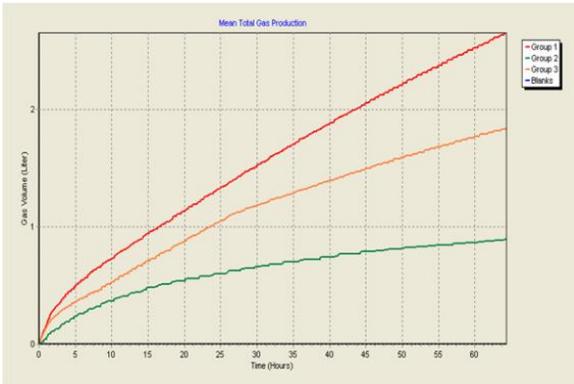


The schematic 3D model of the pre-treatment line with the substrate flow from right to the left. The green box is the treatment chamber where the electrical pulses is applied to the substrate.



Cumulative gas production (red CEPT®-treated, untreated yellow, green YMP)



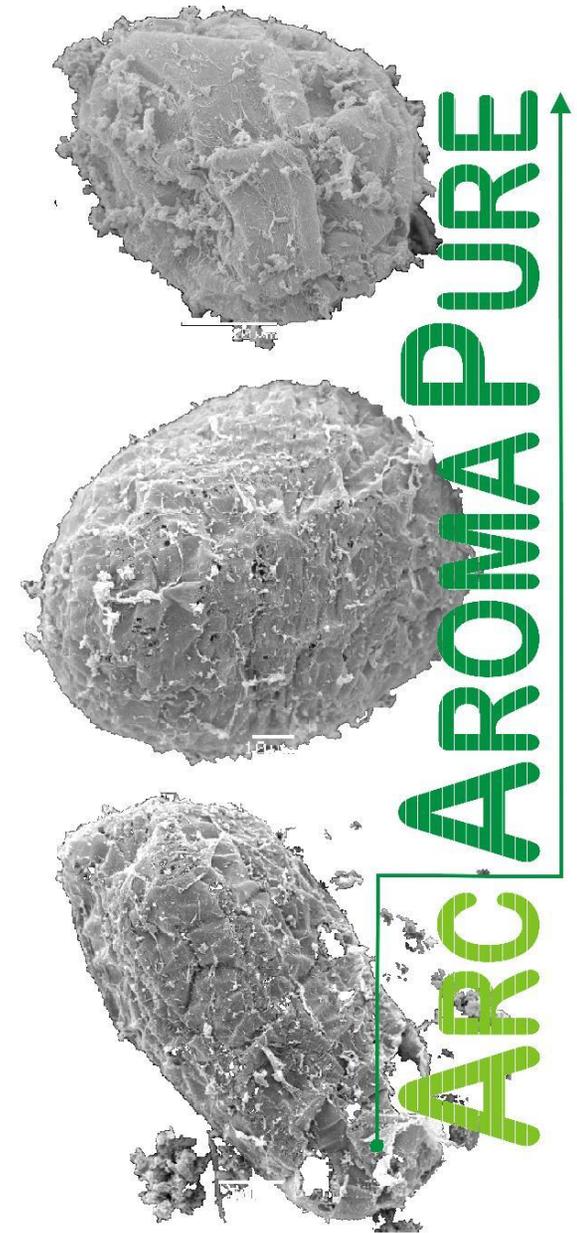
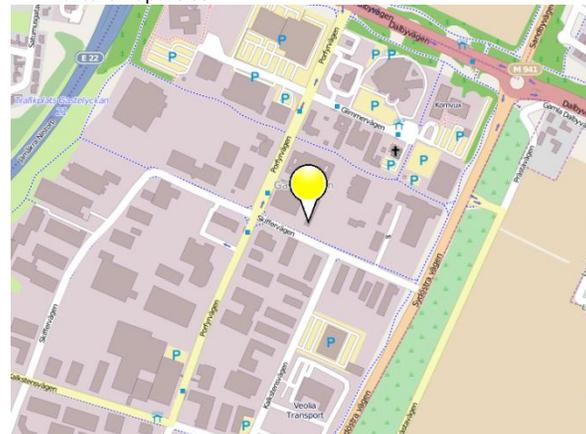
The pre-treatment line at delivery from the subcontractor. This unit is later mounted with all electronics and then installed in the container.

Protect and preserve without additives

Arc Aroma Pure shall develop and market cleantech products based on the innovative and patented CEPT®-platform, which helps our customers worldwide to streamline their production of biogas, clean water or tasty, safe and sustainable food in a climate smart way and meet the world demand for low cost, high-quality and environmentally conscious production.

