

ABSTRACT

The indispensable use of pesticides in agriculture has increased the pesticide accumulation in soil and hence the uptake by plants. Among all pesticides, insecticides are widely used but fungicides are also critical for food storage and their usage is expected to increase. Biochar being economical, accessible, and environmentally friendly is explored for many purposes. Therefore, rice husk biochar was used at three different concentrations 0.5%, 1%, and 1.5% to reduce the uptake of two fungicides (Azoxystrobin+tebuconazole and difenoconazole) in spring onion. A pot experiment was designed to study the effect of biochar on physiological and biochemical factors. QuEChERS method was used to determine the bioconcentration, and translocation factors of spring onion in fungicide spiked soil. A total of 12 treatments were prepared each with three replicates. The results showed an increase in physiological parameters of spring onion with increasing biochar concentration both in fungicide spiked and non-spiked treatments. The leaves and roots phenolics, proteins, and chlorophyll pigments also showed a gradual increasing trend in all biochar amended treatments compared to control. However, a steady decrease was observed in MDA 0.47 (AZX+TBC 1.5% BC) compared to 0.56 (control) and between 0.44 (DFC 1.5% BC) compared to 0.49 (control) $\mu\text{mol g}^{-1}$ and APX concentration in both biochar amended fungicides treatments. Rice husk biochar reduced both BCF and RTF of fungicides in shoots and roots of spring onion maximum at 1.5% concentration. The TF from roots to shoots increased with biochar concentration due to the solubility of fungicides. Overall biochar reduced the fungicides uptake and increased the physiological and biochemical parameters of spring onion. Further study is required to determine the economic feasibility, technical limits, social and environmental implications of biochar use in agriculture.