

Biological seed enhancements

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Promoting the Seed Business
in the Americas



CRODA Agriculture

SMART SCIENCE TO IMPROVE LIVES™

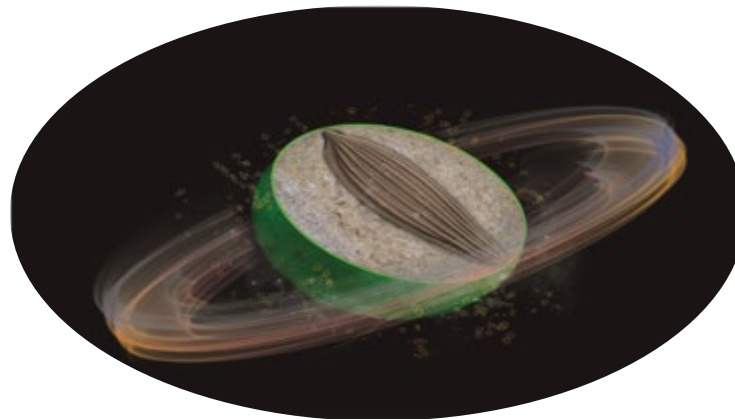
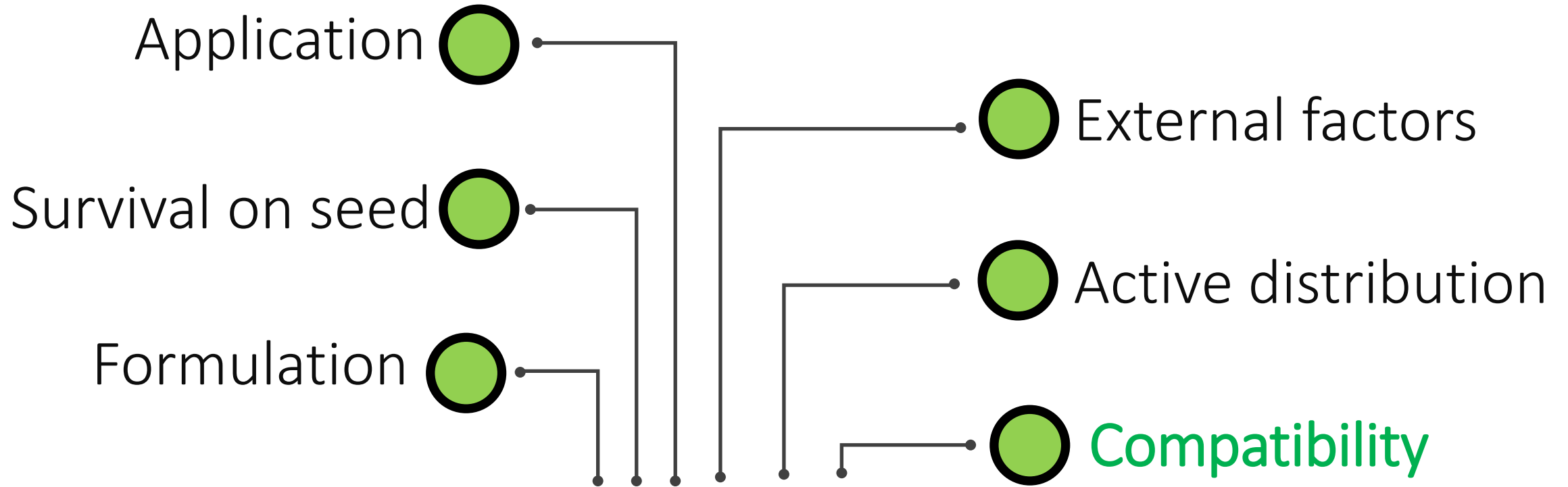
As the umbrella brand for Croda's complete agriculture offering, Croda Agriculture encompasses a broad, sophisticated, and growing agriculture portfolio across crop and seed. By combining our portfolio, capabilities, and expertise under Croda Agriculture, we consolidate and strengthen our sustainable and innovative offering.



