

FINAL REPORT

TREATMENT OF ANAEROBIC PALM OIL MILL EFFLUENT USING

SEVERAL POLYMERS

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DR. ABU ZAHRIM YASER (LEADER)

PROF. IR. DR. ROSALAM HJ. SARBATLY

PROF. MADYA DR. NURMIN BOLONG



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Dr. Abu Zahrim Yaser (Leader)

Chemical Engineering Programme, School of Engineering and Information Technology,
Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, MALAYSIA.

Email: zahrim@ums.edu.my Tel: +6088320000 x 3063, Fax: +6088320348

Prof. Ir. Dr. Rosalam Hj Sarbatly

Chemical Engineering Programme, School of Engineering and Information Technology,
Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, MALAYSIA.

Prof. Madya Dr. Nurmin Bolong

Civil Engineering Programme, School of Engineering and Information Technology, Universiti
Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, MALAYSIA.



SUMMARY

Palm oil mills industry generates large amounts of highly polluting effluent and usually it is being treated in anaerobic ponding/tank system to reduce the pollutants. However, the colour from anaerobic effluent (AnPOME) become dark brownish. Beside lignin and tannin, anaerobic digestion product like melanoidin might be contributed to the effluent appearance. Since public always assume that dark colour effluent is an indicator of water pollution, it is important to find a way for AnPOME decolourisation. Several treatments such as coagulation/flocculation, dissolved air flotation, Fenton oxidation, ultrafiltration and adsorption have been studied. Integrated system has been shown to be necessary for effective AnPOME decolourisation. Based on literature, application of polymer as pre-treatment may useful in this regards. The analysis of the POME from each ponds revealed that the removal of lignin-tannin is found to be significantly unchanged after anaerobic ponds. Furthermore, the anaerobically treated palm oil mill effluent (AnPOME) was in dark brown colour and high organic matter load. Therefore, coagulation/flocculation process was carried out as a treatment for the AnPOME. A non-toxic coagulant i.e. calcium lactate was chosen as a coagulant and five types of cationic/anionic polyacrylamides (PAM) (QF25610, QF24807, QF23912, AN1500 and AN1800) as flocculants. Coagulants dosage and sedimentation time were studied in order to determine the optimum conditions. The study revealed that the addition of polymer as flocculants expedite sedimentation process. The optimum sedimentation time was one hour and cationic polyacrylamide (QF25610) was found to be the best polymer with LMMCC, lignin-tannin, $\text{NH}_3\text{-N}$ and COD removal with 53%, 56%, 52% and 69%, respectively.

KEYWORDS: palm oil mill effluent, coagulation, flocculation, anaerobic digestion, decolourisation

