex Biotechnologies

Avantex's Acufilic™ is a ground-breaking nanotechnology drug delivery system (DDS).

It was originally developed by our team of experienced scientific researchers to improve medical therapeutic and diagnostic outcomes.

Avantex's Acufilic™ is now being adapted for the delivery of Cannabis THC and CBD providing the following advantages:

- Food grade material FDA approved
- Slow release time
- Water soluble
- Masks the taste of Cannabis
- Streamlined manufacturing process





# Introduction to Cannabis Applications

## New Cannabis Formulations

- Enhancing Cannabis bioavailability through the development of long-term gradual release formulations, providing efficient treatment for chronic diseases.
- Infusing Cannabinoids into beverages without impacting the taste of the final products, thus avoiding the side effects found with smoking and vaping.
- Infusing Cannabinoids into creams and gels for topical applications.
- Cannabis-based medical products including gel caps and sprays providing other forms of non-smokable and non-combustible products.



# Challenges for Cannabis Beverage Applications

## Challenges

- **Onset Time**
- **Unpleasant taste**
- **Not water soluble**
- **Unpleasant odour**
- For beverages, unlike alcohol which is water-soluble and easily absorbed into the bloodstream, Cannabis is not water soluble and dosage timing is difficult to control.
- The challenge is to produce a Cannabis drink that has controlled release of THC creating a “sessionable” beverage, where one can have two or three drinks over a few hours, perhaps with friends drinking alcohol, while enjoying a steady, moderate high.

*Source Bloomberg:  
[Scientists Are Racing to Make Weed As Easy to Drink as Beer](#)*



# Solutions for Cannabis Beverage Applications

## Beneficial Solutions

- **Cost effective**
- **More effective**
- **Lower dosage**
- **Lasts longer**
- Avantex's Acufilic™ DDS is amphiphilic (hydrophobic and hydrophilic) and will easily encapsulate the THC and CBD in the water phase.
- Acufilic™ is made from CHC, a FDA approved food-grade nanoparticle natural polymer.
- Acufilic™ provides the benefit of controlled slow release of the psychoactive THC thus avoiding overdoses. It also masks Cannabis' unpleasant taste.



## Cannabis-Infused Beverages

Beverages are one of the most exciting consumer goods with strong growth potential:

- Coca-Cola Is Eyeing the Cannabis Market  
*Source: [Bloomberg Deals – Coca-Cola Eyeing Cannabis Market](#)*
- Corona Beer-Maker Constellation is spending \$3.8 Billion(C\$5B) to boost its stake in Canadian Cannabis grower Canopy Growth Corp.
- Molson Coors Brewing Co. has started a joint venture with Hydropothecary Corp. to develop non-alcoholic, Cannabis-infused beverages for the Canadian market.
- Heineken's Lagunitas craft-brewing label has launched a brand specializing in non-alcoholic drinks infused with THC, the active ingredient in Cannabis.  
*Source: [Fortune – Corona Beer Invests \\$3.8 Billion in Cannabis Grower](#)*





## Cannabis-Infused Beverages

Cannabis infused beverages are poised to be the next big thing. These drinks are coming into the mainstream from the sub cultured shadows. Many brands and breweries have started developing assorted drinks with Cannabis as an ingredient.

*Source: [Drinkpreneur, Beverage Business for Entrepreneurs](#)*

Cannabis provides a new opportunity for drink makers looking for the next trend in consumer tastes, especially as legalization spreads across the United States and new Cannabis users look for more social ways to consume.

*Source: [Cannabis Is the Next Beverage Trend](#)*





## Recent Growth of Cannabis Delivery Systems

### Innovative Cannabis Delivery Technologies on the Rise: Aphria, Tilray, Aurora, and Canopy Growth

In 2018 larger Canadian Cannabis companies have been investing heavily in new Cannabis delivery systems, to provide safer, alternative cannabinoid delivery.

- **Aphria Inc. (NYSE: APHA) Market Cap: \$3.263 B** – Signs exclusive agreement with Rapid Dose Therapeutics, RDT, a Canadian bio-technology company providing innovative, proprietary drug delivery technologies.
- **Aurora Cannabis Inc. (NYSE: ACB) Market Cap: \$7.262 B** – Acquires equity stake in CTT Pharmaceutical which developed a patented drug delivery method for dissolving under the tongue.
- **Tilray, Inc. (NASDAQ: TLRY) Market Cap: \$11.056 B** – Forms exclusive alliance with Sandoz Canada to be exclusive collaborator on non-smokable or non-combustible Cannabis-based medical products such as gel caps and sprays.
- **Canopy Growth Corporation (NYSE: CGC) Market Cap: \$14.357B** – Acquires Colorado based ebbu, Inc. for \$285MM plus \$100MM performance bonus – a producer of Cannabis products including clinically studied water-soluble cannabinoid technology formulated to produce a fast acting, consistent and precise consumption experience. *Source: [Innovative Cannabis Delivery Technologies on the Rise](#)*

