Eco Extraction using Hydrodynamic Cavitation and Water

Infinity Turbine LLC

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https://www.infinityturbine.com/hydrodynamic-cavitation-by-infinity-turbine.html

Company Name: Infinity Supercritical LLC
Product: Sonic Extractor Hydrodynamic Extraction
Game changer technology for the industrial extraction industry.
Processor: 2,000 lbs to 300,000 lbs per 24 hours (continuous operation)
Advantages: Fast extraction in under a second for processing large volumes of biomass material to extract oil.
Technology: Extraction of plant oil using water as the solvent. Closed loop.
Machine: Sonic Extractor Model SDR X, Model SDR2000, Model SDR10K, Model SDR50K, Model SDR100K, Model SDR300K,.
Payback ROI: 5 days.
Industry: Botanical oil extraction and cosmetics. Silver nano particles. Quantum dots. Graphene.
Botanical Oil Extraction Uses: Hemp, lavender, algae, Flax, Oregano, Caffeine, flower, Black Seed, Coconut
High Technology Uses: Silver nano particles. Sonochemistry. Fast reactions using water. Water purification. Water filtering. Quantum dots. Graphene.
Machine Features: Silent operation, Compact, Fast return on investment. In situ winterization (removing wax from

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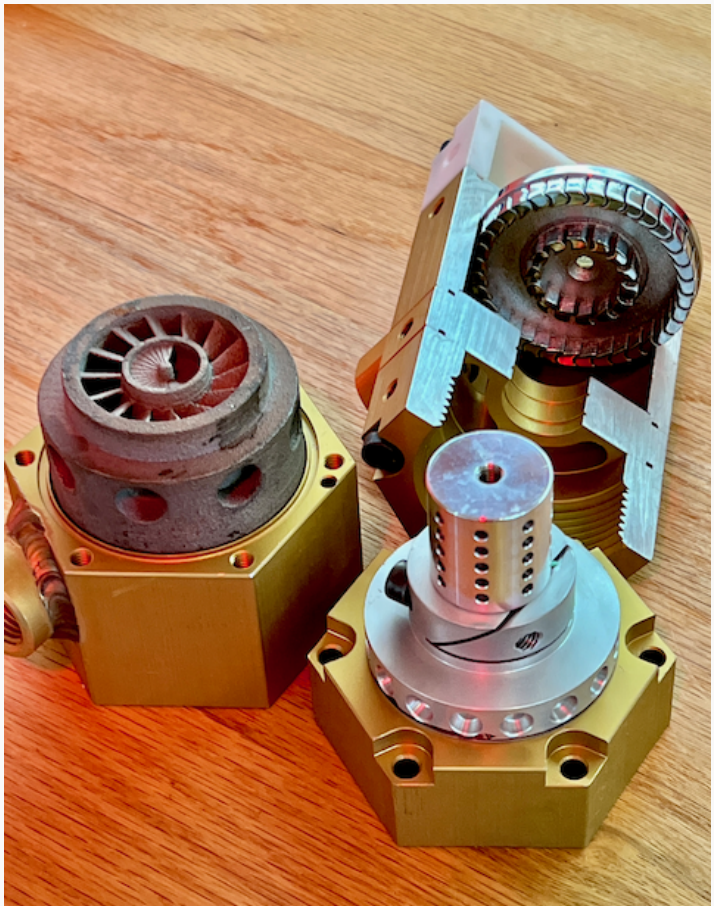
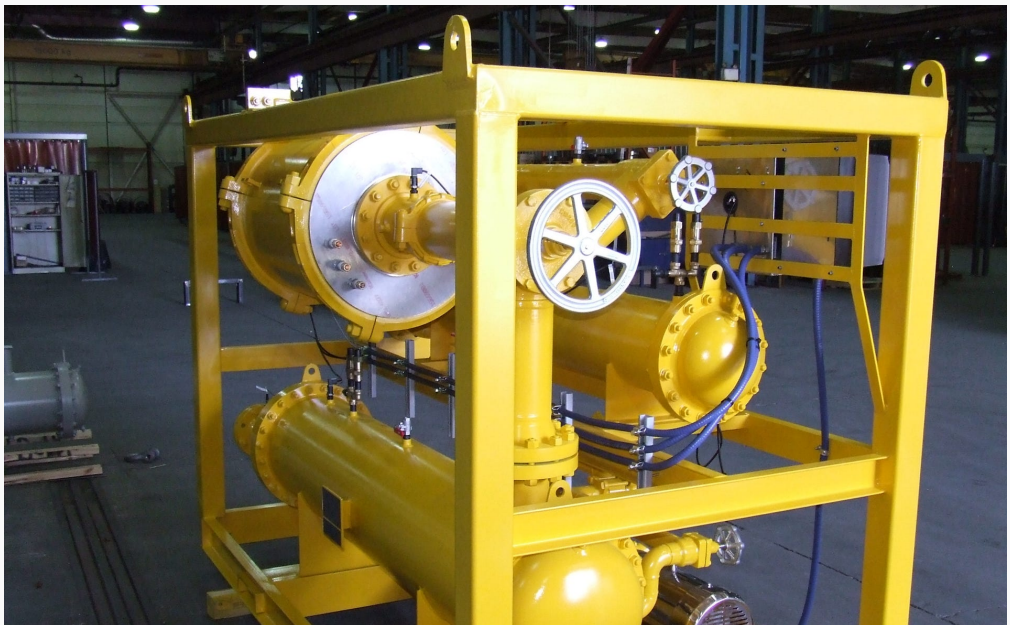
Eco Extraction using Hydrodynamic Cavitation and Water