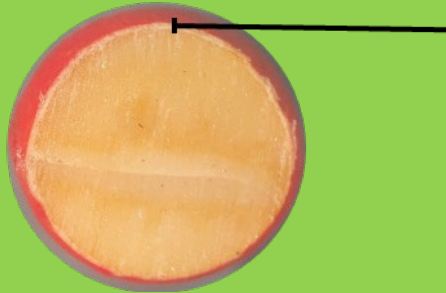
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A CRODA BRAND

the seed
enhancement
company



Film coat



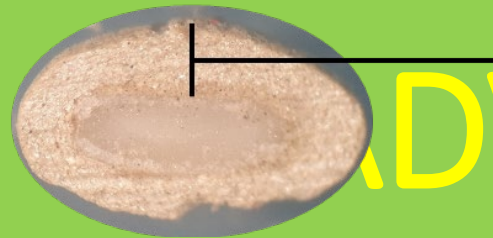
Thin layer

No change in the seed shape

Process: seconds

EACH WITH ITS ADVANTAGES AND

Encrusting

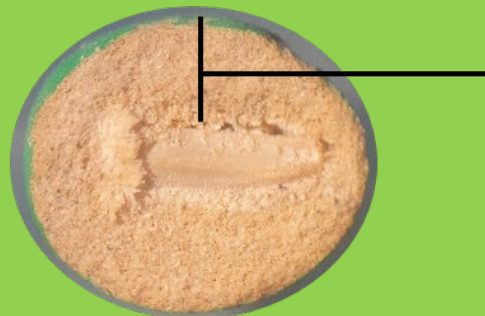


Weight change: 1 to 5 times

Changes slightly the seed shape

Process: minutes

Pelleting



Weight change: 10 to 200 times

Changes the seed shape

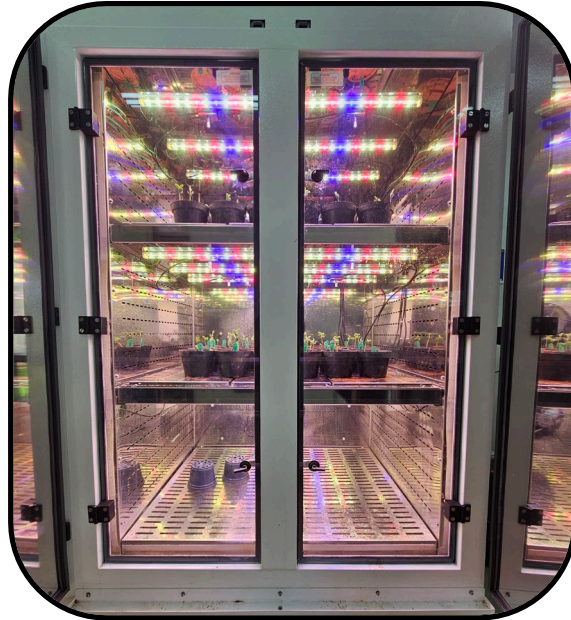
Process: hours

ADVANTAGES!

