



Investigation of Heavy metals stabilization in compost of grain residue with bio-fuel ash and zeolite additives

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The paper presents the methods of experimental investigations of composting the grain residue substrate, obtained after its anaerobic fermentation, with additives (zeolite and wood ash) as well as the analysis of investigation results. Specimens of fermented waste (grain), fruit-tree (apple-tree) leaves, biofuel ash and natural zeolite were composed for composting. The investigations were performed with a laboratory composting equipment (Patent of the Republic of Lithuania No 5675, 2010 08 25) and the average duration of mixture composting was 4 weeks. The compost's composition (the content of macro- and micro-nutrients), humidity and pH were determined weekly. After the completion of the compost experiment of fermented grain with biofuel ash and with zeolite, the heavy metals were determined. The heavy metals concentration decrease according to the intensity of sorption as follows: $Cd > Cr > Pb > Zn > Cu > Mn > Ni$. The investigation results shown that upon composting fermented waste with biofuel ash and additives of natural zeolite the content of heavy metals, Cd, Cr, Pb and Zn, in compost can be reduced by more than 50%. The concentrations of Cu, Mn and Ni in the compost biomass fall by 48.2%, 27.7% and 13.9%, respectively. This showed that a complex use of biofuel ash and natural zeolite additives for the improvement of the process of composting allows a more efficient reduction (by over 2 times) of concentrations of some heavy metals in compost.