The challenges with legacy extraction technologies results in long processing times, poor quality product (like ethanol extraction), operator error, and large operating expenses.

The result of our efforts have focussed on push-button controlled aqueous extraction.

Using the SDR (Spinning Disc Reactor) shortens reaction time to just under a second using mechanically rotating discs. What is unique about this process is that you can perform multiple functions with the same technology including extraction, filtration, separation, and flow all using spinning water. Good for botanical processing, producing silver nanoparticles, and more.





Aqueous Turbine Extraction Technology

Infinity is taking extraction to a new level of processing technology for extraction.

Using rotating elements in series allows the processor to do in-line continuous feed extraction, and optional separation, wax removal, distillation, and isolate.

Push-button operation allows inexperienced operators to run this system.

Mounted in standard shipping containers, this plug-and-play system is ready to operate on delivery. Power with 3-phase 480V service.

Since water is the solvent in a closed-loop process, the need for any permitting is reduced or eliminated.

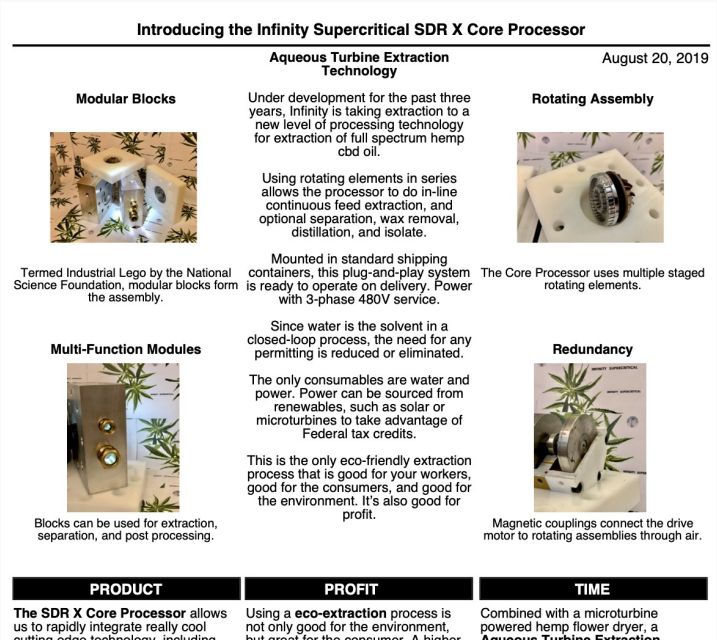
The only consumables are water and power. Power can be sourced from renewables, such as solar or microturbines to take advantage of Federal tax credits.

