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Explicit utilization of blue green microalgae, *Spirulina platensis* (Gomont)Geitler, as bio-stimulant in cereal seed germination

Jerentulina Vijayarasa

School of science and the environment, Memorial University of NL, Canada

INTRODUCTION & AIM

- Seed germination by conventional chemical treatments poses environmental risks. Utilizing eco-friendly bio-stimulants can offer sustainable solutions to improve seed germination and crop establishment.
- Seed germination is a critical stage in plant growth, significantly impacting crop yield.
- Bio-stimulants, like *Spirulina platensis*, are sustainable alternatives to chemical treatments, known to enhance seed germination and early growth.

Aim : To evaluate the effect of *Spirulina platensis* extract as a bio-stimulant on the germination and early growth of paddy (Oryza sativa), maize (Zea mays), cowpea (Vigna unguiculata), and green gram (Vigna radiata).

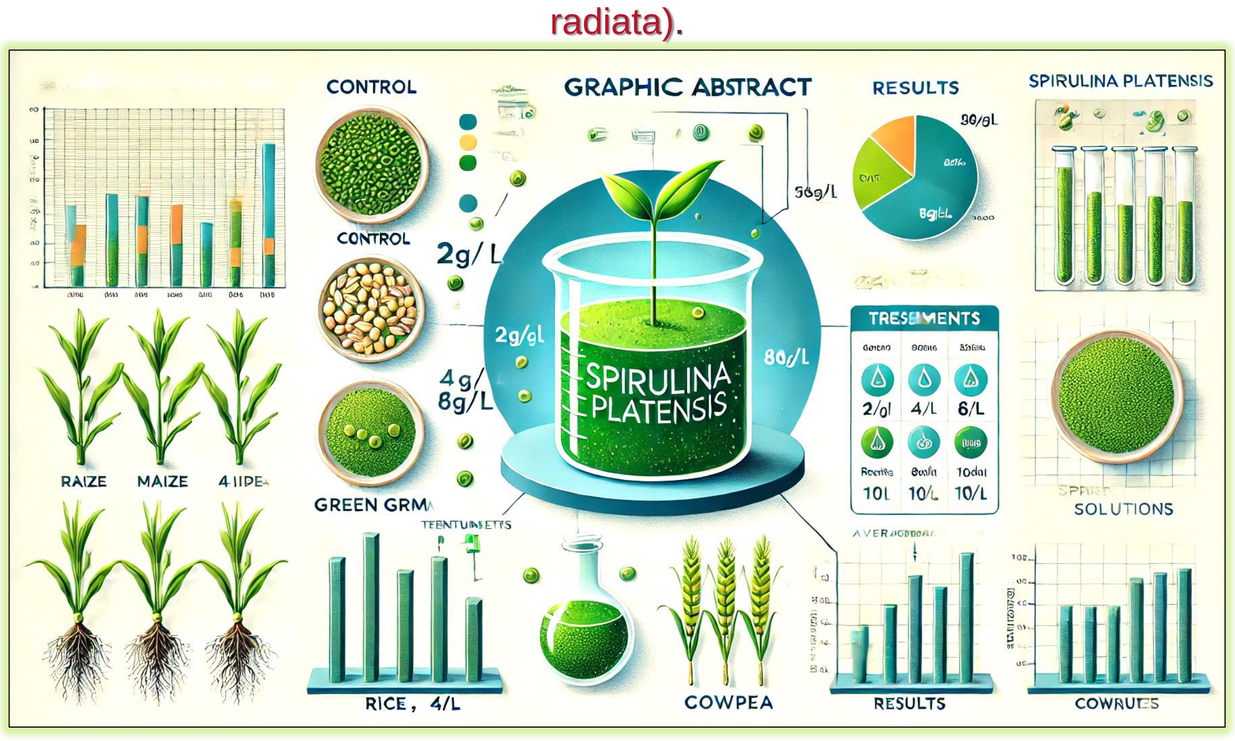

Figure 1. Graphical representation of *Spirulina platensis* on seed germination study

