

Winner of the Cleantech  
Open Global Ideas Competition

# ASEPTORAY™

## Non-thermal Pasteurization Technology



*Natural*



*Improves Food  
Safety & Quality*



*Saves Energy*



## About Us

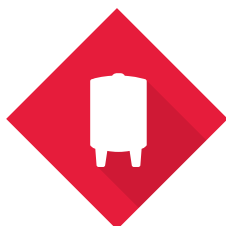
### What is ASEPTORAY™ ?

AseptoRay™ was created to meet the need in the food and beverage industry for non-thermal effective pasteurization that can target unwanted bacteria in most turbid liquids. Unique in the market, AseptoRay offers a proprietary solution based on ultraviolet (UV) technology that is capable of treating low UVT liquids and totally opaque products.

AseptoRay's solution dramatically reduces energy consumption, increases food safety and quality and offers an environmentally friendly and sustainable pasteurization process.

### ASEPTORAY™ : A division of MGT Group

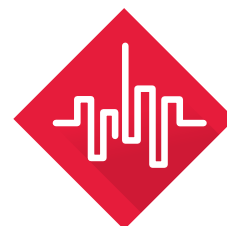
Established in 1969, MGT Industries Ltd. is a privately owned company serving clients worldwide. MGT specializes in the design and manufacture of custom stainless steel tanks, mixing systems, road tankers and process solutions for the food, beverage, pharmaceutical, cosmetic, dairy, chemical, ink and paint industries. The company has established itself as a leader that provides superior tailored and turnkey solutions for the process industry.



**Tanks & Tankers**



**Mixers & Agitators**



**Process Systems**



## Natural



AseptoRay's solution is natural and environmentally friendly on several levels. First, it uses a fraction of the energy compared to traditional pasteurization and has a much lower carbon footprint.

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*AseptoRay's technology can **replace the current batch High Pressure Processing technology** with a continuous non-thermal technology*

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Second, it preserves the product's natural taste and dietary value and prevents nutrient degradation caused by thermal pasteurization. Third, the process is more natural and thus appeals to consumers searching for healthier and less processed foods and beverages which contain less preservatives.

***AseptoRay's technology is an alternative to High Pressure Processing technology***

As opposed to High Pressure Processing (HPP) pasteurization which is limited to batch processing, AseptoRay's solution offers a continuous alternative that easily fits into any production line. A wide variety of products underwent organoleptic tests, and there were no changes in the color, odor or taste of the products, compared to natural or untreated products





## *Improves Food Safety & Quality*



One of the major disadvantages of traditional pasteurization is that it heats and then rapidly cools foods and beverages – a process that negatively affects the quality, nutritional value, and taste of the products.

AseptoRay's solution is a non-thermal process and therefore doesn't expose foods and beverages to temperature changes. As a result, the natural dietary value of the products is preserved and there is no nutritional degradation.

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*AseptoRay's pasteurization technology yields  
**superior microbial results** and  
**eliminates heat resistant spores***

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Laboratory tests have confirmed that AseptoRay's pasteurization technology yields superior microbial results and eliminates heat resistant spores, yeast and molds.

The technology also meets the FDA's stringent Hazard Analysis Critical Control Point (HACCP) requirements which demand a 5 log reduction in the pathogen of concern. This requirement was achieved in several liquids with varying turbidities – from completely turbid liquids such as milk and tropical juice to semi-clear products like coconut water, apple juice and cider.

# Saves Energy



AseptoRay's solution is incredibly energy efficient and has been shown to reduce energy consumption by more than 73% compared to standard heat-based pasteurization methods. As a result, companies can expect an attractive return on investment (ROI) based solely on the reduction in energy costs. Most importantly, the technology can seamlessly integrate into any existing production line and be up and running within a short period of time.

The energy efficiency of AseptoRay's technology has been demonstrated in world leading beverage production lines.

