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COMBINED BIOLOGICAL AND PHYSICOCHEMICAL PROCESSES FOR TREATMENT OF BAKER'S YEAST WASTEWATER

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Abstract

Molasses, a by-product from sugar industry, is used as basic substrate and nutrient source in a large number of fermentation industries, such as ethanol, citric acid and yeast production. The wastewater from these fermentation processes presents high organic load and dark brown colour.

Treatment of highly polluted industrial wastewaters among molasses fermentation wastes is still challenging issue. Baker's yeast wastewater is a high strength molasses based wastewater consists of heavy organic and inorganic materials like melanoidine that is the dark brown colour with high COD (11000-80000 mg /l). Baker's yeast wastewater cannot be completely degraded using biological anaerobic or/and aerobic treatment processes. After conventional biological treatment, most of the organic load is removed but nevertheless the dark brown colour still persists and it can even increase due to repolymerization of coloured compounds. Therefore, a combination of biological and advanced oxidation processes have been suggested.

In this study, three different sequences of ozone, anaerobic and aerobic treatment systems were examined for treatment of baker's yeast wastewater: Ozone- Anaerobic- Aerobic, Anaerobic- Aerobic- Ozone and Anaerobic- Ozone- Aerobic.

The accumulative COD and colour removal efficiency achieved after each stage of combinations were as follows:

Ozon-Anerobic-aerobic: COD (41, 86, 91%); Colour (95, 72, 89%)

Anaerobic- Aerobic- Ozone: COD (67, 86, 99%); Colour (35, 56, ~100%)

Anaerobic- Ozone- Aerobic: COD (69, 81, 91%); Colour (36, 93, 95%)

The most effective combination was the sequence of "Anaerobic-Aerobic–Ozone". In the Ozon-Anerobic-Aerobic sequence after anaerobic treatment the colour increased.

In this contribution, the feasibility and engineering aspect of the biological and ozonation processes will be discussed and a comparison between different processes for decolourizing and COD removal of baker's yeast wastewater in further details will be presented.

Key words: aerobic, baker's yeast wastewater, decolourization, ozone