Nanofertilizers: An innovative solution for reducing nitrous oxide emissions

Nanofertilizers improve fertilization efficiency and help mitigate the effects of climate change.

The implemented initiative

- Using balanced fertilizers and nanofertilizers in greenhouse crops increases biomass production and nitrogen absorption.

The technological solution

- TiO₂, ZnO and zeolite nanofertilizers were manufactured in a high-energy mill by varying the mill’s time, speed and filling factor. Nanofertilizers with sizes less than 100nm were selected.
- Ray grass, oats, and alfalfa crops were established.
- Balanced fertilizers were formulated for crops.
- The effect of adding fertilizers with nanofertilizers on crops was evaluated.
- A financial viability analysis was carried out.
- A business model was proposed.
- A draft Spin-Off proposal was formulated.

Results

- Data with particle sizes of nanofertilizers synthesized by high-energy grinding varying manufacturing parameters.
- Publication of scientific article.
- Evaluation of nutrient absorption and nitrogen use efficiency for Ray grass, alfalfa and oats.
- Evaluation of biomass production in greenhouse crops.
- Technical note defining the type of intellectual property most appropriate for creating the Spin-Off.
- Technical note presenting the support for the financial viability analysis of the Spin-Off.
- Spin-Off creation project proposal.
- Eleven undergraduate theses completed and four in development.
- A completed master’s thesis and one in development.