

HEAVY METALS AND PCBs IN SEWAGE SLUDGE DURING THERMOPHILIC DIGESTION PROCESS

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Abstract: The investigations were carried out in order to assess the effect of thermophilic fermentation on changes in concentration of seven congeners with codes: 28, 52, 101, 118, 138, 153 and 180 in sewage sludge. The total concentration of PCBs was the highest before the process of thermophilic fermentation. On the tenth day of the process of fermentation it was found that the total concentration of LCB doubled the previous level, whereas in higher chlorinated PCBs this value decreased twice. After the process of thermophilic digestion, all the determined congeners of PCBs were still present. However, their total concentration was reduced by 84% on the fourteenth day of the process.

Low concentration of heavy metal ions in the liquid phase of sewage sludge was observed. The metal ions precipitated and remained bound throughout the stabilization process. Metal speciation analysis was performed, and revealed some changes in the chemical forms of the metals during the stabilization process of sludge. The highest increase of zinc, copper, nickel, cadmium, and chromium concentration was observed in the organic-sulfide fraction, whereas the highest increase of lead was found in the residual fraction. Thermophilic methane fermentation did not cause the accumulation of heavy metals in the mobile fractions of sludge.