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THE EFFECTS OF ANTIFOAM AGENT ON MEMBRANE FILTRATION

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ABSTRACT

In order to overcome the problems caused by foaming, antifoam agent or known as deformer has been introduced in various industries especially for cell culture use. Since then, it has been the important compound to minimize the effects of foaming. Proclaimed researches have shown that every antifoam is not just ruin the foam with various efficiency, but will give effect to the same cell and protein. The concentration and type of antifoam that are needed to relieve the foam must be same with the potential consequences obtained from the process. The benefit to the process depends on the higher the concentration of antifoam than would normally be used. The purpose of this study is to determine how antifoam effect the filter performance. For this studies, the result can be divide into 2 which are by using 1000 LMH and 2000 LMH. Flowrate of pump have been constant to 25ml/min for 1000 LMH and 50 ml/min for 2000 LMH. The concentration of antifoam is varies between 0.2%, 0.6% and 1%. The pressure and time taken per 5 ml of volume pass through the membrane filter has been recorded. From the data, flux, volumetric flowrate, resistance and loading capacity can be determined. The results show that the higher the concentration of antifoam, the resistance will get higher that will result to reduced time taken for the filter membrane to get clogged. Moreover, there also increase in pressure due to the formation of cake or modification of the membrane pore size. Due to this, the loading capacity of the filter has been reduced. The result also demonstrated that the flux rate is decreasing with time. Thus, the presence of antifoam in the feed load of a filtration process may disturb the filtration performance.

Keywords— antifoam, filter performance, flux, loading capacity,resistance

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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Foaming caused by improved volatile fatty acid generation and increased gas formation rate was seen in hydrogen fermenters, which strengthened the mixing conditions in the liquid stage and encouraged foam develop (Lin et al., 2008). In bioprocesses industries , foam is due to the introduction of gas in the medium and stabilized body protein crop (Routledge, 2012).

However, foaming causes many problems in industry and cell culture. Foaming usually happens occasionally in large-scale biogas plants and gives negatively effects on the environment and the economy of biogas plants. Foaming often leads to the development of a solid reverse profile with higher concentrations of solids on the top of a reactor, leading to the formation of dead zones and thereby reducing the volume of the active reactor (Ganidi et al., 2009). The foaming-effect actuates critical problems in large-scale anaerobic digesters, for example troubles in fluid phase partition (Subramanian et al., 2015), valve-obstructing because of blending of biomass with the vaporous stage (Kougias et al., 2014), and overflow of foam that capture the microbial biomass.

In order to overcome problems that caused by foam, antifoam was used in most industries and cell culture used. Antifoam may be divided into two which are fast and slow anti-foaming agents which rely upon their foam breaking system. Slow antifoam usually oils that breakdown foam during a higher period of time whereas fast antifoams, they are commonly blend agents that penetrate the layer of the foam