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Stabilization of industry sludge by composting for use as an organic fertilizer

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The effluent treatment plant having PBLEINER SA food industry produces sludge coming from aerobic treatment reactors. The research team FIQ-UNL evaluated the feasibility of their use for the production of organic fertilizers as part of an environmental management problem to reduce the volume of sludge to be moved to land farming located more than 300 km of the plant. The mean values of the variables analyzed in the sludge were the following: carbon: 23.7 %, nitrogen: 7.83 %, pH: 7.36, bulk density: 0.722 g.cm-3, actual density: 1.76 g.cm-3, porosity: 50.7 %, potassium: 0.242 %, phosphorus: 1.29 %, calcium: 1.84 %, magnesium: 0.364 % and electrical conductivity: 3.51 dS.m-1 (25 ºC). The content of heavy metals in sludge is much lower than the limits set by the European Union, USEPA and SENASA for use in agriculture. The mean values of the metals analyzed in the sludge were the following: cadmium: no detected, lead: 18.7 mg.kg-1, zinc 213 mg.kg-1, copper: 40.7 mg.kg-1, nickel: 110 mg.kg-1, chrome: 406 mg.kg-1, mercury: 1.53 mg.kg-1. In this framework it was proposed stabilization of sludge by composting, using sawdust or chips as stabilizing material, with aeration technique in rows with frequent turning and recycling leachate, so as to degrade organic solids humic material for application as a soil conditioner, this is for transformation into a new product to be used as fertilizer. The company provided the physical space and technical staff to assist the research team. This process design is a proposal to improve the waste treatment of an industrial plant, reducing its environmental impact and enabling the use of the resulting product for soil enhancement in the region. Optimizing operating parameters such as kinetics, moisture, temperature, pH, total dissolved solids, nutrient availability, alternative sources of carbon and processing steps, will allow obtaining technical data for the modelling process.