hydrodynamic-cavitation

10/10/2021

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Infinity Supercritical LLC

Eco Extraction using Hydrodynamic Cavitation and Water

Structured Data

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"@type":"WebPage",
"name":"Eco Extraction using Hydrodynamic Cavitation and Water",
"description":"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 (hemp flower).
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 extraction).
Machine Runs On: Three phase power.
Pressure: Ambient pressure and temperature.
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PDF Version of the webpage

This webpage QR code

Fast Processing Using Water Or Vegetable Oil

10/10/2021

Aqueous Turbine Extraction Technology

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

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. We've found with our CO2 processors that operator training is essential to making profit, but that element is the weakest link of a hemp extraction operation when operators refuse training, or know better than our expertise.

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.

10/10/2021

Silver Nanoparticle Production $14 per gram from botanical sources

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

For the full review, please download our pdf: 20190425-infinity-supercritical-sdr-nanoparticle-review

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.

In 2010, the global market for quantum dots was low, sitting at $67 million [27]. It was projected to have an amazing 59.3% compound annual growth rate, which was mostly realized and by 2016 it has become a $610 million global market (with the estimated CAGR it was predicted to reach $670 million by 2015) [28]. The current growth rate is estimated at 41.3% now for 2016 to 2021, predicting the global market to reach $3.4 billion by 2021 [28].

Both silver and titanium dioxide nanoparticles have a realized and open market to enter with predicted growth and new applications coming out consistently. The cost to produce the materials is rather low and the production ability seems high enough, especially with silver, that a company could actively pursue using an SDR to produce the nanoparticles with success. Since the proof of concept and idea is already detailed, there would be a low cost of entry into these markets as well. The revenue from such could be used to support R and D into quantum dots or pharmaceutical nanoparticles.

Strategy: (prices updated on 5 January 2021)

Silver Nano Particles Production at $14.25/gram Sell Price ($285/20/ml):

[Note: these are 2017 figures. For 2021 double the figures below.] If silver nanoparticles of 99% purity or higher can be produced anywhere in the range of 10 nm – 40 nm, they can be sold at a wholesale price of $3+ a gram ($6/gram in 2021). To undercut the market to allow for entry I assumed a price of $2 a gram ($4/gram in 2021). This comes out to be about $24 million a year in revenue for 2017 ($48 million in 2021). As seen in Table 15, this comes out to about $12 million a year in profit for 2017 ($24 million a year for 2021). Referencing Section 2.21, a producer with the production rate would have a 1.56 percent market share of the global market.

Aqueous Turbine Technology

Gas leverage turbine: 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.

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Advantages

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

1. Eco-Extraction: pure water is used as the solvent. Produces a more pure product for the customer. Similar sized ethanol processors which use a batch process may spend more than $1,200,000 per year in ethanol consumable (termed slippage) per year.

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

Tax Credit by Using Microturbine or Solar for Power

If you are producing your own power for your processing facility, you may access the USA 10 percent microturbine or CHP tax credit, or up to 30 percent for solar energy.

All industrial SDR units are 480V 3-phase power.

For more information please visit:

https://www.energy.gov/savings/business-energy-investment-tax-credit-itc
IRS Info: https://www.irs.gov/pub/irs-pdf/i3468.pdf

From the website:

Microturbines: The credit is equal to 10% of expenditures, with no maximum credit limit stated (explicitly). The credit for microturbines is capped at $200 per kW of capacity. Eligible property includes microturbines up to two megawatts (MW) in capacity that have an electricity-only generation efficiency of 26 percent or higher.

Combined Heat and Power (CHP):

The credit is equal to 10 percent of expenditures, with no maximum limit stated. Eligible CHP property generally includes systems up to 50 MW in capacity that exceed 60 percent energy efficiency, subject to certain limitations and reductions for large systems. See the note at the bottom of this page for more details. The efficiency requirement does not apply to CHP systems that use biomass for at least 90 percent of the systems energy source, but the credit may be reduced for less-efficient systems. This credit applies to eligible property placed in service after October 3, 2008.

Solar Technologies: Eligible solar energy property includes equipment that uses solar energy to generate electricity, to heat or cool (or provide hot water for use in) a structure, or to provide solar process heat. Hybrid solar lighting systems, which use solar energy to illuminate the inside of a structure using fiber-optic distributed sunlight, are eligible. Passive solar systems and solar pool-heating systems are not eligible.

