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Cavitus are currently active in the Palm Oil, Olive Oil, Dairy/Soy and Wine Industries.

Cavitus is a privately-held Australian company which commenced operations in 2007. Cavitus' first High Power Ultrasound (HPU) products and IP were in the area of Wine Barrel Cleaning and Disinfection/Grape must extraction.

Today Cavitus specializes in applications development, engineering design, manufacture and installation of equipment in the area of HPU for new and existing liquid-phase industrial applications with a focus on industries where products such as Palm Oil, Olive Oil, Dairy and Soy Proteins are processed.

Cavitus' main emphasis is on bringing to market HPU applications which deliver outstanding value to customers whilst also being a cleaner and greener alternative technology.

Cavitus' customers include agricultural commodities, FMCG, industrial chemicals and pharmaceutical companies in Asia, North America and Europe, served both by Cavitus directly and by our regional channel partners.

Why manufacture with sound

Unlike conventional ultrasound, High-Power Ultrasound (or 'HPU') can be cost-effectively harnessed to upgrade the efficiency of continuous-flow, industrial liquid manufacturing processes without substituting prior factory investments in process technology and without increasing additives.

Click here to see advantages

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29-May-2012

Cavitus and it's Iberian distributor Ros Casares (Ultratecno) recently attended Hispack in Barcelona. Significant interest was shown in Cavitus' applications in Temporary Viscosity Reduction, Barrel Cleaning & Disinfection and particularly Defoaming in bottling lines.

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04-Apr-2012

Cavitus technology features in an article in Scientific American. Click here to read the full article.
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04-Apr-2012

The American Society of Enology and Viticulture (ASEV) has chosen a paper associated with Cavitus' barrel-cleaning research as the best oenology paper for 2011. The ASEV Best Paper Committee evaluated all research papers published in Volume 62 (2011) of the prestigious American Journal of Enology and Viticulture and chose the paper "Relative Efficacy of High-Pressure Hot Water and High-Power Ultrasonics for Wine Oak Barrel Sanitization" which was deemed outstanding in its content and a substantial contribution to the field of oenology.

The Award is an honour for Cavitus and its former Director of Oenology and Industry Marketing and co-founder, Andrew Yap and his three co-authors from the School of Agriculture, Food and Wine of The University of Adelaide. The research was funded by an ARC Linkage Grant and Cavitus Pty Ltd.

The authors found that application of HPU with hot water of at least 60°C, a regime pro¬moted for complete removal of tartrate deposits, was also able to remove culturable Dekerra/Brettanomyces bruxellensis inoculated on the surface and up to 4mm into the oak itself. The finding is important as it offers winemakers an effective method of sanitising oak barrels, thereby reducing the risk of wine spoilage, which can be detrimental to wine quality. No adverse effects on oak volatile extraction into wine stored in HPU-treated barrels were observed.

Further information about HPU technology for barrel-cleaning can be obtained from Cavitus Pty Ltd (info@cavitus.com). The author, Andrew Yap (ayap@wineindustryultrasonics.com) would be pleased to discuss the findings of the research as presented in the paper or data from other HPU-cleaning trials.

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Your Contact Details

* Indicates required fields.

Title: MR

First Name *

Last Name *

Email Address *

Comments/Enquiries

I would like more information about Cavitus' applications for:

- ☐ Palm oil
- ☐ Olive oil
- ☐ Grape must
- ☐ Temporary Viscosity Reduction
- ☐ De aeration
- ☐ De foaming
- ☐ Wine Barrel Disinfection System

I am: -- Please select --

If Other, please specify:

Submit

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Increasing Palm Milling Yields

Due to the significant value of crude palm oil, much work has been done by the milling industry to optimise the amount of oil extracted during the milling process. However, even with the most optimised processes, economically significant quantities of oil remain bound in solid particles, which are expelled from the milling process as waste matter. This oil not only represents a lost revenue opportunity to the mill, but also places a significant load on mill effluent treatment systems and emits substantial quantities of greenhouse gas during wastewater treatment.

Cavitus Palm Extraction (CPE) (patent pending) provides further increases in crude palm oil yield using a simple, additive free, in-line process. By utilising intense ultrasound under conditions known to create effective cavitation, the CPE process ruptures fruit cell walls without reducing solid particle size and increases the amount of crude oil released prior to solids separation.

