

CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME I

Editors:

Suleyman Aremu Muyibi
Mohammed Saedi Jami
Zaki Zainudin



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**Department of Biotechnology Engineering
Faculty of Engineering
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CHAPTER 30

ENHANCING THE DEWATERABILITY OF SLUDGE FROM WASTEWATER TREATMENT PLANT

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ABSTRACT

This paper reports the results of studies on flocculation and dewatering of sludge from wastewater treatment plant by cationic polyacrylamide (PAM) flocculants in the presence of surfactants. The surfactants used were namely anionic sodium dodecyl sulphate (SDS) and non-ionic Trixton X-100 (TX100). After the sludge was conditioned, sedimentation process and filtration process were carried out. The unflocculated sludge has very low settling rate about -33.68ml/h, and can be improved by approximately five times using PAM as flocculating agent. The settling rates are increased in the following order (from the fastest to the slowest): PAM>PAM and TX100>SDS>TX100>PAM and SDS>control. Meanwhile, for the specific cake resistance, only PAM shows the significant in results compared to other samples. However, even though the values for specific cake resistance are not much different, but the cake moistures were decreased. The values of cake moisture in decreasing order are as following: SDS>PAM and TX100>control>TX100>PAM>PAM and SDS.

Keywords: sludge, dewatering, flocculation, wastewater treatment plant, polyacralamide, sodium dodecyl sulphate.

INTRODUCTION

The estimated number of water pollution sources in Malaysia for 2002 was 13,540 comprising mainly of sewage treatment plants, agro-based industries, manufacturing industries and animal farms. From the identified sources of pollution, about 53 percent of the total number of sources was domestic sewage facilities which the total is 7126 sources. In 1994, the example of total waste sludge collected from septic tanks and connected services, increasing to 3.4Mm³ in 1998. There is however a reduction in sludge production of 32% from the septic tanks, with increase in those from connected services to 68% during the four-year period. The overall increase in sludge production is about 15% in four years. In 20 years, the projected increase in sludge production will be about 75% using 1998 as base year (Indah water, 1997). The problem of sewage sludge disposal is proving to be one of the most complex environmental problems nowadays.

Dewatering is a physical unit operation used to reduce the moisture content of sludge and biosolids for one or more of the following reasons (Metcalf & Eddy, 2003).