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KITTISAK TONCHANACHAI : APPLICATION OF UASB FOR WASTEWATER  
TREATMENT FROM SEA-FOOD INDUSTRIES. THESIS ADVISOR : ASSO.PROF.  
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The objective of this research was to study the performance of UASB in treating sea-food wastewater by using four UASB reactors (UASBR) with different gas-solid separators (GSS). Wastewater was obtained from a factory in Samutsakhon and neutralized by adding soda ash 1 g/l. The research consisted of 2 parts. The first part was conducted at the factory using UASBR with GSS #1 and #2 at hydraulic retention time (HRT) of 12 hours and with the acidified tank. Both types of GSS had good separation of gas and solids and had the same surface loading rate of 0.18 m./hr. The volume of GSS for UASBR type #1 and #2 were 14.5 and 60 litres respectively. The experimental result showed that UASBR #2 performed slightly better than #1 at the organic loading of 3.73 kg.COD/m<sup>3</sup>-day. The COD removal efficiency was 55.1% and 46.2% respectively, with the same methane yield of 0.15 l./g.COD removed. The methane contents were 36% and 38% respectively. When the experiment was conducted for a long period of time, the flotation and wash-out of all sludge occurred.

The second part was conducted in the laboratory using UASBR with GSS #3 and #4 which were different in their gas-solids separation capability. The GSS #3 allowed escape of some gas and solids while the GSS #4 could trap the gas and solids better. The research in the second part was conducted also without the acidified tank. The HRT used for the experiments without the acidified tank was 18 hours while in the experiments with acidified tank, the HRT were 12, 24 and 36 hours (excluding the retention time within the acidified tank). The experimental result showed that UASBR #3 performed better than #4. The system without acidified tank had low efficiency and having the COD removal efficiency of 17.0% and 11.2% at the organic loading of 1.77 kg.COD/m<sup>3</sup>-day. Methane yield were 0.09 and 0.32 l./g.COD removed and the methane contents were 35% and 45% respectively. Furthermore, the flotation of sludge bed occurred throughout experiments. However, when the acidified tank was applied, the COD removal efficiency was increased to 43.9% and 36.0% at the organic loading of 2.57 kg.COD/m<sup>3</sup>-day and the flotation of sludge bed disappeared. Methane yield were 0.11 and 0.24 l./g.COD removed and the methane contents of 51.5% and 50.5%. These results indicated that the acidified tank did improve the system performance. The difference in the efficiency might be due to the use of different type of GSS. The escape of solids in using GSS #3 made the system worked more effectively. Furthermore, it was found that at the HRT of 24 and 36 hours the organic loading was decreased to 1.29 and 0.86 kg.COD/m<sup>3</sup>-day and the COD removal was increased to 58.8% and 70.7% respectively. The methane yield in this experiment was lower than the theoretical value (0.35 l./g.COD removed).

From the experimental results it can be concluded that sea-food wastewater treatment required the acidified tank. The HRT and organic loading had direct effect on the COD removal efficiency. The GSS #1 and #2 were unable to solve the flotation and wash-out problem of sludge and The GSS #3 was more suitable than GSS #4.

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