Results from full-scale trials to date have shown yield increases of up to 2.3 kg crude palm oil per tonne of Fresh Fruit Bunch (FFB) on processing lines which are already heavily optimised. These results are based on reduction of oil losses to the mill effluent and sludge streams, thus reducing the environmental impact of the mill and providing increased oil revenue per tonne of FFB processed.

Cavitus Palm Extraction (CPE) is a practical, energy efficient process, which can be easily retro-fitted into existing mill processes.

"Cargill began using the Cavitus Ultrasonic technology in one of our mills in November 2010, and have since optimized the design to minimize oil loss in the POME stream. This has yielded an average reduction of 0.2% in the total absolute oil loss per metric tonne of FFB. Based on data gathered from invention-stage pilot trials a few years ago, greater oil loss is expected in an inefficiently operated plant. Cargill's 0.2% improvement was achieved at our best performing mill, which was already experiencing low oil loss."

Azlan Adnan - Director of Operations, Cargill

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Increase Yield
Reduces Waste
Green Technology
Payback < 2 years
Easy to use

Squeezing More EVOO from Olives

Due to the value of EVOOil, much work has been done to optimise the amount of oil extracted during the Extra Virgin process. However, even with the most optimised processes, economically significant quantities of oil remain in the pomace from the first centrifuge stage. Secondary centrifuging is sometimes used to remove additional oil but unfortunately the recovered oil is not classified as EVOO.

Cavitus Olive Extraction (COE), patent pending, provides further increases in EVOO yield using a simple, additive free, in-line process. As COE is simply a mechanical pre- treatment of the paste upstream of the malaxer, it does not compromise the EVOO status of the resulting oil.

By utilising intense ultrasound under conditions known to create effective cavitation, the COE process ruptures fruit cell walls and increases mass transfer of oil from the cells into the oil phase prior to malaxation. This results in increased oil yield and lower amounts of oil in the pomace stream.

Results from full-scale trials to date have shown consistent yield increases of > 5 kg EVOO per tonne of fruit on Coratina and Arbequina varieties on processing lines which are already using optimised settings plus talc and enzyme.

COE is a practical, energy efficient process that can be easily retro-fitted into existing mills.

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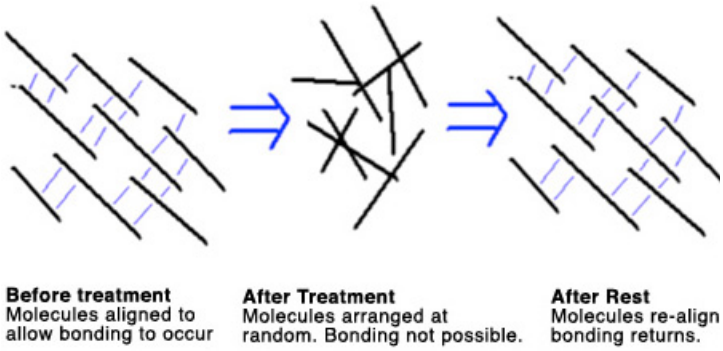
Cavitus Temporary Viscosity Reduction (TVR) patent pending, can be applied to food and beverage products containing hydrocolloid/starch thickeners and impart a substantial temporary viscosity reduction effect.

The mechanism behind this viscosity reduction effect results from a temporary change in the bond alignment/orientation when the ultrasonic energy is applied.

Over a period of time, this bond alignment returns back to its original position and so too does the product viscosity (see the graphic below).



The period of reduced viscosity allows for different types of process efficiency gains in down stream plant equipment. Examples of process improvement using Cavitus TVR include:

- Higher product deposit solids and reduced tailings during jelly confectionery maufacture (3-6% increase in brix solids)
- Enhanced homogenization performance (reduced emulsion droplet size)
- Enhanced heat transfer during evaporation, heat exchanger, pasteurization/UHT processes , cooking
- Enhanced permeate flux rate and reduced fouling during filtration
- Improved de-aeration and fill level control on filling lines

Yoghurt - Viscosity Reduction - After Treatment

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Cavitus' modular, upgradeable, wine barrel cleaner, BCDS (patent pending), cleans effectively into wood pores, reduces Brettanomyces populations by up to 100%, whilst decreasing maintenance, wastage and barrel replacement expenditure. The technology can act as an adjunct to existing high power hot pressure barrel cleaning solutions or be used on its own, depending on the requirements of the winery.