**73% more energy efficient**  
*than traditional thermal pasteurization methods*

## ASEPTORAY™

**Non-thermal UV pasteurization**  
0.34¢/Gal



Uses only a fraction of the energy (compared to thermal pasteurization) and saves over 73% in energy costs

**Heat pasteurization**  
1.3¢/Gal



Standard thermal systems heat with steam and cool using electricity

**HPP: High pressure process**  
130¢/Gal



Alternative pasteurization technology for organic juice

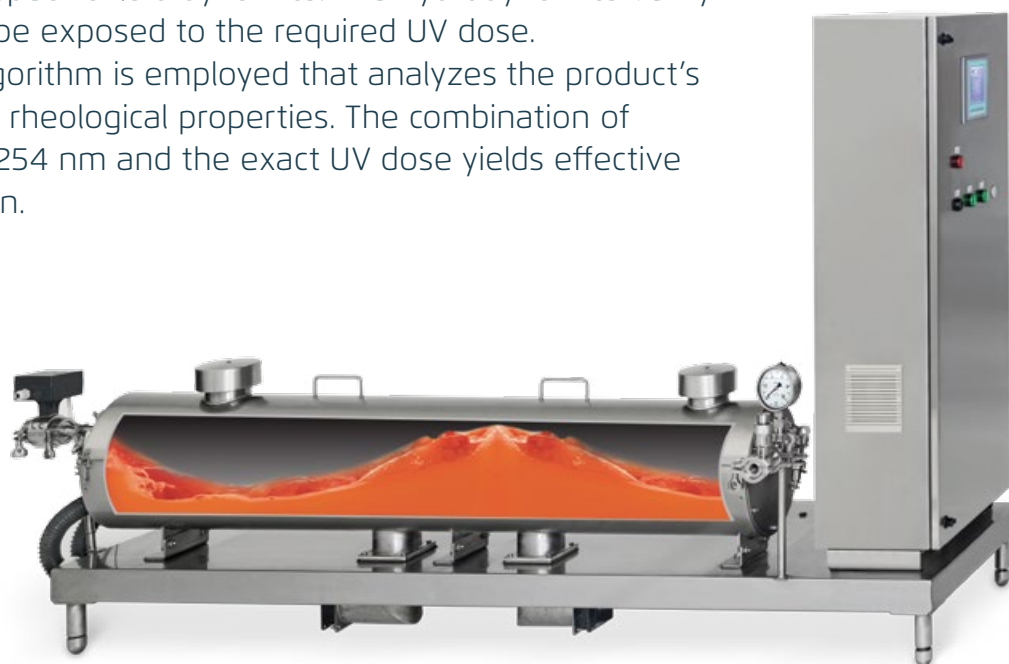


## *The Technology*

AseptoRay has developed an advanced pasteurization solution based on UV technology. While UV inactivation has been widely used in clear water, it has not been able to penetrate and treat turbid fluids. AseptoRay's technology enables UV microbial reduction in most turbid liquids. The system uses amalgam UV lamps that generate UV at 254 nm, a wavelength that is known to affect DNA sequences and to inactivate bacteria by preventing their replication.

The core technology of the system is based on hydrodynamics and fluid dynamics. The technology uses a proprietary reactor design that ensures very specific fluid dynamics. The hydrodynamics verify that the liquid will be exposed to the required UV dose.

A mathematical algorithm is employed that analyzes the product's viscosity and other rheological properties. The combination of UV penetration at 254 nm and the exact UV dose yields effective bacterial elimination.



# Applications

In addition to the juice and liquid sugar markets, AseptoRay's solution is ideal for other food and beverage industries such as the beer, dairy, and soy markets.

For details on results in these fields, please contact AseptoRay at [info@aseptoray.com](mailto:info@aseptoray.com).

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Cold-pressed  
Juice



Beverages



Process Water



Milk



Soy Milk



Liquid Sugar





## Beverage Market



*All commercial juices are pasteurized in order to ensure food safety. Most undergo thermal pasteurization and some are even pasteurized twice since they are produced from concentrate.*

In the US, the FDA requires a 5 log reduction of the pathogen of concern. To achieve this goal, thermal juice pasteurization is often performed at 95°C (203°F). A key disadvantage of this high temperature is that it negatively affects the taste of the juice and other organoleptic properties.

### *Carrot juice log reduction using AseptoRay's solution\**



\* Tested by a certified 3rd party laboratory.