METHOD

Seed Selection	Seeds of paddy (Oryza sativa), green gram (Vigna radiata), maize (Zea mays), and cowpea (Vigna unguiculata) were used
Experimental Design	Six treatments were prepared with varying Spirulina concentrations such as **T0 (0g/L), T1 (2g/L), T2 (4g/L), T3 (6g/L), T4 (8g/L) & T5 (10g/L)**. Each treatment included 20 seeds per replicate with three replicates per treatment.
Seed Soaking	Seeds were soaked overnight in their respective Spirulina solutions to ensure adequate absorption. T0 (control) seeds were soaked in distilled water.
Germination Setup	Soaked seeds were placed on moistened filter paper in Petri dishes and incubated at room temperature for 7 days. Spirulina solutions were sprayed until the end of the experiment. Moisture was maintained consistently throughout the study period.
Data Collection	Germination rate was recorded daily by counting the number of germinated seeds. The average germination percentage for each treatment was calculated over 7 days

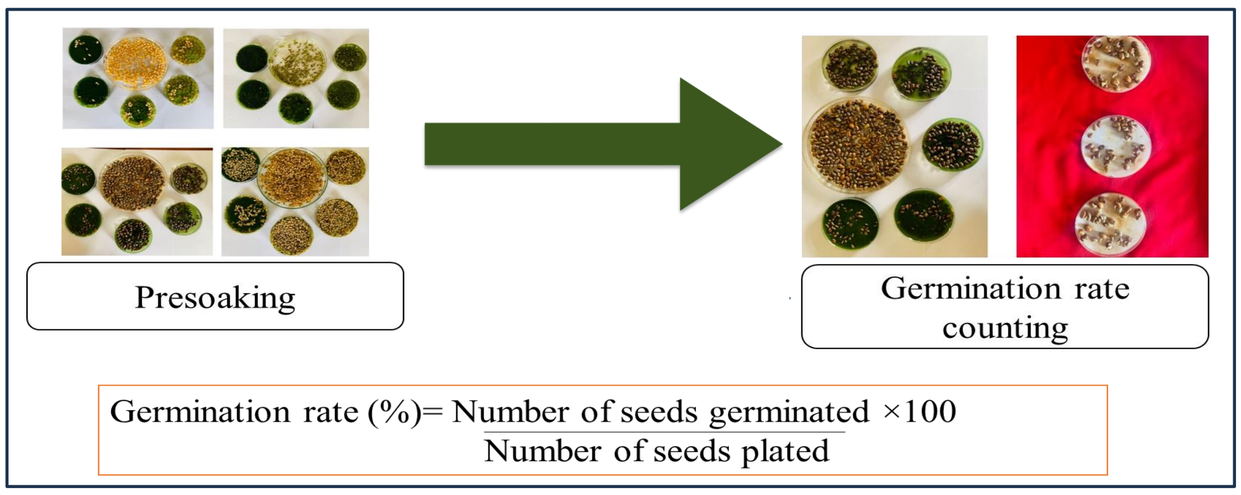

Figure 2. Pre-socking and germination rate counting of selected seeds

RESULTS & DISCUSSION

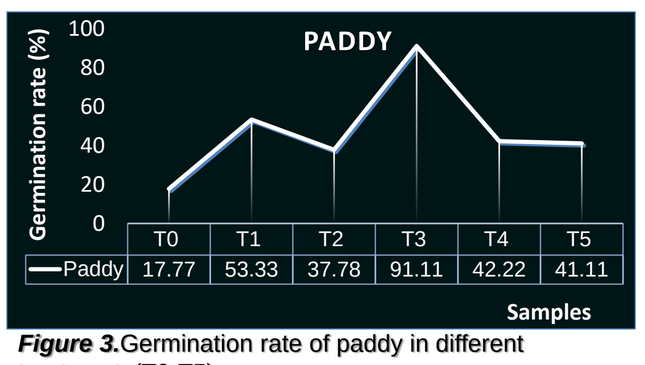

Figure 3.Germination rate of paddy in different treatments(T0-T5)