This is the only eco-friendly extraction process that is good for your workers, good for the consumers, and good for the environment. It's also good for profit.

Using a **eco-extraction** process is not only good for the environment, but great for the consumer. A higher buy price will give you better profit margin on processing.

Consumables (such as slippage, which is a huge cost for ethanol processors) are eliminated, which can virtually pay for a SDR system over time.

Energy sourced from microturbines or renewables, such as solar, make available substantial tax credits for your primary consumable, power. This makes your operation more competitive, compared to other processors.



Introducing the Infinity Supercritical SDR X Core Processor

Aqueous Turbine Extraction Technology

August 20, 2019

Modular Blocks

Termed Industrial Lego by the National Science Foundation, modular blocks form the assembly.

Under development for the past three years, Infinity is taking extraction to a new level of processing technology for extraction of full spectrum hemp cbd oil.

Using rotating elements in series allows the processor to do in-line continuous feed extraction, and optional separation, wax removal, distillation, and isolate.

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Rotating Assembly

The Core Processor uses multiple staged rotating elements.

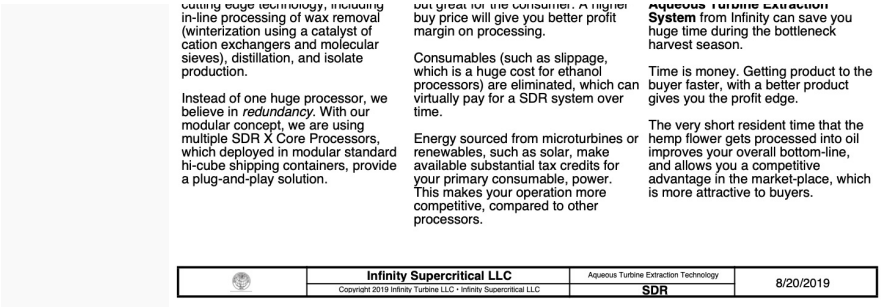
Multi-Function Modules

Blocks can be used for extraction, separation, and post processing.

Redundancy

Magnetic couplings connect the drive motor to rotating assemblies through air.

PRODUCT	PROFIT	TIME
The SDR X Core Processor allows us to rapidly integrate really cool cutting edge technology, including	Using a **eco-extraction** process is not only good for the environment, but great for the consumer. A higher	Combined with a microturbine powered hemp flower dryer, a **Aqueous Turbine Extraction**



cutting edge technology, including in-line processing of wax removal (winterization using a catalyst of cation exchangers and molecular sieves), distillation, and isolate production.

Instead of one huge processor, we believe in *redundancy*. With our modular concept, we are using multiple SDR X Core Processors, which deployed in modular standard hi-cube shipping containers, provide a plug-and-play solution.

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Energy sourced from microturbines or renewables, such as solar, make available substantial tax credits for your primary consumable, power. This makes your operation more competitive, compared to other processors.

Aqueous Turbine Extraction System from Infinity can save you huge time during the bottleneck harvest season.

Time is money. Getting product to the buyer faster, with a better product gives you the profit edge.

The very short resident time that the hemp flower gets processed into oil improves your overall bottom-line, and allows you a competitive advantage in the market-place, which is more attractive to buyers.