Power For Your Water Extraction Facility: 480 V 3-Phase Power. If you do not have 3-phase power, we can also quote a Capstone Turbine gas or LPG (or even diesel or vegetable oil powered) microturbine system, container mounted. One containerized system can produce 1 megwatt (1,000 kW). In the USA, you may be eligible for a 10 percent tax credit (up to 2 MW up through 2021) to install a microturbine, as well as access to power producer gas rates. If you pay more than $.10 a kwh for power, this may be a consideration.

From Baker Tilly: The Investment Tax Credit (ITC) Section 48 allows project owners or investors to be eligible for Federal business energy investment tax credits for installing designated renewable energy generation equipment placed in service during the period 2006 through 2024. Most recently amended by the Bipartisan Budget Act in March of 2018, this evolving program continues to be a source of significant value to both renewable energy project developers, and forward-thinking commercial and industrial energy consumers.

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Spinning Disc Reactor Prototype for Sale

Includes: industrial cart with swivel casters, experimental cavitation discs, spare parts. Also includes a centrifuge to experiment with separating liquids. Domestic USA crate and freight anywhere lower 48 USA $2,500.

Please call or email for pricing.

Features and Design of Experimental Cart System:

Power: 110V 60hz plug. AC to DC variable speed drive. DC motor drive for SDR assembly.

Dimensions: Unit measures 24 inches wide x 48 inches length x 54 inches height. Fits through any USA standard door, hallway, and elevator.

Construction: Powder coated caster beams (bolt together beams) and laser cut clear acrylic table top, back and lower shelf. Caster beams are easily reconfigured using 3/8 bolts/fasteners. Beams have 3/8 inch bores for fasteners, and 3 inch diameter cut-outs for easy access to fasteners, or providing access to wiring or other internal beam contents.

Mobility: Heavy duty industrial 5 inch swivel and lock casters.

SDR Assembly: SDR modular blocks and bolt together with quick release toggle, which allows rapid reconfiguration of internal shaft mounted SDR discs. Multiple cavitation format discs are included. Magnetic coupling for sealed rotating assembly. Multiple input and exit ports on blocks allow multiple configurations. Glass sight viewports for camera and lighting. Sensor ports for pressure, temperature, or other sensors. Vertical solid state liquid heating vessel. When run in cavitation mode, you will hear a gravel-like sound which indicates cavitation of water. In addition, there will be an absence of light present when using a flash light or laser through viewport when water cavitation is in full process. This is not a botanical processor, but rather an experimental system to show cavitation. The most asked question is the ability for continuous flow cavitation, and that cavitation provides the process to extract oil from botanicals. This system allows you to experiment with these issues. This is a low pressure system using patented modular blocks. Seals are designed to contain liquid only (not a pressurized system). System designed for water and oil only. While oil does not cavitate, oil-to-oil extraction is possible and happens quickly with this method of rotating discs. There are several studies which suggest that oil-to-oil extraction is viable and has extraction rates much better than some ethanol extraction processes, but this is something you would have to verify. System can easily be configured for extraction, but that process would be your responsibility.

High Technology Applications: This same SDR (Spinning Disc Reactor) technology can also be used to produce silver nanoparticles and other hi-tech (liquid battery and component) manufacturing. This technology may be a huge impact for manufacturing for companies like Quantum Scape and Ambri liquid metal technology. This system may also be adapted for recycling lithium batteries.

Can You Build This System On Your Own ? Yes, of course you can. But expect about a 12 month trial-and-error process. We use our own patented modular block system, which allows for rapid prototyping and integration from testing to market. What you are buying is time. The time savings alone will easily pay for the system very shortly. In addition, we already have 5 years of botanical extraction experience under our belts, which includes CO2 and water phase change cavitation science experience since 2004.

Sale Conditions: System sold as-is, no warranty,and no guaranty on extraction rates as a experimental system. System is sold with no support. Support may be available as a paid option (depending on application).

How to cash in on the USA Hemp Oil Market

The problem with the hemp market is lack of extraction facilities of full spectrum hemp oil from the hemp flower. There are lots of growers, but few extractors. Even fewer CO2 extractors, which brings a much higher oil price, since CO2 retains valuable flavor and medicinal rich terpenes compared to other methods. Most processors don't have qualified legal oil extract.

The best strategy to start is to buy a CO2 extraction system, number up, then ultimately move up to the large industrial processor using continuous feed water extraction. This provides a clear path to profit and solidifies a vertical system from hemp flower extraction to sales. These systems are offered by Infinity Supercritical.

