

## Production of Lactic Acid from Paper Sludge Using Simultaneous Saccharification and Fermentation Process

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### ABSTRACT

Production of lactic acid from paper sludge was carried out using simultaneous saccharification and fermentation (SSF) process, based upon the experimental data obtained from the unit process of separate cellulose hydrolysis and fermentation. SSF process was employed to avoid product inhibition, for one in several benefits of SSF. In batch SSF process, lactic acid of 16 g/L was produced from 5% paper sludge with the yield of 80%. In SSF of paper sludge in fed-batch mode, the lactic acid production was 81 g/L at 42°C, rating a yield of 78% and productivity of 1.48 g/L · h. Paper sludge which served as a feed appeared to have a pH buffering ability during SSF, probably due to inorganic ash components in the sludge. The final product concentration in the SSF was observed to be limited by the cellulose content in the system, which is expected to be solved by intermittent feeding of paper sludge. The mixed enzyme system used in the SSF of fed-batch mode was 5 and 2 U/mL cellulase and  $\beta$ -glucosidase in initial operation volume, respectively. Cellulase and  $\beta$ -glucosidase which carried out saccharification reaction of paper sludge were observed not to be degraded by fermenting microorganism, *Lactobacillus rhamnosus*.

### REFERENCES

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