	Infinity Supercritical LLC	Aqueous Turbine Extraction Technology	8/20/2019
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Silver Nanoparticle Production 14 USD per gram from botanical sources

Spinning Disc Reactor for Nanoparticle Production to make $24 million per year

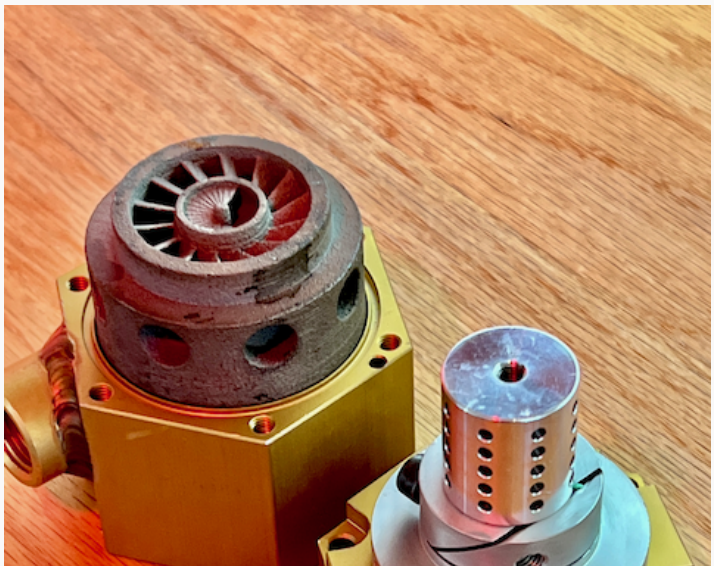
Spinning Disc Reactors, or SDRs, are a very new type of processing unit that has had new applications discovered every year.

A big field of interest as of lately has been process intensification which is a design approach that focuses on smaller, cleaner, safer, and more energy efficient processes. One design that has received considerable attention as of late has been the spinning disc reactor (SDR). Its basic design includes one or more liquid streams being flowed onto a quickly rotating disc.

The centrifugal acceleration from the rotation creates a very thin liquid film which significantly heightens the mass transfer and micro-mixing ability of the liquid streams. It also is a continuous feed reactor which can be applied to many processes that have relied on large volume and high residence time designs like batch or continuously stirred tank reactors (CSTR).

While the SDR can be used for many different processes, it excels greatly in a specific few. These include processes that rely on precipitation and uniformly mixed reactants. These traits allow for SDRs to be used in the bottom-up production of nanoparticles, where particles are created through nucleations and subsequently crystal growth. This is where batch reactors and CSTRs aren't as easily applied due to their high volumes and lack of sufficient mixing ability. Top-down processing where bulk material is ground down into nanoparticles is typically avoided when trying to achieve nanoparticles of a certain size and narrow size distribution due to the lack of control over the process.

Both silver and titanium dioxide nanoparticles have a realized and open market to enter with predicted growth and