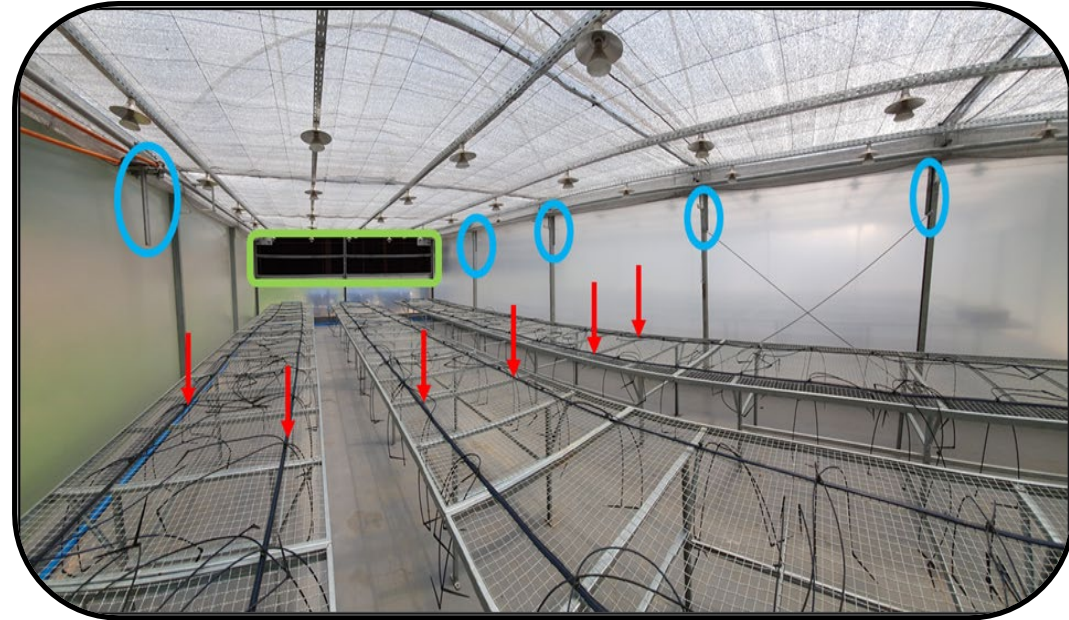
Microbiology Lab



Growth chamber



Greenhouse conditions



- Colony forming unit (CFU)
- Conidia vigor (PrecisionBio™)
- Conidia viability
- Nodulation
- Water restriction tests
- Among other...



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Initiatives

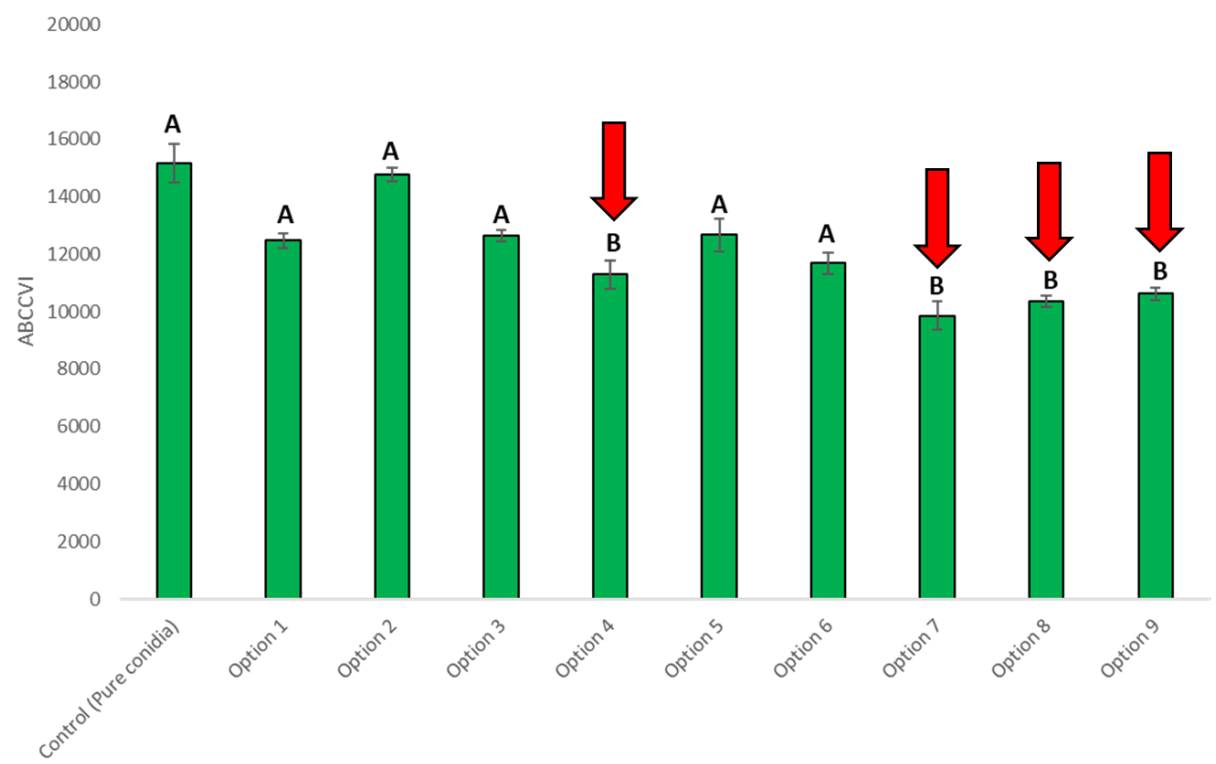
Conidia vigor analysis - PrecisionBio™

The screenshot shows the PrecisionBio software interface with the following components and annotations:

