

# Biomar® AHP: High-Rate Anaerobic Reactor with gas recirculation

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## TECHNOLOGY

The Biomar® AHP is a new type of high-rate anaerobic reactor for the treatment of industrial wastewater, originally developed by the Technical University of Hamburg-Harburg (Prof. H. Märkl), Germany. It combines low footprint and effective mixing through recirculation of biogas, which is virtually non-dependent on biogas formation during anaerobic degradation. Inlet concentrations of more than 100,000 mg COD/L may be treated. The anaerobic reactor is vertically staged in a cascade of so called modules, which are separated by biogas collectors. Typically three modules are implemented at a total height of around 20 m. Modules are shaped as loops with inner and outer sections. Biogas is partially collected at the top of each module. Biogas from the lowest module is recirculated to the bottom of the reactor, inducing mixing in the vessel. Additionally the reactor may be equipped with external pressurized settling for improved effluent sludge separation. Through external separation also small sludge particles are removed from the effluent and sludge loss is minimized.

## INNOVATION

- Multi-stage design (typically three modules)
- Level-controlled removal of biogas at different reactor heights
- Biogas recirculation for mixing
- External biogas purification possible for reduction of H<sub>2</sub>S partial pressure
- Patented pressurized settling (external)

## FIELDS OF APPLICATION

- Treatment of wastewater from the production of biofuels
- Yeast production wastewater
- Wastewater of food industries
- Paper production wastewater



Figure 3.- Full scale installation at a biodiesel production site

Improved settling of sludge particles through hydrostatic pressure

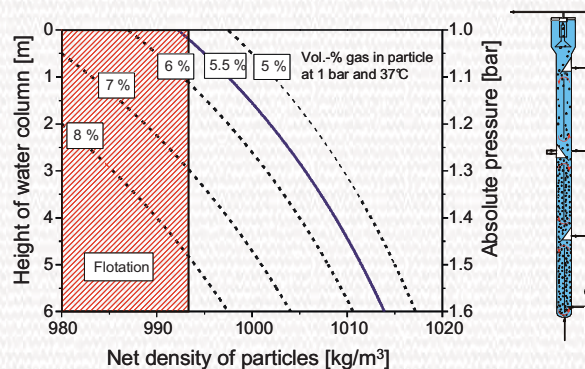


Figure 4.- Pietsch, T., Mehrwald, R., Grajetzki, R., Sens, J., Maerkl, H., Water Research. Vol. 37, no. 5, pp. 1071-1079. Mar. 2003

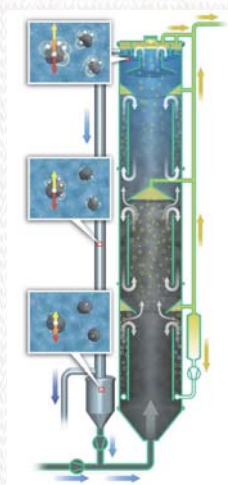


Figure 1.- Schematic Graph of Reactor and Hydrostatically Pressurized Settling



Figure 2.- Pilot Scale Reactor, EnviroChemie Rossdorf