Tidal-induced Dilution of Ammonia – Nitrogen (NH_3-N) along Batang Salak

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ABSTRACT

NH_3-N is an important parameter considered for water quality monitoring. High NH_3-N contents in the river system may lead into euthrophication. Tidal flushing in the river determines the assimilation capacity of the river system affected by the tide. Therefore, the objective of this study was to monitor the tidal effect on the NH_3-N dilution in the Batang Salak. The study conducted along Batang Salak comprised eight stations during nebb tide. The first round of sampling started at 0900 hr during low tide with the highest NH_3-N concentration found at station 8. NH_3-N ranged from 0.47 mg/L - 2.86 mg/L. The 0900 hr trip corresponded with the decrease in tide level that brought the upstream farm discharge water of Loba Kara channel into Loba Bodoh where station 8 is located. NH_3-N recorded among station during 0900 hr trip was significantly different. Second round started at 1200 hr during low tide with station 6 showing the highest NH_3-N concentration. NH_3-N ranged from 1.17 mg/L – 3.03 mg/L. The high NH_3-N was likely due to the location of station 6 at Loba Kara estuary where the high tide water mixed with the prawn farm effluent. Third and fourth round started during high tide at 1500 hr and 1800 hr and NH_3-N concentrations ranged from 3.04 mg/L - 5.87 mg/L and 0.75 mg/L – 4.43 mg/L respectively. Station 6 and Station 4 showed the highest NH_3-N concentration during 1500 hr and 1800 hr respectively. Station 6 still had the highest NH_3-N as the previous round at 1200 hr. The highest NH_3-N at Station 4 at 1800 hr was due its at the upstream of the Loba Kara where the pond farm effluents discharged was brought back upstream by the peak high tide at 1700 hr. NH_3-N concentration at 1500 hr was significantly higher compared to NH_3-N recorded during 900 hr, 1200 hr and 1800 hr. This study indicated the possibility that the pond effluent was discharged during high tide. Tide level thus influences the NH_3-N content in the river where the 1500 hr was the highest and slowly dropped following the tide level.

Keywords: tidal flushing, ammonia – N, water quality

INTRODUCTION

Samariang River is an important river supporting the community around Batang Salak area in terms of household income. However, shrimp farm nearby discharged their ponds effluent into Samariang River. Nitrogen (N) is well known as the main component in shrimp farm effluents that originated from the nitrogen-rich pellets[1-4] and prawn excretions.[3,5] Domestic sewages from urban populated area and the villages nearby also contribute into NH_3-N in Batang Salak. Tidal cycle in the river system become the main factor to maintain the carrying capacity to assimilate the shrimp farm discharge. This scenario shows us the importance of tide as a means for shrimp pond effluents dilution along the river. Low tide theoretically brought the pollutant to the sea while high tide will bring back the pollutant upstream. Ammonia-nitrogen (NH_3-N) is selected to determine the dilution effect of tide because it exists in large amount in shrimp ponds effluent and also an important agent responsible for river euthrophication. Thus this study aims to determine the tidal effect on NH_3-N dispersion along Batang Salak.