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Biochar Increases the Sorption and Reduces the Potential leaching the Diuron in Sandy Soil

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Recent studies demonstrated that application of biochar has increased the carbon content in humic acid and humin fractions. As there is partial oxidation of aromatic structures at the edges of biochar, there is increased exposure of loads. Accordingly, through the effect on the humin and humic acid fractions, biochar can contribute to pesticide sorption by increasing the reactivity and molecular stability, thus contributing to increased physical and chemical interaction. The objective of this study was to verify the long-term effect of biochar application on the kinetics of sorption and desorption of diuron in a Cerrado Haplic Plinthosol. The samples were collected in an experiment conducted in the field in a randomized block design consisting of the combination of two levels of fertilizer application (0 and 300 kg ha^{-1} of 05-25-15 formula of NPK fertilizer) and three doses of biochar (0, 16 and 32 Mg ha^{-1}). The Freundlich isotherm properly described the sorption of diuron in all treatments. The application of biochar increased sorption (Kf) and reduced desorption of diuron. This effect is attributed to the contribution of biochar to the levels of total organic carbon and C-humin, and to the increase in the reactivity of the humic acid and humin fractions. The reactivity of the humic acid and humin fractions was highly correlated with Kf (r = 0.99**). The positive correlation between the partition coefficient of organic carbon and Kf confirms the importance of the soil organic compartment for the sorption of diuron. The higher and lower capacity of sorption and desorption respectively of diuron in sandy soils with biochar application reduces the potential risk of leaching and contamination of subsurface waters.

Palavras-chave: leaching, persistence, soil organic matter, herbicide, pyrogenic carbon.

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