عنوان مقاله:

Sugarcane waste products as source of phytotoxic compounds for agriculture

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خلاصه مقاله:

Purpose This article aims to evaluate the phytotoxic potential of metabolites present in the waste from sugarcane processing industry, such as vinasse, filter cake and bagasse, in order to reuse them as raw materials for the production of natural herbicides. Methods Vinasse, filter cake and bagasse were submitted to different treatments, which originated ۱۵ different samples. They were chemically identified by negative-ion mode electrospray ionization Fourier transform ion cyclotron resonance mass spectrometry (ESI(-)FT-ICR MS), gas chromatography-mass spectrometry (GC-MS), and liquid chromatography–mass spectrometry (LC-MS). Furthermore, they were submitted to phytotoxic assays, and to total phenolic content determination. Correlation between chemical and biological methods was performed through chemometric analysis and multiple linear regression. Results From vinasse, dichloromethane

(VDiCl) and ethyl acetate (VAcOEt) samples were the most phytotoxic fractions at the concentrations of ۵۰۰ mg L-۱ and ۲۵۰ mg L-۱. VDiCl inhibited L. sativa root growth by ۷۲.۶% and ۵۹.۷%, respectively, while VAcOEt inhibited by ۶۲.۱۳% and ۳۰.۶۷%, respectively. The IC۵۰ values established for VDiCl e VAcOEt were ۱۶۸.۴ mg L-۱ e ۲۶۲.۳ mg L-۱, respectively. The set of analyzes provided evidence that the synergistic action between fatty acids and phenolic compounds was of paramount importance for greater phytotoxicity of fractions. Conclusion The results indicate that the waste from the sugarcane processing industry, especially vinasse, can be reused as raw material for the .production of natural herbicides, minimizing the environmental risks of incorrect disposal

کلمات کلیدی:

Saccharum officinarum L, Industrial residues, Fatty Acids, phenolic compounds, Natural herbicides, Chemometrics