

# Possibilities for the use of Sludge from a drinking water treatment plant at Ggaba III in Kampala, Uganda

*Charles B. Niwagaba, Ajak Ezekiel Ayii, Ambrose O. Kibuuka and Raffaella Pomi*

## **Abstract**

Sludge from the drinking water treatment plant at Ggaba III, located in Kampala (Uganda), was tested to evaluate the feasibility of two valorization routes, for building material and Solid Recovered Fuel (SRF) production. The aim of the research was to divert the huge amount of sludge produced every year, approximately equal to 2,140 metric tons of TSS/year, from landfilling. The average high heating value of the sludge was 8.44 MJ/kg TS, corresponding to the lower value of the interval of variation typically reported for other biosolids (8.0-23 MJ/kg). Different bricks were prepared at sludge to clay ratios of 0, 0.05, 0.1, 0.3 and 0.5 by weight. For each mixture composition, bricks of nominal size 215 x 102.5x 65mm were prepared by hand and fired for 6hrs in a Hoffman kiln at temperatures: 850°C, 900°C, 950°C, 1000°C and 1050°C. The bricks produced with a sludge to clay ratio of 0.1 fired at temperatures of  $\geq 980^{\circ}\text{C}$  met the compressive strength of 3N/mm<sup>2</sup> for common bricks according to Ugandan Standard (US) 102:1995. These results suggest that water treatment sludge at Ggaba is more suitable for the production of common bricks than using it as an energy source. Given the encouraging results that make the studied valorization route applicable in an emerging economy country as Uganda, further investigations are required to assess the leaching behaviour and stability of the mechanical properties over time.

**Keywords:** Bricks; Compressive strength; Heating value; Loss on ignition; Temperature