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ANAEROBIC FILTRATION OF WASTE WATERS  
ARISING FROM THE PRODUCTION OF  
BAKERS' YEAST

A thesis presented in partial  
fulfilment of the requirements  
for the degree of Doctor of  
Philosophy in Biotechnology  
at Massey University.

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1984

## ABSTRACT

A study was carried out to assess the effectiveness of the anaerobic filtration process in providing a relatively simple on-site waste pretreatment system for the wastes from the production of bakers' yeast. These are of a high strength and acidic nature. To maintain practical constraints on the project a real waste water was used. The waste water is low in suspended material, has a high organic matter concentration giving a COD of 70000 to 90000 mg/ℓ ( $BOD_5$  14250 mg/ℓ) and a pH of 4.5 to 5.0. Two experimental anaerobic filter units were constructed of glass cylinders packed with glass 'Raschig' rings as the inert support matrix, and used in the trials. A statistically designed experimental programme was used to test the effects of influent substrate concentration, hydraulic retention time, temperature and filter unit on the filter response variables. Substrate concentrations of 5500 to 47200 mg COD/ℓ (1000 to 9000mg  $BOD_5$ /ℓ) and hydraulic retention times of 1 to 5 days were used which gave rise to organic loading rates of 1.15 to 47.2 kg COD/m<sup>3</sup>d (0.2 to 9.0 kg  $BOD_5$ /m<sup>3</sup>d). Empirical models were derived from the response data, using multiple regression techniques, and describe COD removal rate, total gas production, methane production and conversion of COD to methane in terms of the independent process variables. Results showed that the anaerobic filter achieved COD removals of 34 to 65 percent with corresponding conversions of 24 to 78 percent efficiency to methane at loadings of up to 47.2 kg COD/m<sup>3</sup>d. The empirical equations were able to explain 92 to 97 percent of the observed variance. The system was stable over the entire range of applied conditions.

## ACKNOWLEDGEMENTS

I would like to extend my gratitude to the following

My supervisors, Professor R.L. Earle and Dr V.F. Larsen for their guidance and above all their patience over the years.

The Biotechnology Department for the use of their facilities, and especially John Alger for invaluable assistance with construction and maintenance of the equipment.

Dr Mary Earle for her continued encouragement and assistance with the preparation of the manuscript.

Joanne for giving up her time to do the typing.

The DSIR for providing the grant which enabled the project to proceed.

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