# Does Depth And Sanitation Type Affect The Quality Of Faecal Sludge In The Tropics? The Case of Yaoundé, Cameroon

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## Background:

Faecal sludge (FS) management is a challenging problem in low-income countries where large parts of the urban population rely on onsite sanitation systems (Koné, 2010; Strande et al., 2014). In these countries, the discharge of raw faecal sludge directly into the environment is a common practice that threatens environmental and public health, because pollution of water resource. To avoid this situation, characterization of faecal sludge for adequate treatment before discharge into the environment is needed. Many studies were carried out on the faecal sludge characterization and treatment (Kengne, 2008; Bassan et al., 2013). Cameroon like other sub-Saharan countries lack in term of FS characteristics in onsite sanitation system. This work aimed at studying the effects of storages systems on the characteristics of FS in Yaoundé.

## Objectives:

This work aimed at assessing some of the factors that affect the quality of FS in on-site sanitation systems in Yaounde, especially the type and depth of device.

## Method:

From January to April 2014, 53 FS samples were collected from different onsite sanitation systems in various locations of Yaounde (47 % from traditional pit latrines, 6 % from flush toilets, 11 % from septic tanks, 6 % from VIP latrines and 19 % from 'piped' latrines). Other information regarding onsite sanitation devices were also collected, including latrine depth measurements. Parameters such as total and suspended solids, total volatile solids (TVS), chemical oxygen demand (COD), biological oxygen demand for five days ($BOD_5$), total Kjeldahl Nitrogen (TKN), moisture content, ammonium nitrogen ($N\text{-}NH_4$), pH, redox potential, electric conductivity, helminth ova and protozoa were determined according to standard methods for the examination of water and wastewater (AWWA,-APHA-WEF, 2005; Schwartzbrod J., 2003).

## Results

### Depth of devices and FS characteristics

The depth of device alone seems not to influence the quality of sludge. N-NH4, TKN, COD and $BOD_5$ for instance showed scattered values (Figure 1.1).

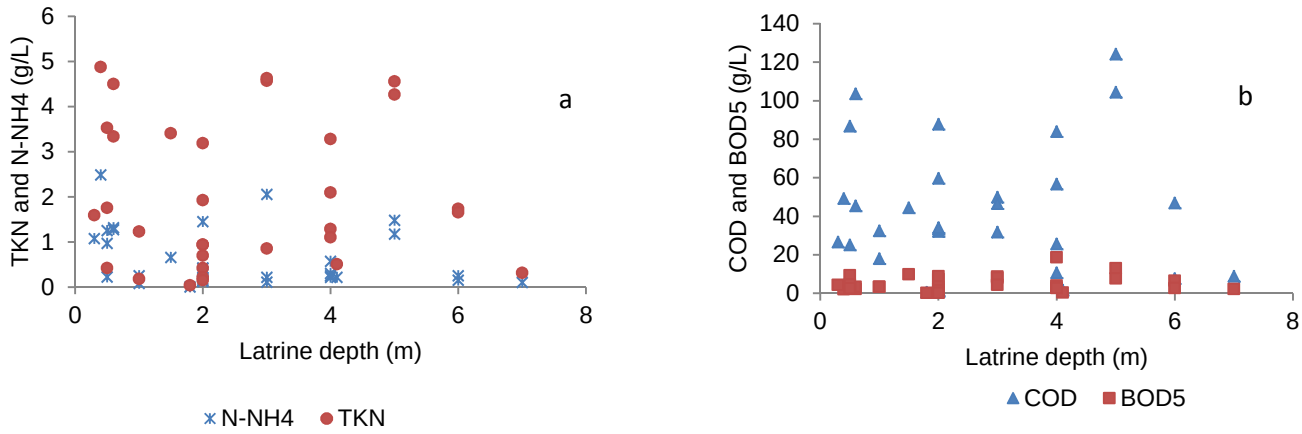


**Figure 1.1.** Variation of some FS parameters with depth of traditional pit latrines investigated (a: N-NH4 and TKN; b: COD and BOD5).

**Types of devices and FS characteristics**

Average pH of FS sampled were slightly basic (pH= 7.2) with minimum value of 6.87 units in superficial latrines and maximum values of 7.65 unity in flush latrines. Regarding organic content, average Values of BOD5 and COD where 41.46 g/L and 4.77g/L, 33.20 g/L and 2.22 g/L, 23.82 g/L and 3.52 g/L, 3.03 g/L and 1.37 g/L, 28.44 g/L and 3.41 g/L respectively for traditional pit latrines, VIP latrines, flush latrines, septic tank, 'piped' latrines (Figure 1.2).

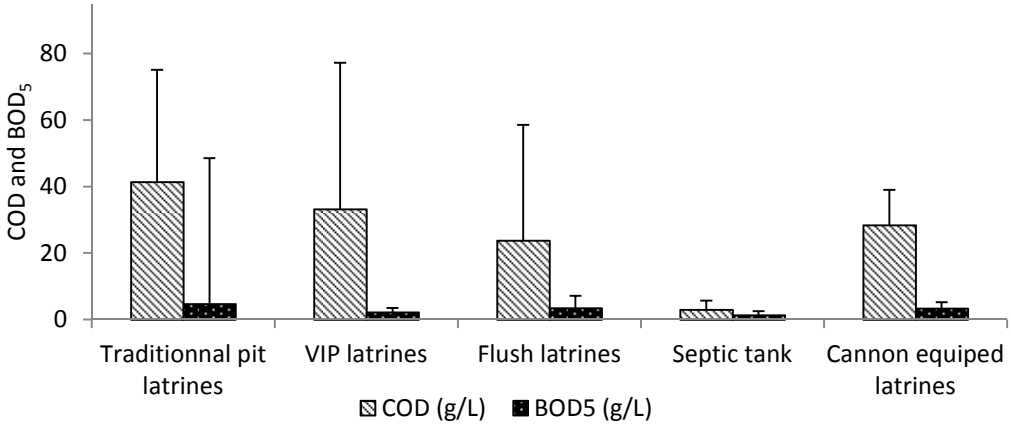


**Figure 1.2.** Variation of some physicochemical parameters with type of devices.

For TKN and salinity average values obtained were 2.06 g/L 3.03 ‰, 1.64 g/L and 2.49 ‰, 0.96 g/L and 3.35 ‰, 0.52 g/L and 1.22 ‰, 0.84 and 3.78 ‰ respectively for traditional pit latrines, VIP latrines, flush latrines, septic tank, 'piped' latrines. According to water content and total solids, high variability were found with mean values of 51.02 % and 10.89 %, 54.26 % and 4.56 %, 60.47 % and 4.30 %, 61.46 % and 1.27 %, 58.57 % and 12.57 % respectively for traditional pit latrines, VIP latrines, flush latrines, septic tank and 'piped' latrines. Helminth ova were more prevalent than protozoa in FS (210 and 69 parasites/L, respectively). High concentration of parasites were found in septic tanks (308 parasites on average /L), followed by traditional pit latrines, flush latrines, 'piped' latrines and VIP latrines (217, 129, 128, 111 parasites/L, respectively). *Ascaris lumbricoides, Enterobius vermicularis, Ankylostoma duodenale, Fasciola hepatica* were the most prevalent parasites.

## Conclusion

The faecal sludge characteristics were highly variable between latrines investigated. Septic tank was associated to the best stabilization of faecal matter than other types of devices investigated. The quality of FS was not affected by the depth of device.

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