AMMONIUM (NH$_4$-N) REMOVAL FROM LEACHATE THROUGH BIO-TRICKLING FILTER PROCESS FOR BIOGAS FEED

Name/NRP : Ginanjar Trio Pamungkas   NRP. 2308 100 528
Major  : Chemical Engineering – Faculty of Industrial Technology ITS
Advisor Lecturer : Dr. Ir. Sri Rachmania Juliastuti, M.Eng.
               Ir. Nuniek Hendrianie, M.T

ABSTRACT

Leachate (leachate) is the liquid waste generated by the landfill waste. It contains the dissolved organic components, inorganic components, heavy metals and xenobiotic organic components. Therefore it is necessary leachate treatment, one of the largest content of leachate is ammonium (NH$_4$-$\text{N}$). The purpose of this study was to obtain leachate as a standard raw material of biogas with appropriate NH$_4$-$\text{N}$ concentration and also obtain scale between feed composition and feed rate to the rate of nitrogen removal in leachate. The process used in this study is a biological trickling filter (bio-trickling filter) using activated sludge as a biological growth medium according to attached growth system. Variables used in this study is the comparison between the leachate rate and air rate of 1:3, 1:6 and 1:9 (L / min) with aeration only from the bottom column and aeration from the bottom column along with a half of the packing height. From research conducted Bio-trickling filters can be used as the leachate processing in an effort to reduce levels of NH$_4$-$\text{N}$ for biogas feed. The best ratio between the feed rate to the rate of air for leachate treatment with Bio-trickling filter system was 1:9 (L/min) with aeration from the bottom position and half of the packing height could reduce ammonium up to 91.798% with a final ammonium concentration is 110.16 mg NH$_4$-$\text{N}$ /liter and COD is 1601.804 mg COD / liter.

Key words: Leachate, ammonium, activated sludge, bio-trickling filters, attached growth
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