THE WHAT AND WHY

Use of biofertilizers reduces soil greenhouse gas emissions in a broccoli crop

High fertilizer use has the potential to have significant adverse environmental impacts in agricultural areas, such as soil and water contamination, greenhouse gas (GHG) emissions, and biodiversity loss. As a result, replacing inorganic fertilizers with microbial inoculants could potentially mitigate the negative impact of huge inputs. We compared the effect of different types of microbial inoculants on GHG emissions and soil enzyme activity in a broccoli crop. Four treatments were developed: a) F100 (traditional fertilization); b) BA+FU (nutrient solubilizing bacteria and fungi + 50% fertilization reduction); c) BA (nutrient solubilizing bacteria + 50% fertilization reduction); and d) F50 (only 50% fertilization reduction). Fertilizer reduction had no significant impact on broccoli yield. GHG emissions and crop yields were unaltered. GHG emissions responded to soil organic C content (mostly the soluble fraction), available N, and microbial activity assessed by enzyme activities, which were not different between fertilization regimes. This could be due to the crop type (Brassicaceae, which produces allelopathic substances), a lack of nutrient limitation, and traditional management practices such as tillage and pesticide use. Nonetheless, the yield of crops was found to be positively correlated with CO_2 emissions, suggesting that an active soil microbial community could be linked to high yields.

1. Broccoli plantation and harvest in Mediterranean South region (Spain).

KEYWORDS

Biofertilizers, broccoli, yield crop, greenhouse gas emissions, enzyme activity, microbial community.

AUTHORSHIP

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