THE WHAT AND WHY

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

A high demand for fertilizers has the potential to have significant environmental consequences in growing areas, such as soil and water contamination, greenhouse gas (GHG) emissions and biodiversity loss. As a result, substituting inorganic fertilizers by microbial inoculants could help mitigate the negative impacts caused by massive inputs. We compared the effect of microbial inoculants on GHG emissions in a potato crop in rotation, after three years of implementation of the strategy. Four different fertilization treatments were applied: i) inorganic fertilizers applied at the rate to cover the nutritional demands of the crop (F100); ii) 50% of the rate of inorganic fertilizers added in F100 (F50); iii) F50 + the application of a formulation of fixing nitrogen and phosphorus and potassium solubilizing bacteria (BA); and iv) F50 + the application of a formulation of bacteria and non-mycorrhizal fungi (BA+FU). Results showed that reduced fertilization decreased CO_2 emissions by 30% compared to F100. The addition of microbial inoculants decreased CO_2 emissions by 50%. There was no effect on N_2O and CH_4 emissions. Crop production was not negatively affected by decreasing inorganic fertilization rate. Thus, the use of microbial inoculants can be an effective strategy for climate change mitigation while keeping high crop yields.

1. Potato plantation in Mediterranean South region (Spain).

KEYWORDS

Biofertilizers, potato, greenhouse gas emissions, crop yield, climate change.

AUTHORSHIP

Ollio, I., Fernández J.A., Sánchez-Navarro V., Lloret E., Egea-Gilabert, C., Martínez-Martínez, S., Zornoza, R.

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