- 1. Open interface**: Points to the main window title bar.
- 2. Select magnification**: Points to the 'Magnification' dropdown menu set to 'X100'.
- 3. Upload folder**: Points to the 'Selected Folder' field containing 'D:\Spores\New pictures\X100\T1'.
- 4. Set conversion parameter**: Points to the '1 [unit length]' field set to '4.78 pixels'.
- 5. Initiate analysis**: Points to the 'Go' button.
- 6. Stop analysis ('Stop' button will appear)**: Points to the 'Upload' button.
- 7a. Results**: Points to the 'Results' section showing:
 - Average Length (+/- Standard Deviation): 99.71 +/- 14.10
 - Average N. of Germinated Spores (+/- Standard Deviation): 23.67 +/- 5.48
 - Comments: Edge-touching elements have not been always removed (green). In 1 images out of 10 no germinated spores have been detected (red).
- 7b. 'Save' button**: Points to the 'Save' button.
- Analyzed images with identified elements**: Points to the bottom section showing three analyzed images: 'T1 1 X100', 'T1 10 X100', and 'T1 2 X100'.

The interface also features a bar chart titled 'Average Lengths' showing data for 10 analyzed images. The y-axis is 'Average Lengths' (0-300) and the x-axis is 'Analyzed Image' (1-10). A horizontal dashed line indicates the 'Average Length' at approximately 100. The bars show varying lengths, with image 1 being significantly higher than the others.

PrecisionBio™ user interface and the processed data results.



PrecisionBio™ results after data transformation and statistical analysis. Columns followed by same letter, do not significantly differ by Dunnett test ($\alpha=0,05$).

Water restriction evaluation - soybean



Percentage of effects on different biometrics evaluations on seedling originated from soybean seed treated with *Priestia megaterium* (S1C25), *Priestia aryabhattai* (S1C26), *Bacillus pseudomycooides* (S2C3) and blend of strains under greenhouse conditions and water restriction (40% of field capacity) until 35 days after sowing. The percentages are in reference of the values obtained in control seedling (without treatment).

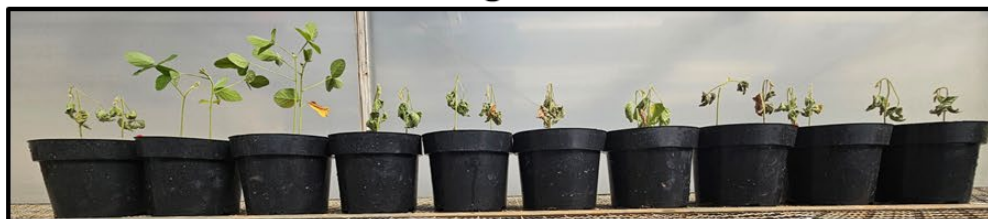
EVALUATIONS	TREATMENS			
	<i>Priestia megaterium</i> S1C25	<i>Priestia aryabhattai</i> S1C26	<i>Bacillus pseudomycooides</i> S2C3	Strain blend
Fresh aerial biomass	14,28%	42,85%	14,28%	14,28%
Fresh root biomass	15,38%	23,07%	Neutral effect	7,69%
Root volume	6,66%	20,00%	Neutral effect	6,66%
Dry aerial biomass	10,71%	21,42%	17,85%	10,71%
Dry root biomass	10,52	36,84%	5,26%	Neutral effect

