Effect of digestion practice on production of odorants from anaerobically digested biosolids


ABSTRACT
This study was conducted to evaluate biosolids odorant production from anaerobic digestion processes. To understand the impact of upstream solids characteristics on VSC production, three sets of biosolids cake samples from a mesophilic anaerobic digestion facility were analyzed. The anaerobically stored cake samples were analyzed for VSCs after they were dewatered using the same dewatering equipment type but on different dates (several months apart). The VSC production characteristics from the cakes varied considerably for the three sample dates, even though the upstream anaerobic digestion process was operating in a consistent manner with similar volatile solids destruction efficiency and volatile solids remaining for the three sample dates. It is hypothesized that although anaerobic digestion performance characteristics may impact biosolids VSC production characteristics, the parameters used to evaluate anaerobic digestion performance efficiency do not adequately describe downstream product odor characteristics or potential. In an additional experiment, the cakes from three types of digestion processes were evaluated for VSC production characteristics. The processes included mesophilic digestion, temperature-phased digestion and thermophilic digestion. It was found that thermophilic digestion creates a lag phase in VSC odorant emissions. This lag phase in odorant emissions for thermophilically digested biosolids should provide a longer time-window for biosolids land application. The peak methanethiol concentration for biosolids obtained from thermophilic and temperature-phased facilities were in general lower than for those obtained from mesophilic digestion facilities from this and past investigations, confirming more general observations by several facility operators that thermophilically digested biosolids produce lower odor products.