

**Ciba<sup>â</sup> Expert Services****Innovative treatment of wastewater containing active pharmaceutical ingredients (API)****Introduction**

Because the demand for pharmaceuticals remains strong and analysis is continually improving, more and more pharmaceutical and hormone-active substances are being detected in our natural water bodies. The risks that these micro-pollutants pose to the aquatic environment are little known in spite of numerous research projects – leading to growing concern among the public.

**Problem**

A significant source is the production and formulation of active pharmaceutical ingredients and their intermediate products. The pharmaceutical-laden wastewaters from these plants are normally treated in conventional sewage treatment plants. But many active substances are not eliminated by these treatment plants and are ultimately released into our natural water bodies.

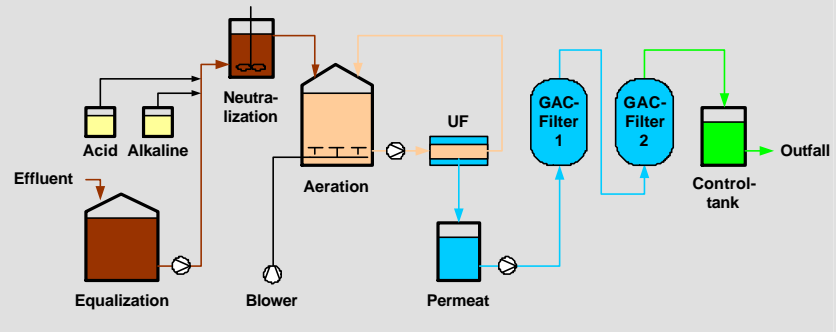
**Solution**

A process developed by Environmental Technology is used to treat API-contaminated wastewaters prior to discharge into a treatment plant. The process consists of a membrane bioreactor followed by an activated carbon adsorption stage. This combination of biological and adsorption treatment very efficiently and cost-effectively removes the active pharmaceutical ingredients from the wastewater – with minimum carbon consumption.

Membrane bioreactor followed by an activated carbon adsorption stage for treating 4 m<sup>3</sup>/h of wastewater. The system removes 95% to 99% of the active substances



## Simplified flow-sheet



## Mode of operation

Typically, wastewater from pharmaceutical production contains a large percentage of unproblematic substances and agents, and only small amounts of active ingredients. Most of the substances can be degraded in a bioreactor with little consumption of energy and resources. The membrane filtration retains all the bacteria in the bioreactor, which leads to stable operation and high degradation rates. After biological treatment permeate is free of suspended solids and contains only traces of refractory substances, mainly active ingredients which are removed very effectively in the subsequent activated carbon adsorption unit and with minimum carbon consumption. The process is completely automated and requires very little manpower and maintenance.

## Your advantage

- High API-removal rates due to the combined mode of operation
- Minimum activated carbon consumption and low operating costs
- Completely automated process provides high reliability and requires minimum manpower and maintenance

Ciba®Expert Services has many years of experience in environmental protection. We find solutions with ecological *and* economic benefits. We can give you an individually engineered treatment process and a suitable operation model designed specifically for your needs and circumstances.

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