Biofilm Formation for Fermentation Process

Abstract

A biofilm was usually found on solid substrates submerged in or exposed to some aqueous solution. Many biofilms were studied in their properties and effect in difference species of microbes and mostly used *S.cerevese* and *Z.mobilis* as 2 main microorganisms that used for studied in fermentation process in order to convert glucose into ethanol as a byproduct. Both of them can produce ethanol but they have different pros and cons. And this experiment was focused *on Z.mobilis* to studied of growth rate, biofilm formation and the consumption of glucose in 5 different strains; ZM4, 405, 548, 550, 551. There were had a different rate of growth in anaerobic and aerobic conditions; ZM4: $\mu_{max} = 2.38\frac{1}{hr}$, 405: $\mu_{max} = 0.693\frac{1}{hr}$, 548: $\mu_{max} = 0.3465\frac{1}{hr}$, 550: $\mu_{max} = 0.693\frac{1}{hr}$, and 551: $\mu_{max} = 0.231\frac{1}{hr}$. in order to see the different between 2 conditions and they were formed biofilm and detached from the surface in the different rate time; ZM4 was formed biofilm on day 1 and starting to detach on day 2, 548 was formed biofilm on day 2, 550 was formed on day 1 but in a very slow rate. For the consumption of glucose were tested by using DNS method for checked glucose that had left between free cell and biofilm which were in 30g/L of hydrolyzate, free cell glucose was consumed by ZM4 = 6.81 g/L, 548 = 4.34 g/L, 550 = 5.77 g/L. and for biofilm, glucose was consumed by ZM4 = 8.42 g/L, 548 = 4.72 g/L, 550 = 6.88 g/L. and there had not significantly different between growing on glass or plastic tube. Also for the consumption of glucose in hydyolyzate that there had not significantly different between using free cell and biofilm

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