10/10/2021

SDR 2000 Eco Extraction Using Hydrodynamic Cavitation and Water

The SDR 2000 uses water as the solvent and is closed-loop. Using standard temperatures and pressures, this system does extraction in under a second. It is a 24/7 continuous process.
Infinity Supercritical
Model: SDR2000
Dry Botantical Flower Input (lbs/day): 2,400
Full Spectrum Oil (kg/day): 87
Revenue Per Day: $476,328
Payback (days): 6
Based On $/gram: 6
Aqueous Extraction. One Touch Craft Extraction.
Consumables: Water (closed loop) and Power.
Comparison to Ethanol Extraction - Savings Per Year from Consumable Slippage: $1200000

10/10/2021

SDR 10k (10,000 lbs per day) Eco Extraction Using Hydrodynamic Cavitation and Water

The SDR 10k uses water as the solvent and is closed-loop. Using standard temperatures and pressures, this system does extraction in under a second. It is a 24/7 continuous process.
Infinity Supercritical Model: SDR10K
Dry Botantical Flower Input (lbs/day): 9,984
Full Spectrum Oil (kg/day): 362
Revenue Per Day: $1,985,412
Payback (days): 8
Based On $/gram: 6
Aqueous Extraction. One Touch Craft Extraction.
Consumables: Water (closed loop) and Power.
Comparison to Ethanol Extraction - Savings Per Year from Consumable Slippage: $4,992,000

10/10/2021

SDR 50k (50,000 lbs per day) Eco Extraction Using Hydrodynamic Cavitation and Water

The SDR 50k uses water as the solvent and is closed-loop. Using standard temperatures and pressures, this system does extraction in under a second. It is a 24/7 continuous process.
Infinity Supercritical Model: SDR50K
Dry Botantical Flower Input (lbs/day): 49,992
Full Spectrum Oil (kg/day): 1,815
Revenue Per Day: $9,950,406
Payback (days): 5
Based On $/gram: 6
Aqueous Extraction. One Touch Craft Extraction.
Consumables: Water (closed loop) and Power.
Comparison to Ethanol Extraction - Savings Per Year from Consumable Slippage: $24,996,000

10/10/2021

SDR 100k (100,000 lbs per day) Eco Extraction Using Hydrodynamic Cavitation and Water

The SDR 100k uses water as the solvent and is closed-loop. Using standard temperatures and pressures, this system does extraction in under a second. It is a 24/7 continuous process.
Infinity Supercritical
Model: SDR100K
Dry Botantical Flower Input (lbs/day): 100,008
Full Spectrum Oil (kg/day): 3,632
Revenue Per Day: $1,991,593
Payback (days): 5
Based On $/gram: 6
Aqueous Extraction. One Touch Craft Extraction.
Consumables: Water (closed loop) and Power.
Comparison to Ethanol Extraction - Savings Per Year from Consumable Slippage: $50,004,000

10/10/2021

SDR 300k (300,000 lbs per day) Eco Extraction Using Hydrodynamic Cavitation and Water

The SDR 300k uses water as the solvent and is closed-loop. Using standard temperatures and pressures, this system does extraction in under a second. It is a 24/7 continuous process.
Infinity Supercritical Model: SDR300K
Dry Botantical Flower Input (lbs/day): 288,000
Full Spectrum Oil (kg/day): 10,460
Revenue Per Day: $5,731,360
Payback (days): 5
Based On $/gram: 6
Aqueous Extraction. One Touch Craft Extraction.
Consumables: Water (closed loop) and Power.
Comparison to Ethanol Extraction - Savings Per Year from Consumable Slippage: $144,000,000

10/10/2021

What is this ?

Infinity Supercritical is now deploying its QR code based system. This e commerce and system operation strategy allows equipment components and items to be referenced.

Try it yourself. Scan the code to the left and it will bring up this page automatically on your smartphone browser.

Why use this technology?

We're using QR codes to enable operators/processors to quickly access information for support, maintenance, and parts reordering.

The QR code saves time. And time is money.

This helps to reduce or eliminate user manuals, support, and other items which bog down a processor.

All of our SDR equipment comes with QR code labels that allow operators to quickly ascertain flows, component, and operational standard operating procedures.

This allows our systems to quickly contribute to your bottom line - profit.

10/10/2021