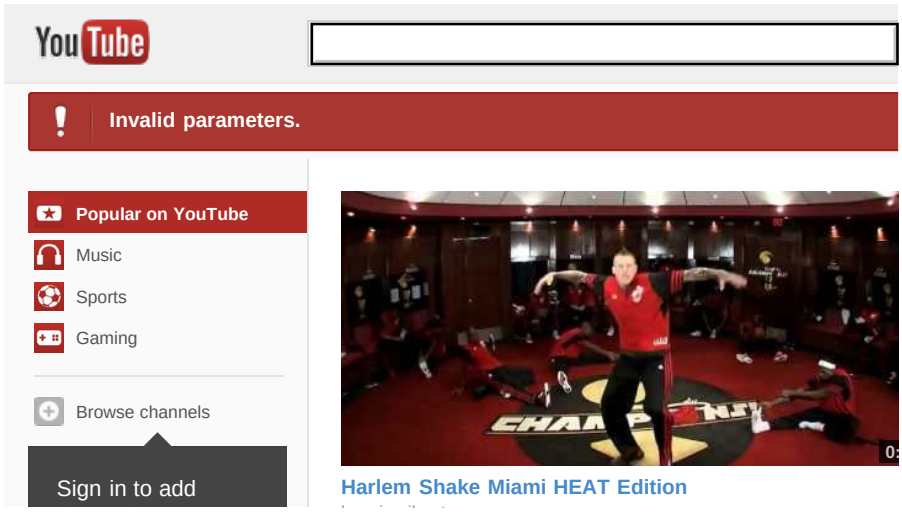
"High power ultrasound has become a credible and effective technology alternative for removing tartrates and destroying Brettanomyces in wine barrels"

Prof. K. Fugelsang

California State University, Fresno

Solution and Benefits

The solution - proprietary product for cleaning and disinfecting oak barrels - aimed at reducing wine spoilage costs, increasing barrel life and enhancing oak transfer in wine production. The Wine Barrel Cleaner uses high-power ultrasonics to effectively remove tartrates, anthocyanins, solid residues and biofilms, whilst simultaneously killing Brettanomyces and other spoilage microorganisms, both from the interior surfaces and subsurface of oak wood. In independent tests, use of the Cavitus Wine Barrel Cleaning solution has had no deleterious effect on the pore structure oak wood.



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Cavitation Bubble

High Power Ultrasound is an Emerging Technology that is Clean and Green and adds to the Sustainability efforts of the businesses who embrace it.

High Power Ultrasound (HPU) as applied by Cavitus can be used in many industrial process applications. The current core product applications being sold commercially by Cavitus are using low frequency, high-power ultrasound (20kHz - 1MHz).

HPU is distinguished from traditional, low-power ultrasonics (jewellery cleaning baths and medical imaging) by the energy transmitted per volumetric measure (e.g., W/cm3), with typical differences measured in orders-of-magnitude.

Ultrasonic sound waves as emitted by HPU the Cavitus systems cause the creation of sub-microscopic vapour bubbles in the liquid phase, which expand and contract thousands of times per second. The collapse or implosion ("cavitation") of the vapour bubble creates localised high temperature (Up to 5000+ Kelvin) and pressure (of 2000+ atmospheres) and the creation of a fast moving high-shear energy wave (i.e., 570 km/h).

The High-Shear energy created by the Cavitation effect can be focused and used in a range of applications such as the modification of particles in a liquid, for the break-down of cellular and molecular structures, de-aeration of liquids and surface.

High Power Ultrasonics can be easily retrofitted and applied to existing manufacturing processes.

