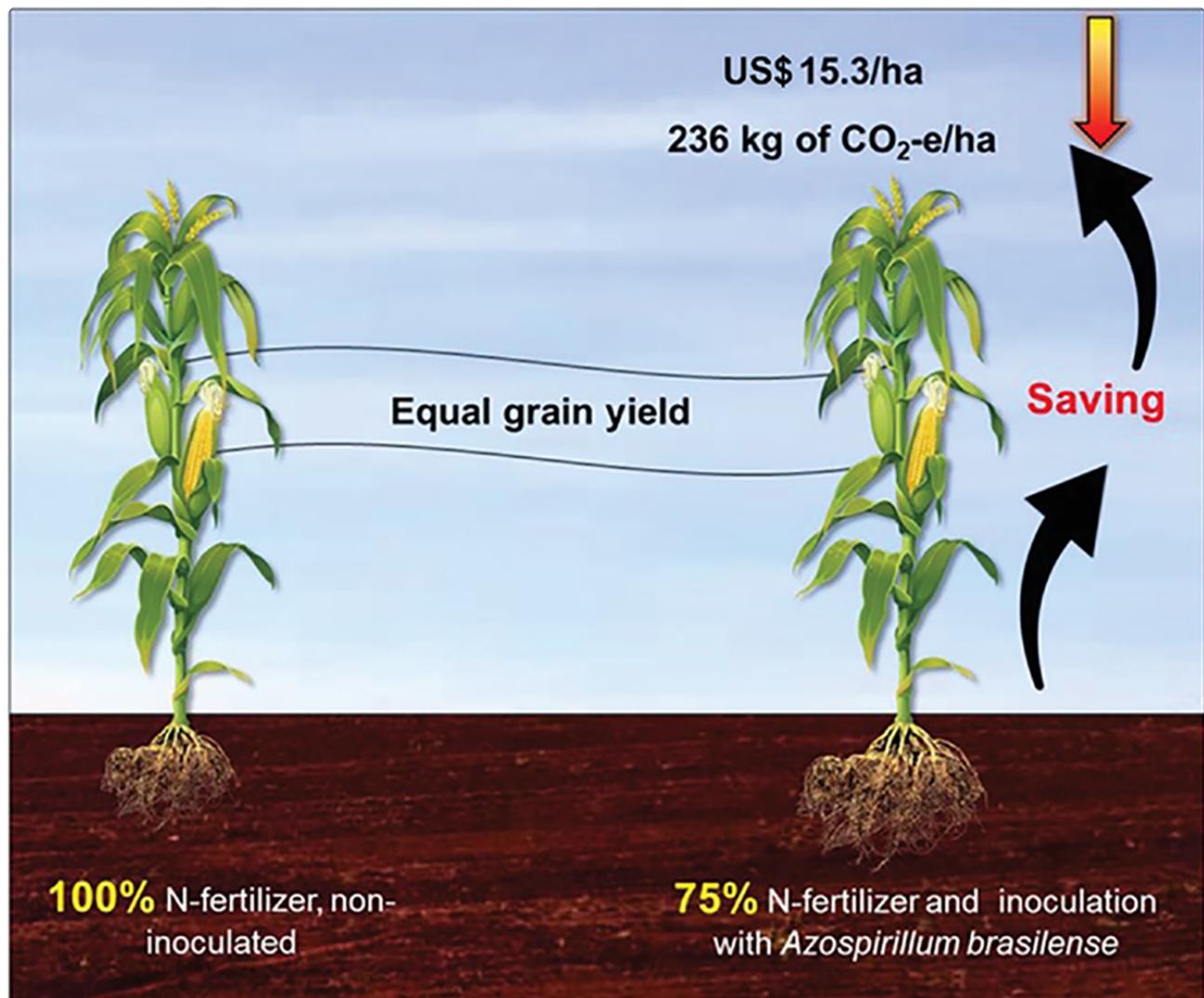




# Inoculation with *Azospirillum brasilense* reduces fertilizer needs in maize

October 6, 2022



*Inoculation with *Azospirillum brasiliense* strains Ab-V5 and Ab-V6 replaces 25% of N fertilizer, providing economic and environmental benefits. Image courtesy of Mariangela Hungria.*

---

Maize requires nitrogen (N) fertilizers, which are expensive, in short supply in many countries, and can pollute the environment. Scientists tested an alternative method of fertilizing maize that reduced N fertilizer by inoculating the maize at sowing with two strains of the bacterium *Azospirillum brasiliense*: one that synthesizes phytohormones and one that fixes atmospheric N.

The researchers conducted 30 field trials over 10 years in the main producing regions of Brazil. They compared the performance of uninoculated plants topdressed with 100% of the N fertilizer with inoculated plants that received 75% of the fertilizer. They found that both sets of plants produced the same amount of maize. The study demonstrated inoculation's positive effects under varying conditions, including different grain yield levels, climates, soils, and amounts of soil organic matter.

Performance of the inoculated fields was attributed to better root growth, which increased the N fertilizer use efficiency and reduced both nitrate losses and greenhouse gas emissions. The inoculation, per hectare, reduces costs by US\$15 and CO<sub>2</sub> emissions by 236 kg equivalents. Inoculation with plant growth-promoting bacteria represents an important strategy for growing maize both productively and sustainably.

## Dig deeper

Hungria, M., Barbosa, J.Z., Rondina, A.B.L., & Nogueira, M. A. (2022). Improving maize sustainability with partial replacement of N fertilizers by inoculation with *Azospirillum brasiliense*. *Agronomy Journal*. <https://doi.org/10.1002/agj2.21150>

[More science](#)

[Back to issue](#)

[Back to home](#)

---

*Text © . The authors. CC BY-NC-ND 4.0. Except where otherwise noted, images are subject to copyright. Any reuse without express permission from the copyright owner is prohibited.*