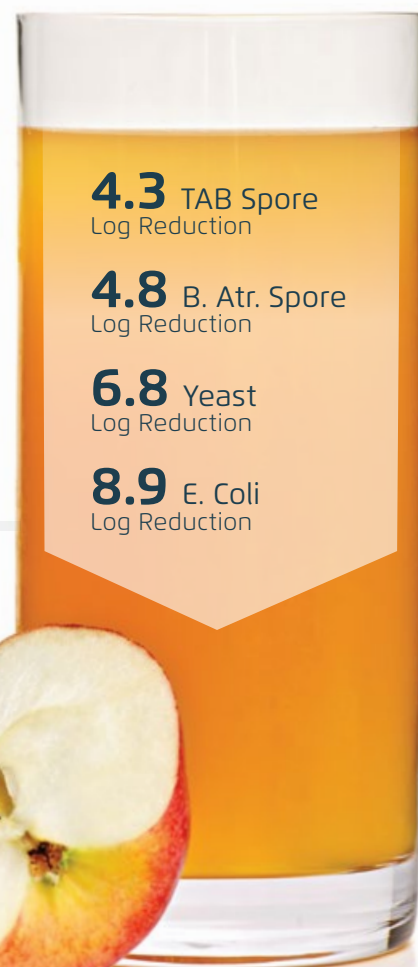




However, 95°C (203°F) cannot effectively neutralize all bacteria and spoilage heat resistant bacteria, such as Thermo Acidophilic Bacteria (TAB), survive the pasteurization process. This has become a major concern in the juice manufacturing industry and the reason for many product recalls and bacterial quality issues.

AseptoRay's solution offers a true breakthrough in the field of juice pasteurization. Studies have confirmed that its non-thermal technology effectively meets the FDA's\* required 5 log reduction in the pathogen of concern. They have also shown that AseptoRay's process doesn't affect the natural characteristics of the juice and its taste and texture remain intact – factors which dramatically increase the freshness and quality of the product.

**AseptoRay's solution effectively treated a wide variety of juices. From clear apple juice to turbid tropical juice as well as exotic drinks like coconut water**



***Apple juice log reduction using AeptoRay's solution\****

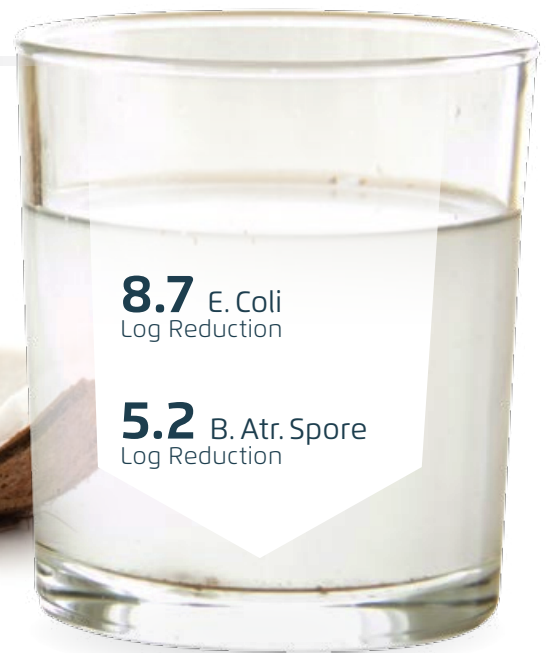


\* Tested by a certified 3rd party laboratory.



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**Coconut water log reduction using AseptoRay's solution\***



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**Green juice log reduction using AseptoRay's solution\***



\* Tested by a certified 3rd party laboratory.





## Liquid Sugar



*Liquid sugar (sucrose) is widely used in a variety of beverages and is pasteurized to prevent pathogens and spoilage bacteria.*

Lower temperatures (around 80°C, 176°F) are used to pasteurize liquid sugar since heat causes the liquid to caramelize. As a result, heat resistant bacteria are able to survive the pasteurization process and this factor has been a major cause of food and beverage spoilage.

Since liquid sugar contains different levels of sugar, i.e. Brix, AseptoRay's system tested a variety of concentrations for both pathogens and spores. The test results confirmed that AseptoRay's technology successfully reduced unwanted bacteria, yeast and molds in liquid sugar and fructose with different viscosities and Brix content.

