

**Product Novelty**

- IP rights granted -

# Ultrasonic-Assisted Freeze-Drying

Shorter processing times, higher throughput, and lower energy consumption

## Challenge

Freeze-drying (lyophilization) is an established method for gently drying high-quality products. In this process, water is removed from a frozen product through sublimation. The process is used in particular for food, pharmaceutical products, and biotechnology applications.



Despite its advantages, freeze-drying is associated with high investment costs, significant energy requirements, and long process times. These factors limit plant throughput and increase production costs

## The Innovative Solution

The targeted use of ultrasound during the freeze-drying process can significantly accelerate sublimation.

Ice crystals form in the product during freeze-drying. Ultrasonic technology breaks down these crystals, thereby increasing the effective surface area of the ice. This leads to significantly faster sublimation and thus a considerable reduction in drying time.

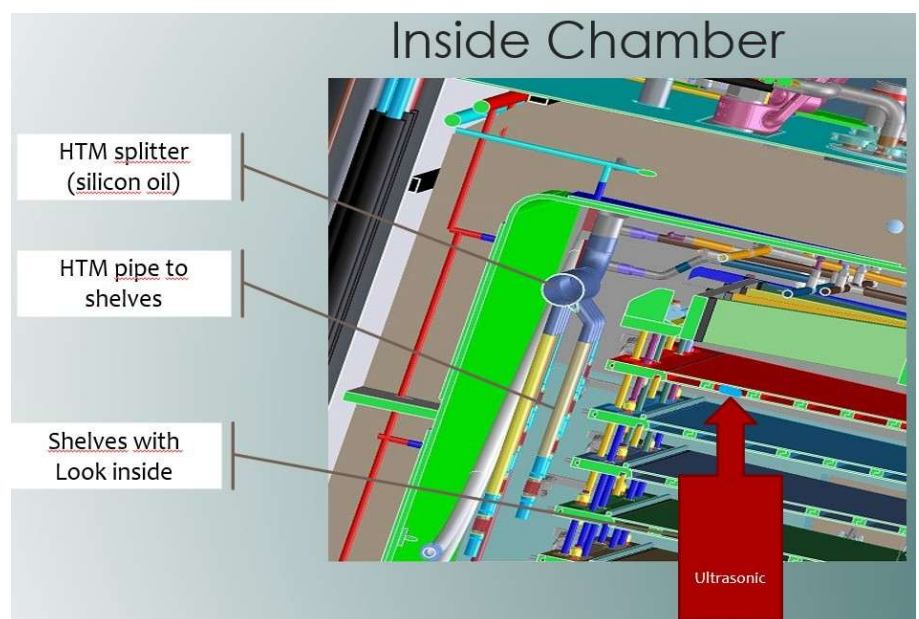
A particular advantage of this technology is that it can be integrated not only into new systems but also used as a retrofit solution in existing freeze-drying systems.

Seeking buyers of intellectual property rights or licensees!



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Possible technical implementation

### Proven Results:

Tests conducted in a freeze-dryer have shown that ultrasonic-assisted freeze-drying:

- can reduce **drying time by 40–60%**,
- nearly doubles system throughput,
- and significantly reduces energy consumption at the same time.

The technology thus enables a significant improvement in the economic efficiency of existing and new freeze-drying systems.

### Advantages at a glance:

- ✓ Up to 60% shorter drying times
- ✓ Higher system throughput
- ✓ Reduced energy consumption
- ✓ Lower production costs
- ✓ Retrofittable in existing systems
- ✓ Easy integration into new systems
- ✓ For thermal oil or electrically heated systems

### Typical Applications:

- ✓ Instant coffee
- ✓ Freeze-dried fruits (e.g., strawberries, raspberries, bananas)
- ✓ Ready-to-eat meals and outdoor food
- ✓ Pet food and snacks
- ✓ Vaccines and pharmaceutical products
- ✓ Biotechnology products

### Innovation with Direct Added Value

Ultrasonic-assisted freeze-drying combines the highest product quality with significantly improved process efficiency. Through shorter batch times, lower energy consumption, and higher production capacities, the technology offers considerable potential for cost reduction and increased sustainability in industrial drying.

- ⇒ Innovation with unique selling points, protected by patent law
- ⇒ High customer benefit

More informations:



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