

## **SORPTION AND DESORPTION OF METRIBUZIN IN SOILS AMENDED WITH SUGARCANE STRAW BIOCHAR PRODUCED AT DIFFERENT PYROLYSIS TEMPERATURES**

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**Destaque:** The pyrolysis temperature of 750°C produced a biochar with high sorption capacity and reduced desorption of metribuzin in the soil.

**Resumo:** Biochar is defined as a carbon-rich product that can be used as a source of nutrients and waste management. Residual herbicides, such as metribuzin, may have their bioavailability reduced due to the increased sorption provided by soil amendment with biochar. The pyrolysis temperature factor has shown to directly interfere in the sorption and desorption of the herbicide. The objective of the study was to investigate the interference of the sugarcane straw biochar produced at different pyrolysis temperatures on the sorption and desorption of metribuzin in soil. The experimental design was entirely randomized composed with three pyrolysis temperature of biochar (BC350, BC550 and BC750°C) added to the soil at application rates 10% w w<sup>-1</sup>. The sorption and desorption study were carried out in an equilibrium batch method with five concentrations of metribuzin (0,5; 1; 2; 4 and 8 mg L<sup>-1</sup>) where the average concentration corresponds to the highest recommended dose of the herbicide (1920 g a.i. ha<sup>-1</sup>) for sugar cane cultivation. The analysis of the herbicide was performed in High Performance Liquid Chromatography (HPLC). The sorption and desorption coefficient data were fitted to the Freundlich isotherm model ( $K_f$ ). Sorption and desorption of metribuzin were 1.42 and 0.78 mg<sup>(1-1/n)</sup> L<sup>1/n</sup> Kg<sup>-1</sup> respectively, for the soil unamended. BC750°C increased the  $K_f$  of sorption of metribuzin 11-fold and reduced  $K_f$  of desorption 45-fold compared to unamended soil. However, for the BC350 and BC550°C, the  $K_f$  for sorption increased 4- and 6-fold and reduced the  $K_f$  for desorption 18- and 35-fold, respectively, relative to the unmodified soil. The percentage sorbed was 63.8; 75.5 and 89.4% and the desorbed was 8.3, 5.8 e 3.7% for the BC350, BC550 and BC750°C, respectively, relative to the total initially applied. A pyrolysis temperature of 750°C produced a sugarcane straw biochar with higher sorption potential of metribuzin, which can become an alternative for immobilization of metribuzin in soil

**Palavras-chave:** Weeds; residual; pre-emergent; carbonaceous material

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