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MIXED DESIGN FOR PHYTOTOXICITY GERMINATION BIOASSAYS IN *Lactuca sativa* L. USING PINE BIOCHAR AND MUNICIPAL SOLID WASTE COMPOST

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Abstract

The aim of the research was to assess the Germination Index (GI) with *Lactuca sativa* L. applying different doses of pine biochar and compost from municipal solid waste (19 treatments) through the i-optimal mixed design. The physicochemical characteristics, heavy metals, functional groups of biochar and compost were evaluated. The i-optimal statistical model had 3 factors: (A) compost (0-20% w/w), (B) biochar (0-15% w/w) and (C) sand (65%-100% w/w). The biochar was produced at 300°C (PBC300) and 500°C (PBC500), 15°C/min, 1.5h, and the temperature was a block factor for the mixed design. The physicochemical characteristics and heavy metals of biochar and compost are in accordance with international legislation, excepting arsenic in PBC500. Average GI of all the treatments for PBC300-compost exceeded the minimum germination content established (GI>80%) compared to PBC500-compost. Furthermore, the mixed design that best fitted for all treatments was the special cubic with a p-value= 0.0009 and R² =0.8366; however, values with high doses of compost could have phytotoxic effects on *Lactuca sativa* L. It is concluded that the biochar-compost under different doses and under an adequate methodology could predict values of GI in *Lactuca sativa* L. It is suggested that further studies be carried out regarding this matter.

Key words: bioassay germination test, compost, *Lactuca sativa* L., mixed design, pine biochar

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