

Drying characteristics of textile dyeing sludge and use as a fuel

Chinthaka Jayakody and Madhavi Wijerathne

Dept. of Chemical & Process Engineering, Faculty of Engineering,
University of Peradeniya, Peradeniya

Textile sludge is considered as a hazardous material due to contamination of heavy metals contributed by the pigments used in fabric dyeing process. Currently, sludge is incinerated to recover heat energy for industry purposes. However, sludge incineration has some limitations due to excessive moisture which is trapped inside the sludge particles. This research investigated the drying characteristics and feasibility of use of sludge as a fuel.

Preliminary experiments were carried out to identify drying characteristics of different aged sludge samples, particle size distribution and calorific values of dried samples. Temperatures of sludge samples at different processing stages were also measured.

It was found that bonding strength of sludge and moisture are increased to a certain extent and then, gradually decreased with the aging of the sludge. This may be due to unbound moisture content in the sludge, which is reduced with the age. Further, microbial decomposition or slow chemical reaction may also play an important role in moisture trapping mechanism of the sludge.

The highest calorific value 13,500 kJ/kg was measured in the fresh sludge after drying at 104°C for 9 hours. This could be due to high concentration of volatile matter in fresh sludge. Therefore, substantial amount of heat energy can be obtained once the moisture is removed from the textile sludge.

Key words: Textile sludge, drying characteristics,