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Research area: General aims

Environmental technology // Water

Key words:

Anaerobic treatment, recovered paper recycling, failure

Title:**Trouble-free operation of an anaerobic effluent treatment when recycling high-grade recovered paper grades****Background/Problem area**

Anaerobic technology for effluent and circuit water treatment is well established in the paper industry. There are indications that the use of certain high-grade recovered paper grades cause impairments of the plant output. The call for products with greater brightness resulted in greater use of these recovered papers in the past few years. The development and evaluation of economically and technically acceptable measures designed to ensure reliable and efficient anaerobic plant operation using high-grade recovered paper grades might cause the economically attractive anaerobic process to be used for effluent treatment in many small- and medium-sized mills as well.

Objectives/Research results

The objective of the research project is to prevent service failures and to guarantee reliable and efficient operation of anaerobic plants when high-grade recovered paper grades are being used.

On-site mill analysis has been executed for several mills that use high-grade recovered paper grades. Most of the mills are operating an anaerobic plant. The used recovered paper grades had been examined by biological and chemical analyses. In addition, materials preparation technology, sludge, process and effluent characteristics as well as the operating data of the process or effluent treatment plant had been assessed and recorded. Pilot trials in one mill had been executed for examining and evaluating measures for preventing and combating interruptions of operation of the anaerobic treatment plants by using a recovered paper grade especially studied during this research project.

The paper grades investigated showed the following effects:

- White wood free papers:
No disturbance of anaerobic degradation.
- Thermal papers:
Increase in residual COD by inert substances and for some grades (strong) inhibiting effects on anaerobic treatment at thermal paper concentrations which are realistic in paper mills with normal operating conditions. Inhibiting substances identified: Co-reactants; Inert substances identified: sensitizer, colouring agents
- Carbonless copy papers:
Increase in residual COD by slowly degradable/inert substances (fragments of optical brighteners and DIPN-analogue), no damage to anaerobic sludge by use of carbonless copy paper for recycling and input of substances into effluents

Non-effect amounts of thermal papers depend on grammage and coat weight of papers and on the percentage of critical substances present in the coating layer. In general their use is actually possible only in amounts smaller than 0,5 % (5 kg thermal paper/ m³ effluent).

Various technologies have been tested for the avoidance of failures and operational trouble in anaerobic treatment stages. The results show that active carbon treatment is actually possible and aerobic treatment of partial stream appears to be possible and suitable as well. Other tested technologies like filtration, adsorption, ozonisation are ineffective or not effective enough.

Application/Economic benefits

Anaerobic technology is the most significant treatment process for the paper industry from a process engineering and business management standpoint. Expanding the scope of application of this process will help to reduce effluent treatment costs. Another economic incentive for the use of high-grade recovered paper as the raw material is the increase in high-grade secondary fibre that can be used for the quality enhancement of new high-grade paper.

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Remarks

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