Benefits of High Power Ultrasonic Technology to customers can include:

- Reduced Waste
- Reduced Chemicals
- Reduced Energy input
- Improved product Quality (reduced Heating)
- Improved Plant efficiency
- Improved Food Safety
- Impressive Capital payback

Unlike conventional ultrasound, High-Power Ultrasound (or 'HPU') can be cost-effectively harnessed to upgrade the efficiency of continuous-flow, industrial liquid manufacturing processes.

Over recent years, advances in HPU technology mean that lab/pilot scale trials can now be "scaled up" to plant scale replicating the earlier results achieved, this of course is only possible with the assistance of Cavitus' expert Technical Resource. The advances in HPU technology and equipment manufacture also mean that most installations meet the internal investment criteria for Capital Equipment of most organisations around the world.

There is a wide range of possible applications for HPU across all industries, to date Cavitus engages in Palm Oil, Olive Oil,Dairy/Soy and Wine.

It is expected that as a "clean technology", the use of HPU will rapidly increase in importance throughout the world.

The UK Department of Trade and Industry has described it as a 'key technology for the future'. The scope and potential in food processing is only now being fully realized.

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The issue of entrained air and other gases in the production of many food and beverage products can be a significant issue impacting the day to day operation of many manufacturing process.

Unwanted entrained gas in food and beverage production processes can result in the following forms of waste:

- Reduced manufacturing efficiency
- Reduction in plant capacity
- Increased material loss (reduced yield)
- High energy requirements (ie: to Pump)
- Reduced product quality (shorter shelf life)

Highly aerated process streams can impact the following types of production equipment:

- Evaporators, Heat Exchangers, Pasteurization and UHT equipment
- Membrane Filters, Homogenizers
- Mixing equipment, Pumps, Depositing lines, Food and beverage filling lines.

Cavitus' FLUIDSONIC^{TM} Density Enhancement (De-aeration) system (patent pending), can be applied to food and beverage products containing unwanted entrained air/oxygen and in a short time remove a substantial amount of the trapped gas.

The effect of the ultrasonic waves on the process stream causes the micron/sub micron gas bubbles to grow very rapidly in size (due to coalescence). These bubbles become so big that they leave the fluid phase by themselves or could be further accelerated in combination with an integrated vacuum process.

The Cavitus FLUIDSONIC^{TM} Density Enhancement system can be applied either in a tank operation or in the process pipe line feeding a tank operation allowing for all types of process efficiency gains in downstream plant equipment.

Examples of process improvements resulting from Cavitus' FLUIDSONIC^{TM} Density Enhancement system include;

- Enhanced heat transfer during evaporation, heat exchanger, pasteurization/UHT processes and cooking
- Enhanced product quality in depositing lines (ie: jelly confectionary, chocolate)
- Enhanced homogenization performance
- Enhanced permeate throughput during RO and UF membrane filtration (3-10%)
- Improved production speeds and level control on filling lines
- Enhanced separation efficiency in centrifuges and settling tanks

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Reduction in anti foam chemicals

Increased vessel capacity/production rate

Reduced waste from tank foam overflow

SDS can be cleaned in place under CIP conditions

Traditional methods of controlling foam in food and beverage industries involve the use of anti-foaming chemicals, reducing packing container temperatures below the ambient environment, or the use of mechanical breakers. Each of these approaches has negative implications on the product, equipment, efficiency of the production process and the environment.

Cavitus' Sonic De-Foaming System (SDS) provides an alternative, cost-effective and more environmentally friendly foam dispersement solution. The Cavitus SDS utilises high power ultrasonics (HPU) technology. Using a combination of fluctuating high pressures, bubble resonance, cavitation, radiation pressure and sonic wind, foam bubbles are attracted to sound wave nodal points and are imploded by the compressive forces generated as sound waves travel.

The SDS technology utilizes a high energy piezoelectric transducer to direct airborne HPU at 20-40kHz to the liquid surface where foam is generated.

Cavitus' SDS has been applied in numerous applications including canning/bottling lines, tank operations including dairy and fermentation reactors.

Benefits of SDS on packaging/bottling lines:

- Increased filling line speed
- Reduced waste from foam overflow
- Reduced cap seal contamination
- Single plate SDS - up to 700 bpm
- Double plate SDS - up to 2000 cpm
- Designed for aseptic and non aseptic filling lines
- Low energy and maintenance costs

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