

## Buffering capacity in an anaerobic baffled reactor treating carbohydrate–protein wastewater

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### ABSTRACT

A 10-L working volume of an anaerobic baffled reactor (ABR) with three, six and eight compartments using an organic loading rate of 4 g COD/l-d (named as 3C-OLR4, 6C-OLR4, and 8C-OLR4 experiments, respectively) was used. COD removal efficiencies of 74%, 78% and 83% were accomplished, respectively. The effluent pH and alkalinity values were maintained around 7.9 and 2000 mg/l as CaCO<sub>3</sub>, respectively, and the effluent VFA concentrations were mostly less than 500 mg/l as CaCO<sub>3</sub>. This resulted in a low VFA/alkalinity ratio (less than 0.4), which indicated that the system had a high buffering capacity with only 2000 mg/l as CaCO<sub>3</sub> alkalinity concentration. Subsequently, the eight-compartment ABR was selected to further investigate the effect of organic loading rates (OLRs) of 8, 12, 16 g COD/l-d (8C-OLR8, 8C-OLR12, 8C-OLR16). The same influent alkalinity (2000 mg/l) was applied to these three OLRs. The effluent pH values of those remained in the range of 8.1–8.5 and the effluent alkalinity concentrations were around 2500 mg/l as CaCO<sub>3</sub>. This signifies that the alkalinity requirement in the ABR treating carbohydrate–protein wastewater would be reduced, resulting in chemical cost reduction.

*Keywords:* Anaerobic baffled reactor; ABR; Alkalinity; Volatile fatty acid; VFA; SRT/HRT ratio

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