## The Cannabis Market Size

- The medical Cannabis market in the United States was worth \$4.7 billion in 2016 and is expected to grow to \$13.3 billion by 2020.
- The global market for Cannabis was valued at \$9.3 billion in 2016 and is projected to reach \$146.4 billion by the end of 2025.
- In addition, the industry is witnessing a surge in demand for Cannabis. In 2018, the demand for Cannabis in the United States alone was \$52.5 billion. The annual retail sales of Cannabis are expected to reach \$8 billion to \$10 billion by the end of 2018.
- With Canada's upcoming legalization of recreational use of Cannabis at the federal level, total annual Cannabis sales in Canada are also projected to reach \$10 billion and expand at a CAGR of 66.8% between 2017 and 2025. *Source: [Grand View Research – Legal Marijuana Market Worth \\$146.4 Billion by 2025 | CAGR: 34.6%](#)*

**\$13.3B**

**\$146.4B**

**\$52.5B**

**\$10.0B**

## Business Model

- Partner and collaborate on Cannabis-infused beverages
- Licensing arrangement for recreational and medical Cannabis applications
- Co-development partnership and alliances with pharmaceutical companies and commercial partners
- Licensing technology post IP value creation





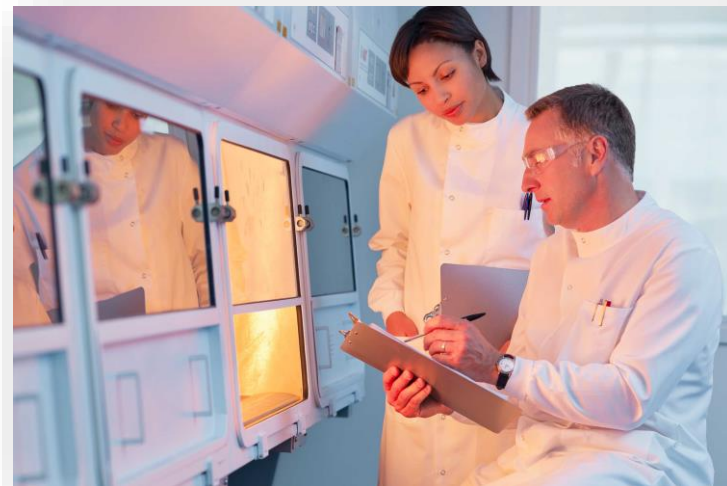
## Exclusive Licensed Patents

### IP DEPLOYMENT

- Taiwan, Japan, USA, China

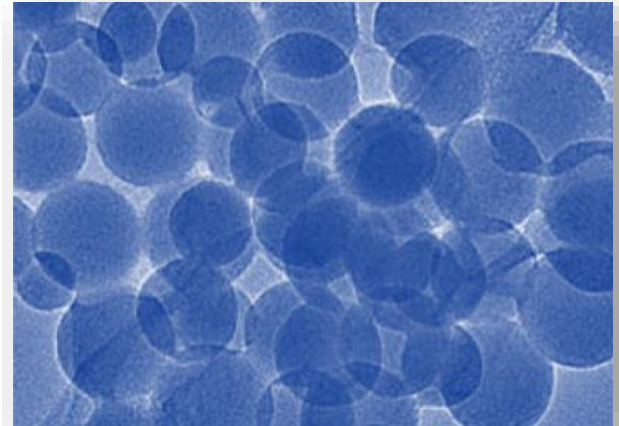
### IP CLAIMS

- New drug-formulations
- Nanodrug carrier
- Dual-drug co-delivery systems
- Thermo-sensitive gel
- Dual-drug carried solution
- Long-term slow-release system
- Targeting and MR imaging molecules



## Characteristics of the Avantex Nanoparticle

- Avantex Acufilic™ Chitosan-based natural polymer (food grade) FDA approved
- Size of Particle: 5 – 50 nm in diameter
- Amphiphilicity: Chitosan modified with hydrophobic and hydrophilic side groups in a specific ratio
- Self-assembly Capability: Self-assembling into nanoparticle in natural water
- High Drug Encapsulation Efficiency: Single drug: 92% to 98%
- High Stability



# One Pot Synthesis Manufacturing Process

## Easy to Manufacture

- Water soluble
- Produced in a one-pot synthesis
- Produced at room temperature
- Natural pH value making it easier to control variables

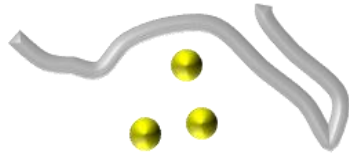


Keeps ingredient activity

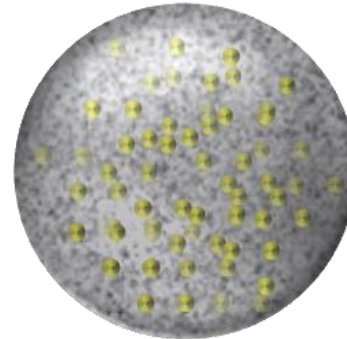
Easily mixed into water or any beverage

**Acufilic™  
Polymer**

**Cannabis**



**Self-assembly**





## Core Technology – Multifunctional Nanoparticle Platform

Avantex's Acufilic™ core technology features:

- Amphiphilicity – hydrophobic and hydrophilic
- Water soluble – ideal for Cannabis beverages
- High drug encapsulation efficiency – over 90%
- Excellent biocompatibility and bioavailability
- One-pot synthesis, manufacturing process @ room temperature
- Control / slow release
- Various formulations – Injection, oral, inhalation, gel and dressing

*Source – Springer:*

*Enhancement of Bioactivity and Bioavailability of Curcumin with Chitosan Based Materials*

**Water  
Soluble**

**90%  
Drug  
Encapsulation**

**Slow  
Release**

## Avantex Acufilic™ – Additional Platform Applications

### **New Eye-care Gel**

- Thermo-sensitive gel with long-term slow release property is a suitable device for eye care.

### **New Contrast Agents**

- Improved MRI applications resulting in increased sensitivity and lower toxicity.

### **New Anticancer Formulation**

- Avantex's Acufilic™ proprietary platform provides an efficacious therapeutic strategy that lowers required dosage, lowers toxicity, and considerably reduces the side effects
- Improving cancer treatment efficiency: Avantex's formulation provides ½ ED50 dose from conventional drug
- Reducing toxicity: No toxicity is found with Avantex's formulation with the LD50 of conventional drug
- Used with new anti-cancer drug molecules being developed by collaborative partners including Johns Hopkins University and Harvard University.

## Properties for Cannabis

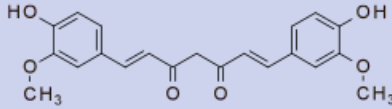
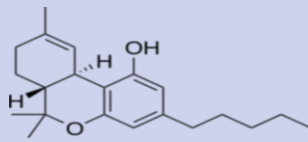
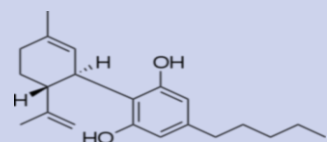
	CBD	THC
Produce a “high”	No	Yes
Side effects	Almost none	Psychoactive side effects
Shows on drug test	Yes	Yes
Pain reliever	Yes	Yes
Reduces nausea	Yes	Yes
Eases migraines	Yes	Yes
Reduces anxiety	Yes	Yes
Increases appetite	No	Yes
Decreases seizures	Yes	No
Anti-inflammatory	Yes	Yes

Source: [CBD vs. THC: What's the Difference?](#)



## Comparison of Curcumin and THC/CBD

Avantex has not done tests on Cannabis, however we have done tests on Curcumin. Curcumin has similar properties and chemical structure to Cannabis as shown below.

Properties	Curcumin	THC Tetrahydrocannabinol	CBD Cannabidiol
Chemical Structure			
<b>Formula</b>	<b>C<sub>21</sub>H<sub>20</sub>O<sub>6</sub></b>	<b>C<sub>21</sub>H<sub>30</sub>O<sub>2</sub></b>	<b>C<sub>21</sub>H<sub>30</sub>O<sub>2</sub></b>
Molecular weight (g·mol <sup>-1</sup> )	368.39	314.47	314.464
Water solubility	3.12 mg/L at 25°C	2.8 mg/L at 23°C	12.6 mg/L at 25°C
Bioavailability – oral	5 – 10%	6 – 20%	13 – 19%

## Experienced Team

Avantex Biotechnologies is managed by an experienced and motivated team of professionals with extensive international experience and a broad range of biotechnology industry skills.



**Nikita Chou, MBA, President** – Co-founder of 360 Capital and Special Advisor to the Canadian Securities Exchange. Accomplished and professional international corporate executive and entrepreneur.



**John Gan, Chief Financial Officer** – Founder of 360 Capital, former executive of numerous large international insurance companies. Experienced in capital markets & securities industry.



**Deanmo Liu, PhD, Chief Innovation Officer** – Experienced research scientist, developer of controlled release nanodrug delivery systems. Experienced in nanomedicine and functional materials for improving health.



**Winnie Sun, MSc, Chief Scientific Officer** – Chairwoman of the Sun Group, Canada, Former Head of Chungwa Chemical Pharmaceutical Co R&D Division, Past Chair of Monte Jade Science and Technology Association.

**Ullrich Schade, Vice President, Marketing** – Marketing and branding expert with 25+ years experience as a communications professional and entrepreneur. Former president of American Marketing Association BC & a founder of the Vantec Angel Network.

**Dan Cohen, Vice President, Corporate Strategy** – 20+ years as a business strategist with deep background in science and technology industry. Experienced in investment and capital markets.

**Louis Liu, M.D, PhD, Medical Advisor** – Former head of Chest Division of Chang Gung Memorial Hospital. Specializing in thoracic medicine. Attending chest and severe care expert with 30+ years of experience.

**Wendy Huang, PhD, Research Manager** – Developed new drug formulations, working in cooperation with Harvard University Medical School. Specializing in nanomedicine, molecular imaging for diagnosing and treating cancer



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