

Title: BIODEGRADABILITY DETERMINATION OF SLUDGE OF CITRUS JUICE INDUSTRY IN SOIL.

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Abstract:

The sludge composition is diverse and depends on the source of the effluent. Some are easy to be degraded and do not exhibit toxicity, others from the chemical industry can be toxic in varying degrees and even recalcitrant. The juice industry is growing and consequently the production of this type of waste also remains a problem for businesses. Therefore, the realization of analyzes is required to enable the safe disposal of this sludge. The environmental organizations provided rules for its disposal in soil. One requirement is that about 30% of carbon has been biodegraded in 50 days. The aim of this study was to verifying the sludge biodegradability from the citrus juice industry, respirometric technique and quantify the microorganisms involved before and after biodegradation. The analyzed material showed, 78.9% moisture and 21.1% solid waste, of which 19.3% organic matter and 11.04% total organic carbon. This sludge was mixed with soil at 5 and 10% proportions. Adding the sludge in the soil it was observed significant increase the production of carbon dioxide when related to the control soil. Results showed that there was intense CO₂ production in the first 15 days for the two tests. The soil with 5% of sludge addition had accumulated CO₂ content of 6,28 mg/g soil and with 10% addition the CO₂ accumulated was 9,88 mg/g soil. On the other hand, the biodegradation efficiency decreases when increasing the amount of sludge added to the soil. In soil with 5% sludge was observed biodegradation efficiency of about 30% between 7 and 9 days, reaching a maximum of 55% in 50 days of incubation. Regarding the samples with 10% sludge concentration it was observed that the 30% efficiency was achieved between 15 and 17 days and only 43% in 50 days. The bacterial population after 50 biodegradation days remained at the same initial count rate, about 10⁵ CFU/g soil. Regarding fungi, it was observed that there was intense colonization of sludge addition to soils in the first week of the experiment, but after 50 days the number of fungi returned to initial levels 10⁵ CFU/g soil, this is probably due to the depletion of organic matter in soil.

Keywords: sludge biodegradation, respirometry biodegradation efficiency.

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