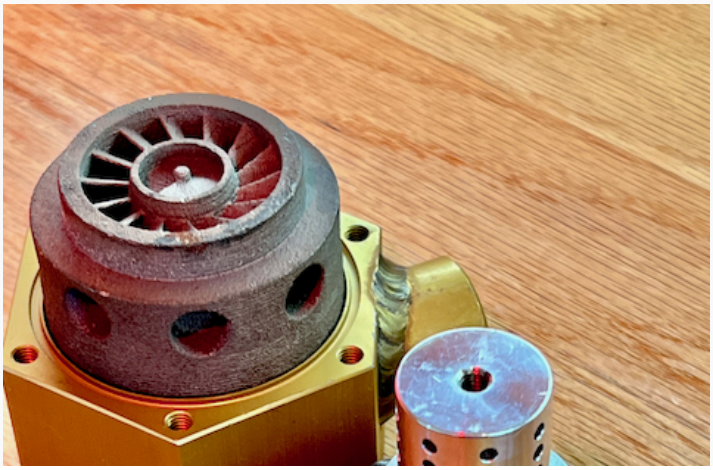
Aqueous Turbine Technology

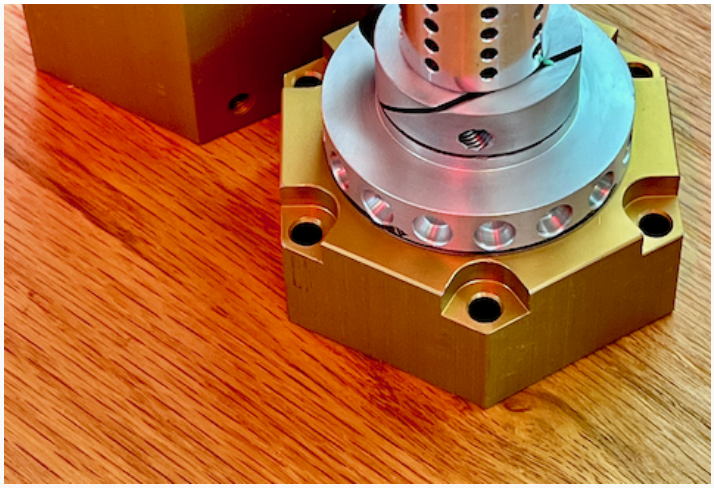
Point-of-use, on-demand, tunable phase change (solubility of botanical in liquid), for water process reactions. The underlying science is hydrodynamic sonochemistry.

The basic concept was developed back in 2004 for the rapid conversion (green chemistry) of liquid CO2 into fuel-grade ethanol, methanol, and butanol.

The same technology can be used for cell lysis (current) and in-situ fractionalization of isolate (future development). The core technology is a series of devices on a common shaft, similar to a air breathing turbine, but this one uses water. Patented.

New technology (since 2021) is pinned disc cavitation. Email us for a detailed analysis.





Advantages

The advantages of a water based solvent and using SDR technology:

1. Eco-Extraction: pure water is used as the solvent.

2. Small Footprint SDR2000: four 20 ft. shipping containers provide a modular extraction facility. Larger extraction systems use 40 ft. shipping containers.

3. Proven Technology: Spinning Disc Reactors and hydrodynamic cavitation is well-proven in the food processing and pharmaceutical industry.

4. No Fire Code Restrictions: unlike high pressure and volatile solvents, water processing extraction has minimal code compliance.

5. GMP: systems are built to GMP standards.

6. Silent Closed-Loop Operation: The extraction system runs with a low audible footprint. The system is closed-loop to conserve water.

7. Most Energy Efficient Extraction System Available: Because water is the solvent, the system is the most energy efficient process in the industry. CO2 requires high pressure (and maintenance prone) special pumps, and some like Apex Supercritical require noisy air compressors.

8. Better Environment for Workers: since water is used as the solvent, there are no volatile (i.e. flammable) materials to handle. There are also no airborne chemicals to breathe in or need for huge air exhaust systems.

9. Full Spectrum Oil Right Out of the Machine – Craft Extraction: the SDR produces a full spectrum crude oil right out of the system. This can be combined with a carrier oil (i.e. coconut oil) and bottled for direct sale to the consumer. The oil is rich in all extracted components, and may be further processed in to lower value isolate which is in high demand everywhere.

10. Push-Button Operation: because high pressure or volatile solvent operation is not needed, the flows of water can be controlled by a SCADA computer system which has lower worker input.

11. Rapid Oil Extraction: this is the fastest extraction method available, and accomplished by instantaneous hydrodynamic cavitation. Cell lysis occurs in under a second.

12. Dual Flow: the extraction system has a dual-flow processing circuit, which allows either system to be paused for maintenance, while the system is still performing the extraction process.

13. Plug-and-Play: the system is build into four (or more) modules, which can be shipped anywhere in the world, and set up indoors, or outdoors. The modules are connected together by modular power and water conduits for rapid installation. Typically a system can be ready for extraction in a few days.

14. Raw Input: you can back-up your walking floor trailer or other storage system to convey into the SDR hopper, in whole bud or flower format. The SDR does the rest.

15. Wet or Dry: we recommend you dry prior processing, so that you can store your flower without any mold or degrade. This gives you a much longer processing window then trying to process out of the field without drying. Longer term storage necessitates drying of the flower, then bagging (vacuum bag or freezer) storage to preserve valuable components.

16. Fast ROI: the return on investment is fast, due to the larger processing capacity, and lower solvent consumable costs. Payback time is typically a few weeks or less.

17. Continuous Feed: this is the only extraction system on the market that is continuous feed. All other botanical oil extraction systems are batch processing (you put into a vessel, where it is