**Bacterial log reduction of liquid sugar using AseptoRay's solution\***



\* Tested by a certified 3rd party laboratory.





## Dairy & Milk



*AseptoRay's advanced pasteurization technology is ideal for Third World countries that suffer from rapid milk spoilage due to inadequate or non-existent pasteurization. add to the sentence: Preserve significantly higher levels of immunological proteins and vitamins while maintaining the milk's natural flavor.*

AseptoRay has tailored a solution for India, African countries, and other remote areas around the world that suffer from rapid milk spoilage.

***Milk log reduction using AseptoRay's solution\****



### **AseptoRay's solution has been proven to:**

- Eliminate different pathogens and microorganisms
- Preserve significantly higher levels of immunological proteins and vitamins while maintaining the natural flavor

\* Tested by a certified 3rd party laboratory.



## Process Water



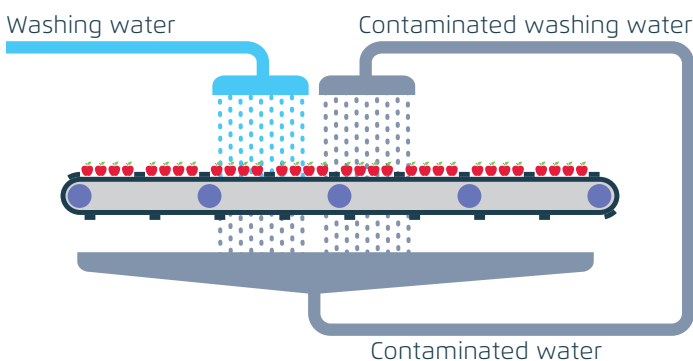
*Water used to clean and transfer produce may be inadvertently contaminating it.*

- Washing water - the recycled water is often turbid and may be carrying in it unwanted bacteria.
- Water on the conveyor belt- if not cleaned, the water may be damaging the produce

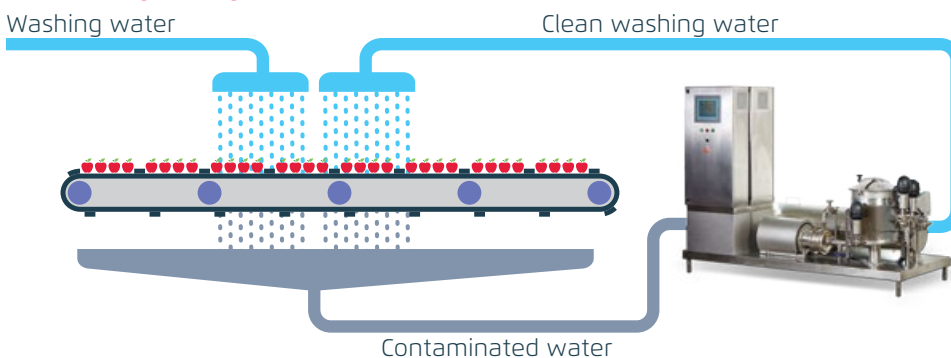
The AseptoRay system successfully treats turbid Process Water created from a wide variety of industries. Extensive laboratory tests and real-life case studies have confirmed that the system can completely eliminate pathogens in the water and as a result it can be recycled and reused. This translates into reduced operating costs for the enterprise as well as an ecological solution that helps the environment.