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English

CEPT®

Arc Aroma Pure AB (publ) is a cleantech company developing the patented CEPT®-platform. CEPT® is a non-thermal, cost-effective and chemical-free system for biological treatment and pasteurization of pumpable products, "cold pasteurization." CEPT® stands for "closed environment PEF treatment" and is based on electroporation. Pulsed Electric Field (PEF) creates pores in the cell membrane. The phenomenon is scientifically analyzed and occurs when a cell is exposed to a strong electric field and this may be one or more very brief electrical pulses that have high power but a very low energy content.

Applications: There are many applications where the CEPT®-platform can make a big difference. Pretreatment of substrate for biogas industry, cold pasteurization of food and sanitation of sewage sludge and water (such as drinking water, industrial water and ballast water, etc.). Furthermore, the technology is an important part of the innovative freezing technology the associate company OptiFreeze develops which allows freezing of vegetables and berries without loss of flavor or texture.

Current focus: The current focus of Arc Aroma Pure is on the development of a pre-treatment line designed for the optimization of biogas production. When biogas substrate is CEPT®-treated, the cells and other structures in the substrate explodes and nutrients are released. The freed nutrients makes the production of biogas more efficient, it speeds up the process and increases the amount of gas that can be produced from a given amount of raw material.

Biogas: The production of biogas transforms a social burden to a resource. It produces biogas from sewage sludge, municipal waste, industrial waste, etc... The organic waste decays in an anaerobic environment, which produces methane and carbon dioxide. Methane can be stored, transported and when it's upgraded it becomes an excellent candidate to replace fossil fuels.

The Biogas industry's Problem: Biogas production is not profitable, in addition, the available material is not enough to cover the needs of the intended expansion. A latent risk of biogas production is the spread of disease and unwanted plants, therefore, the substrate is often hygienised. Hygienisation means that all harmful bacteria and microorganisms are killed, often by heating the substrate to 72 degrees for up to three hours. This is a very costly process, both in terms of investment and operation. Hygienisation must normally be carried out batchwise, thus an optimized constant flow cannot be obtained.

Solution: ARC Aroma Pure manufactures a complete line of pre-treatment based on CEPT®-platform. The platform has been

evaluated in cooperation with a leading energy group and large scale experiments have been carried out, inter alia, on a commercial biogas plant. In total, a large number of experiments have been carried out in the lab and on a large scale, all indicate that:

- The CEPT®-platform smashes cell membranes and other structures in the substrate. This releases nutrients causing the fermentation process to produce biogas **quicker and more** biogas can be produced.
- The CEPT®-platform enables the introduction of **new substrates** for biogas production that were previously unprofitable, such as certain crops, forestry residues, algae and seaweed.
- The CEPT®-platform has the potential to use **cold pasteurization** and can replace the heat-based hygienisation which gives a **substantial reduction in energy** consumption and a continuous flow resulting in a **higher capacity utilization**.

In summary, the technology has the potential to significantly improve production efficiency and improve profitability. With Arc Aroma Pure's technology, profitability can be achieved without state aid and subsidies.

Hygienisation: completed studies show that elimination of bacteria in the extent stipulated in the existing EU norm is possible with CEPT®. This means that the CEPT®-platform can be used as a very energy efficient alternative to conventional heat treatment for hygienisation of raw material for biogas production. However, a certification process must be performed before the method is used in full scale. In this procedure, the EFSA is the authorizing authority.

The pictures to the right are taken with an electron microscope. They show cells in a biogas slurry before and after CEPT® treatment.

1. The first image shows an untreated plant cell. Its cell membrane is intact and the cell is alive.
2. The second image depicts a cell with obvious damage as a direct result of the CEPT®-treatment. Big holes have been formed which are excellent attack vectors for bacteria. With pores in the cell wall, bacteria can penetrate into the cells and initiate the decomposition from the inside.

3. The third picture is an extreme magnification of the cell in Figure 2 in the right corner. Here you can see how the germs are

finding their way into the cell through the hole formed during the CEPT®-treatment. The bacteria, which perform the fermentation process, gets a new way into the cells which means that the cells in the sludge can be broken down much faster.

4. The plant cell in the fourth image has been treated with CEPT®. A closer analysis shows the pores in the cell formed by the treatment. Plant cells do not "explode" like animal cells because they have a cell wall that retains the structure even if it is full of the pores.

