Comparison of faecal sludge composition and influential factors on dewaterability in Japan and Vietnam

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1 BACKGROUND AND OBJECTIVES

While faecal sludge is treated with on-site sanitation systems such as septic tanks in many developing countries, the treatment efficiency of such systems is still limited. For the appropriate treatment of desludged faecal sludge, the process of sludge dewatering can play a significant role on the treatment efficiency improvement and cost reduction. There is not much knowledge on sludge dewaterability. This research aimed to (1) characterize faecal sludge properties and (2) identify factors which affect the sludge dewaterability. The research fields were set in Vietnam, where the importance of appropriate sludge treatment is increasing, and in Japan, where treatment of faecal sludge has long been implemented.

2 MATERIALS AND METHODS

Faecal sludge samples from Japan and Hanoi City, Vietnam were collected and used for measurements. In Japan, night soil samples (n =17) and *Joukasou* sludge (n =10) were collected from 5 faecal sludge treatment facilities. In Hanoi, faecal sludge samples from domestic septic tanks (n =10) and public toilet (n =4) were taken. General parameters including TS, surface charge by colloid titration method, and particle size distribution (PSD) by Serial filtration method without using advanced equipment, were then measured. As for dewaterability index, Capillary suction time (CST) and moisture dewaterd were studied. Also, adjusted CST (CST/TS) was also used in this research because CST is easily influenced by solids.

3 RESULTS AND DISCUSSION

The parameters for sludge solids, TS, TSS in Vietnam tended to be higher than faecal sludge from Japan. Next, correlation analysis between faecal sludge characteristics was conducted without classifying kinds of faecal sludge. Then, significantly strong correlation of NH_4-N and E.C. were clarified. Also, surface charge has weak correlations with pH, and 10 μm≦TS < 32 μm. Through these comparison and correlation analysis, it is suggested that faecal sludge characteristics is not always depend on kinds of faecal sludge.

From the correlation analysis between CST and Moisture dewatered, there was not significantly correlation. Result between adjusted CST and moisture dewatered was also same. While these parameters are widely used as dewaterability index of sewage sludge, suggesting the dewatering mechanisms are different.

Correlation between dewaterability and characteristics showed moisture dewatered has a significant correlation between; surface charge, E.C., NH4-N, TS < 10 μm, 32 μm ≦ TS < 75 μm and 75 μm ≦ TS < 1 mm. On the other hand, adjusted CST had a significant correlation with E.C. and TS < 10 μm. Next, as objective variable was dewaterability and explanatory variable was characteristics, multiple regression analysis was conducted. This result indicated that adjusted CST could be estimated from either surface charge and E.C. or surface charge and NH4-N or surface charge and TS < 10 μm. Given the fact of correlation between E.C., NH4-N and fact of correlation between surface charge and 10 μm≦TS < 32 μm, it is suggested that surface charge and ion matter concentration included in TS < 32 may be control factor.