Water restriction evaluation - soybean

No treatment



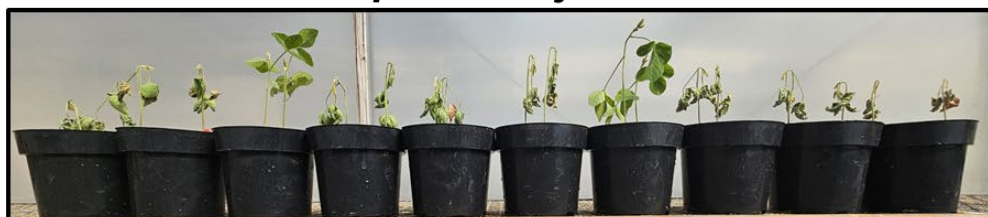
Priestia megaterium S1C25



Priestia aryabhattai S1C26



Bacillus pseudomycooides S2C3

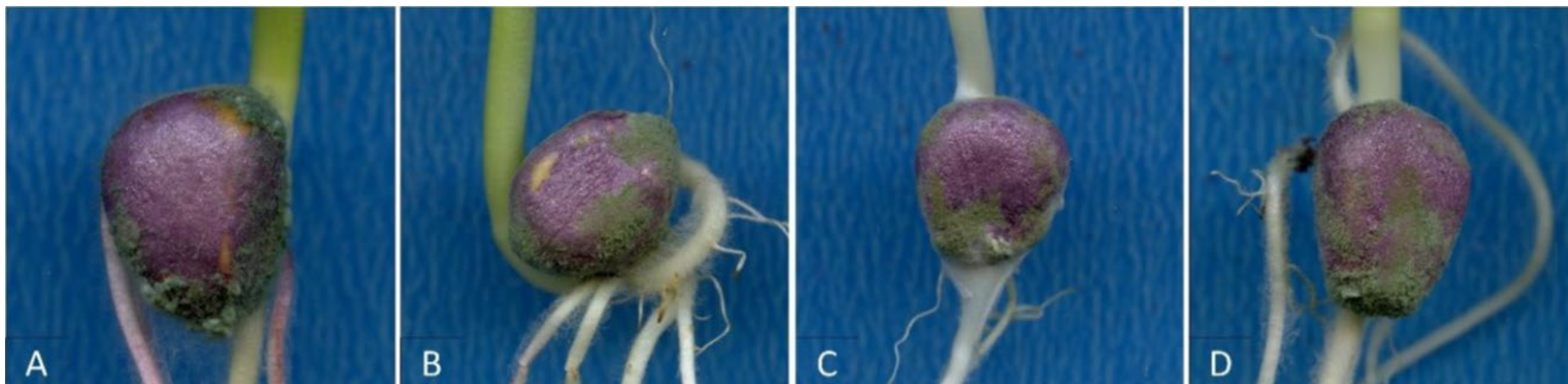
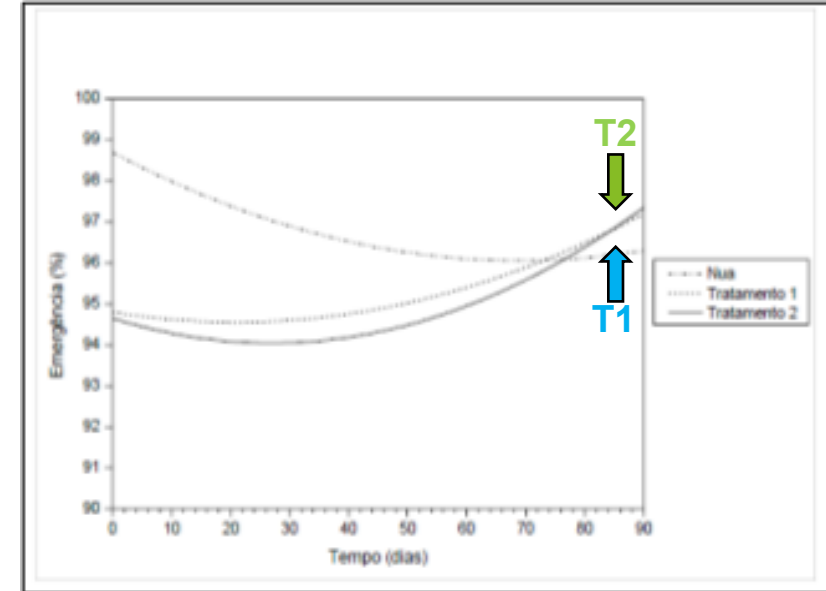
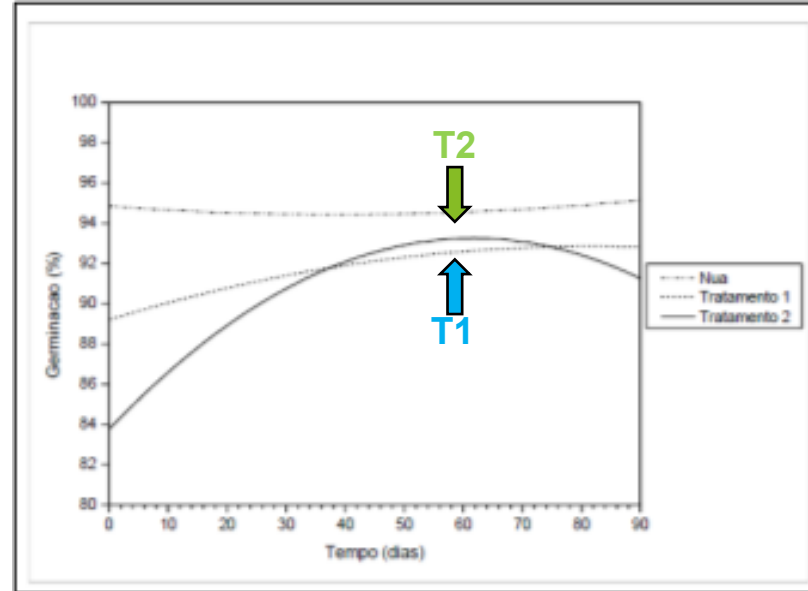
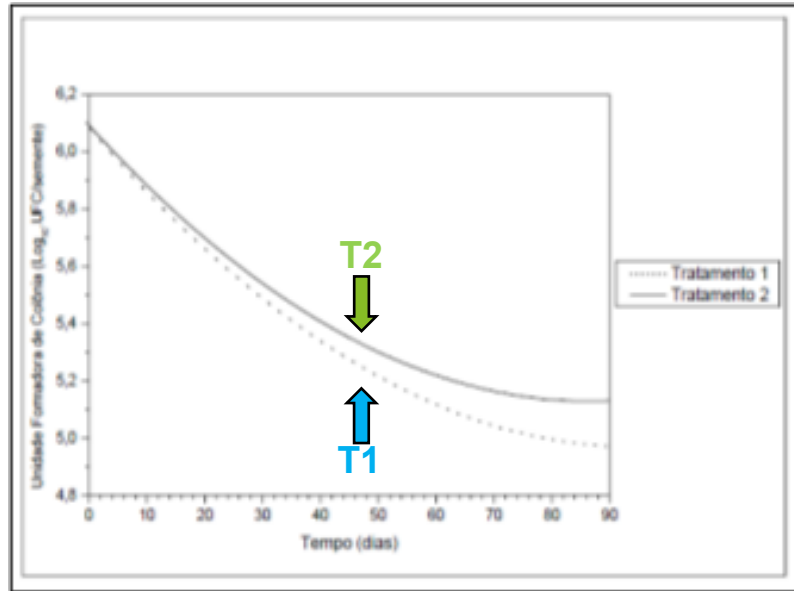


Blend isolados



Visual aspects of soybean seedlings originated from soybean seeds treated with *Priestia megaterium* (S1C25), *Priestia aryabhattai* (S1C26), *Bacillus pseudomycooides* (S2C3) and blend of strains under greenhouse conditions and water restriction (40% of field capacity) until 35 days after sowing.

Application evaluation – *Trichoderma asperellum*



Trichoderma asperellum corn seed colonization over storage period: (A) 0 day, (B) 30 days, (C) 60 days and (D) 90 days after encrusting process.

Collaboration is the key to success!



THANK YOU!

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