

Ultrasonic Treatment of Baker's Yeast Effluent

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Abstract : Baker's yeast industry uses molasses as a raw material. Molasses is end product of sugar industry. Wastewater from molasses processing presents large amount of coloured substances that give dark brown color and high organic load to the effluents. The main coloured compounds are known as melanoidins. Melanoidins are product of Maillard reaction between amino acid and carbonyl groups in molasses. Dark colour prevents sunlight penetration and reduces photosynthetic activity and dissolved oxygen level of surface waters. Various methods like biological processes (aerobic and anaerobic), ozonation, wet air oxidation, coagulation/flocculation are used to treatment of baker's yeast effluent. Before effluent is discharged adequate treatment is imperative. In addition to this, increasingly stringent environmental regulations are forcing distilleries to improve existing treatment and also to find alternative methods of effluent management or combination of treatment methods. Sonochemical oxidation is one of the alternative methods. Sonochemical oxidation employs ultrasound resulting in cavitation phenomena. In this study, decolorization of baker's yeast effluent was investigated by using ultrasound. Baker's yeast effluent was supplied from a factory which is located in the north of Turkey. An ultrasonic homogenizator used for this study. Its operating frequency is 20 kHz. TiO₂-ZnO catalyst has been used as sonocatalyst. The effects of molar proportion of TiO₂-ZnO, calcination temperature and time, catalyst amount were investigated on the decolorization of baker's yeast effluent. The results showed that prepared composite TiO₂-ZnO with 4:1 molar proportion treated at 700°C for 90 min provides better result. Initial decolorization rate at 15 min is 3% without catalyst, 14,5% with catalyst treated at 700°C for 90 min respectively.

Keywords : baker's yeast effluent, decolorization, sonocatalyst, ultrasound

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