

Dewatering equipment can affect biosolids odors

Biosolids can become more odorous during storage, and these odors are thought to be caused by protein degradation. Protein contains amino acids, such as cysteine, methionine, typtophans, and tyrosine, that can break down to form odorous volatile sulfur compounds (VSCs) such as mercaptans and dimethyl sulfide, and aromatic compounds, such as indole, skatole and p-cresol.

When analyzing biosolids that had been digested and dewatered using high-solids dewatering equipment researchers found that methanethiol and dimethyl sulfide emissions were two orders of magnitude (in ppmv) greater than indole, skatole and p-cresol emission. Emission of the two volatile sulfur odorants occur during the first two weeks of storage, while indole, skatole and p-cresol emissions occur later.

EFFECTS OF DEWATERING EQUIPMENT:

Researchers found that the type of dewatering equipment influenced VSC production. The high-solids centrifuges are much more likely to produce more VSC as compared to belt filter presses. In fact, belt filter presses simulator resulted in no detectable VSC production. Apparently, the belt filter press is a low-shear device that does not increase protein lability and subsequent VSC production. In summary, low-shear solids processing equipment will minimize VSC production characteristic in digested biosolids(as long as the digestion process performs adequately).

Researchers found that peak volatile sulfur compounds (VSCs) production was linked to protein lability. Also discovered that a decrease in headspace methane emission rate correlates with an increase in peak VSC emission, suggesting that partially inhibiting methanogenesis may influence VSC emission. Labile protein removal during storage may need to be compared with VSC emission, because all labile protein may not be immediately bioavailable.

So, researchers suggests that VSCs have an odor cycle where a balance exists between odor production and degradation processes. If protein bioavailiabililty increases after digestion, it can break down to form odor compounds.

CONCLUSIONS:

Overall, researchers found that dewatering triggers VSC production and the type of dewatering equipment affects VSC emission characteristics considerably. High-solids centrifuges increase VSC odors as compared to low-shear belt presses. Odor compounds in digested biosolids have a production and degradation cycle that is affected by dewatering and storage processes. High velocity ventilation and removal of VSCs is strongly recommended within a dewatering building.