

Thesis Title	Decolorization of Molasses Wastewater by Acetic Acid Bacteria
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Abstract

The studies were concerned in biological-decolorization of molasses wastewater by acetic acid bacteria No.PB103. At first, the optimal conditions such as carbon sources, nitrogen sources, pH and inoculum size, were determined for highest decolorization yield. The results showed that the optimal concentration of carbon sources, nitrogen sources, pH and inoculum were glucose 3%, yeast extract 0.5%, pH 6 and 2 ml of inoculum in 20 ml of synthetic molasses wastewater (7.6×10^8), respectively. The decolorization yield, COD removal efficiency and BOD₅ removal under above optimal condition were 78.31 %, 45.71% and 33.28% respectively. The COD and BOD₅ concentration in influent were 23,104 and 557.64 mg/l, respectively.

When the stillage and molasses wastewater from anaerobic pond were investigated, it was found that the molasses wastewater from anaerobic pond that was supplemented with nutrients could be easier decolorized than both nutrients supplemented stillage and non-nutrients supplemented stillage. The decolorization activity of acetic acid bacteria in supplemented and non-supplemented nutrients stillage were 32.33% and 9.77%, respectively. But the decolorization activity, BOD₅ and COD removal efficiencies of molasses wastewater from anaerobic pond that supplemented with nutrients were 75.38%, 33.33% and 64.29 %, respectively. The effluent COD and BOD₅ from above experiment were 15,384 and 1,990 mg/l, respectively.

For the determination of molecular weight distribution, the results showed that the large molecular weight pigment in both molasses wastewater (stillage and molasses wastewater from anaerobic pond) were reduced when it was cultivated with acetic acid bacteria No.BP103. And the

large molecular weight pigment in nutrients supplemented molasses wastewater could be removed easier than in non-nutrient molasses wastewater.

For the continuous decolorization process, acetic acid bacteria showed the decolorization activity at 74.47% within 4 day cultivation. And the BOD₅ was reduced to 544.53 mg/l. But the decolorization activity of the system was decreased after 8 day cultivation. For the semi-continuous decolorization process, acetic acid bacteria showed the decolorization activity higher than continuous system. The decolorization activity was the highest (84.99%) after 21 day cultivation. And this semi-continuous decolorization process could be operated with the stable decolorization activity even the system was replaced for four times.

Keywords : Acetic acid bacteria / Biological treatment / Continuous process / Decolorization /
Molasses pigment / Molasses wastewater / Semi-continuous process