### **AseptoRay's solution - saves water & improves product quality**

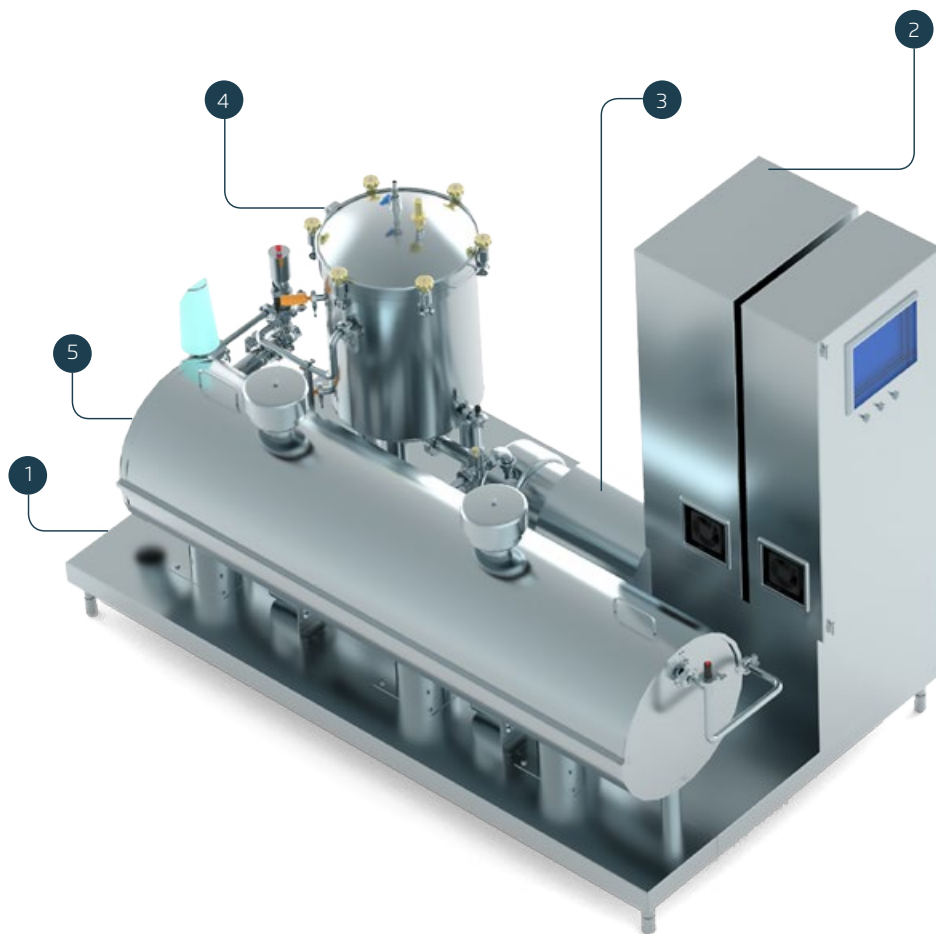
#### **Without AseptoRay:**



#### **With AseptoRay:**



# The AseptoRay™ System



## The system consists of:

1. Skid mounted
2. Electrical cabinet and control panel
3. Product pump
4. Balance tank
5. Reactor chamber





*AseptoRay™ has developed several pasteurization systems, each with a different processing capacity, in order to meet the needs of small, medium, and large manufacturing facilities.*

The current models are the AseptoRay1000, capable of processing up to 1200 lph (4.3 gpm), the AseptoRay3000, capable of processing up to 4000 lph (10 gpm), and the AseptoRay8000, capable of processing up to 12,000 lph (35 gpm). A higher capacity system of 16,000 lph (70 gpm) will be available soon.

AseptoRay1000



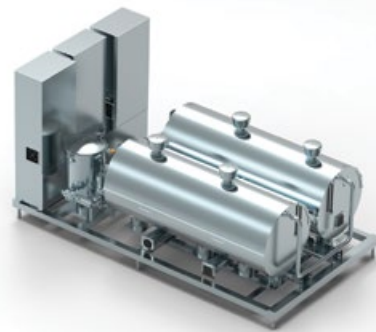
AseptoRay3000



AseptoRay8000



AseptoRay16000



- Power supply: 380V, 3 phase, 32A, 50 Hz
- System weight: 640 Kg
- Compressed air supply: 6 bars, dry, filtered (no oil residuals)
- Product inlet: pipe with 2 inch ferrule connection
- Product outlet: pipe with 2 inch ferrule connection
- Product outlet: pipe with 2 inch ferrule connection

- **Product:**
  - I. Inlet temperature: 5-90°C (41-194°F)
  - II. Viscosity: 1-150 CP
  - III. Specific gravity: 1-1.4 gr/cm<sup>3</sup>
  - IV. UVT: 1-100%

For More Information Visit:  
**[www.aseptoray.com](http://www.aseptoray.com)**

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Find us at:

**ASEPTORAY™**