

Impact of Sugarcane Field Residue and Mill Bagasse on Seed Germination

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The chemical interaction between plants, which is referred to as allelopathy, may result in the inhibition of plant growth and development. Research indicates that sugarcane field residue and sugarcane mill bagasse may be allelopathic. Sugarcane field residue is the harvested plant material that is not brought to the mill for processing; this includes leaves, immature nodes and growing tips. The field residue will blanket sugarcane fields for extended periods, often through the winter and early spring. Sugarcane mill bagasse is the fibrous material remaining after removing the sugar from sugarcane at the mill. Typically, mills are powered by burning a portion of the bagasse; however the unused bagasse accumulates outside the mill in large mounds. Research was conducted to determine the allelopathic impact of sugarcane field residue and sugarcane mill bagasse on vegetable seed germination. The experiment included 2 sources of sugarcane plant extracts (sugarcane field residue and sugar mill bagasse), 4 extract concentrations (0.0, 16.6, 33.3 and 66.7 g/L), 3 vegetable species [tomato (*Solanum lycopersicum*), Chinese kale (*Brassica alboglabra*), and cucumber (*Cucumis sativus*)], 20 seeds per treatment, and 5 replications. The extract solutions were prepared using field residue from the USDA, ARS, Sugarcane Research Unit, Ardoyne Farm, Schriever, LA. The bagasse was obtained from the Raceland Raw Sugar Corporation mill, Raceland, LA. Each of the extract solutions were added to separate Petri dishes which contained 20 vegetable seeds. The covered Petri dishes were then placed in a dark growth chamber at 26.6 °C. After 7 days, the seed germination percentage was determined for each treatment. The research demonstrated that the bagasse solutions did not reduce seed germination for kale or cucumber, but tomato germination was reduced by 13% at the highest bagasse extract concentration (66.7 g/L) compared to the control (0 g/L). However, the sugarcane field residue extracts did decrease seed germination for kale, cucumber, and tomato, especially at the highest concentrations (66.7 g/L), and in some cases (kale and cucumber) stifling radicle development almost completely. Future research should investigate the effect of these solutions over longer time periods, later in plant development, and their potential usefulness in weed control.