

**Pengaruh Gradien Kecepatan (G) dan *Dissolved Oxygen* (DO) Terhadap
Penyisihan COD Dan Amonia Dengan *Simultaneous Nitrification
Denitrification* (SND) Pada Sistem Karbon Lumpur Aktif**

Mega Nora Budiana, Wiharyanto Oktiawan, Junaidi

ABSTRACT

Biological wastewater treatment which is commonly employed is activated sludge system. Its aim is to coagulate suspended, colloidal and dissolved organic matters in the wastewater. Conventional activated sludge consists of aeration tank and sedimentation tank. Organic removal can be identified with COD (Chemical Oxygen Demand) values. Ammonia (NH₃) can be removed in activated sludge process in 2 stages nitrification and denitrification. These stages are usually conducted in 2 separate tanks, aerobic tank for nitrification and anoxic/ anaerobic tank for denitrification. However, This experiment attempted to remove ammonia in 1 tank, with Simultaneous Nitrification Denitrification (SND). Application of Granular Active Carbon (GAC) as the attach media of microorganism, combined with suspended system of activated sludge, is expected to be able to remove ammonia better. It can be accomplished in extreme condition that is less than 2 mg/L of DO (Dissolved Oxygen) concentration. Mixing can affect the formation of flocs where nitrification-denitrification occurs. Therefore, variation of DO and Mixing Velocity Gradient (G) is used in this experiment. Nitrogen removal with GAC can remove COD and ammonia better than that without GAC (decrease less than 15%). The highest rate of ammonia removal which was 83.85 % was accomplished in G (40-70) /d and (1.5-2) of DO. The highest rate of COD removal which was 99.65 % was accomplished in G (10-40) /d and (2-2.5) of DO.

Keywords: GAC, activated sludge, COD, ammonia, nitrification, denitrificatio, SND