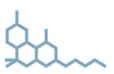




PandaPLUS

Benchtop Homogenizer

nanoemulsification equipment for manufacturing premium beverages, edibles, and topicals

ROOT 
SCIENCES

GEA PandaPLUS

Key Features

- Flow rates up to 24 L/h, produces up to 160k 10 mg servings per 8-hour shift
- Produces water-soluble cannabinoid nanoemulsions that are easily added to beverages and edibles
- Benefits include enhanced shelf-life, improved bioavailability, and faster uptake
- Clean-In-Place (CIP) and simple preventative maintenance procedures
- Easily added to beverages, edibles, and topicals
- More precise dosage due to true homogeneous mixing
- Produces clear, high-load, or flavorless nanoemulsions with Root Sciences' proprietary formulations
- Proven homogenization technology used in beverage, chemical, and pharmaceutical processing

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Advantages of Products Manufactured with Nanoemulsions

Hemp and cannabis nanoemulsion-based products provide substantial benefits compared to traditionally manufactured edibles and beverages.

The proprietary nanoemulsification and micronization technologies greatly increase the bioavailability of cannabinoids. This creates a substantially more stable product that is highly resistant to separation. Products created with nanoemulsions take effect more quickly than traditional infused edibles and deliver more consistent and enjoyable experiences for consumers.



High-Pressure Homogenization

Nanoemulsions are stable dispersions of two immiscible liquids, such as cannabis oil and water. The tiny droplets of oil are typically between 20 and 600 nanometers in diameter and are stabilized by a thin film of surfactants.

First, a coarse emulsion with large droplet sizes is created through the use of a high shear mixer. Then the coarse emulsion is passed through a GEA High Pressure Homogenizer several times. This process can easily be integrated into a large scale manufacturing line.

The GEA pressurizes the fluid and then releases it through a special homogenizing valve. The extreme shearing forces the emulsion experiences during this process causes the droplets to become extraordinarily small, improving its stability and bioavailability.

GEA has been at the leading edge of homogenization technologies since 1947, servicing the food and dairy, pharmaceutical, chemical, and biotechnology industries. GEA produces the worlds largest high pressure homogenizers, with flow rates of up to 5,000 liters per hour at 1,500 bar.



NANOEMULSIFICATION

Available Models

	Production Rate (10 mg servings/h)	Pressure (PSI)
PandaPLUS 1000	20,000	14,500
PandaPLUS 2000	9,000	29,000
Pony 1000	68,000	14,500
Pony 1500	30,000	21,700
Panther 1200	85,000	14,500
Panther 1500	42,000	21,700

TECHNICAL DATA

Model	PandaPLUS 1000	PandaPLUS 2000
Max Flow Rate	24 L/h	10.8 L/h
Production Rate <small>(10 mg servings/h)</small>	20k (flavorless)	9k (flavorless) 7.5k (clear) 40k (high-load)
Pressure	1,000 bar	2,000 bar
Motor Power	2.2 kW	1.85 kW
Electrical Options	3Φ 200 V, 50 Hz 3Φ 220 V, 50-60 Hz 3Φ 400 V, 50-60 Hz 3Φ 460 V, 60 Hz	
Feeding Hopper Volume	0.4 L	
Minimum Sample Volume	60 mL	30 mL
Dimensions <small>(LxWxH)</small>	810 x 540 x 440 mm	
Weight	105 kg	

Optional Upgrades Include:

- 2 L feeding hopper
- Heat exchanger for product outlet
- IKA T-25 High Shear Mixer Package



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ABOUT US

Root Sciences is a global leader in the distribution of equipment and support services for processing facilities in the cannabis and hemp industries, representing premium extraction, distillation, and other post-processing technologies. Backed by years of hands-on experience in both growing and processing, Root Sciences' collective knowledge as a team of seasoned practitioners and process engineers is unmatched in the hemp/cannabis industry.

GEA is one of the largest technology suppliers for food processing and a wide range of other industries. The global group specializes in machinery, plants, as well as process technology and components.

In 2020, Root Sciences and GEA joined forces to introduce nanoemulsion technology to the hemp and cannabis markets for use in cannabinoid applications. Together, the two companies have developed unique nanoemulsion formulations for use in manufacturing edibles, beverages, and topicals.