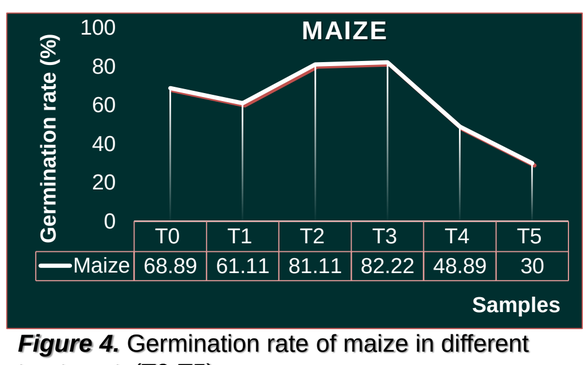

Figure 4. Germination rate of maize in different treatments(T0-T5)

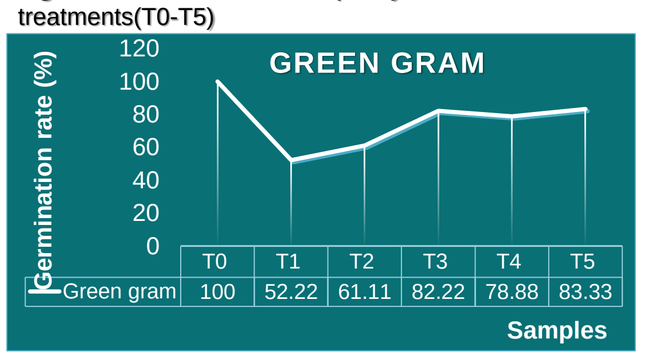

Figure 5. Germination rate of Green gram in different treatments(T0-T5)

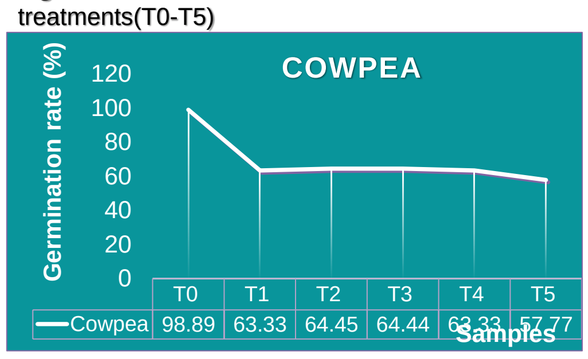

Figure 6. Germination rate of cowpea in different treatments(T0-T5)

Selected Grain Seed	Results and discussion
Paddy (Graph – 01)	• Showed positive response with treatment • Based on the graph, germination increased with increasing spirulina concentration up to T3 then T4and T5, indicating potential inhibition at higher concentrations.
Maize (Graph – 02)	• Positive to Spirulina treatment • T2 and T3 achieved the highest germination rate Compared to the control especially, T3 showed an approximate 13% increase in germination but germination rates decreased with higher concentrations of Spirulina.
Green gram (Graph – 03)	• The treatments failed to show consistent improvement compared to control.
Cowpea (Graph – 04)	• None of the treatments demonstrated a significant improvement over control. • Spirulina treatments may not have a stimulatory effect on cowpea seed germination

CONCLUSION

- **Paddy** and maize showed the most significant improvement, at **6g/L** Spirulina (T3), compared to the control
- **Green gram** and **cowpea** showed bit, or no improvement compared to the control, with **green gram** even showing a decrease in germination at higher concentrations.

FUTURE WORK / REFERENCES

- Evaluate the performance of Spirulina treatments under field conditions with Multi-Crop Studies to assess their practicality and scalability for agricultural applications.
- Danesi, E. D. G., Carvalho, J. C. M. and Sato, S. (2004) ‘Effect of reducing the light intensity on the growth and production of chlorophyll by Spirulina platensis’, Biomass and biotechnology, 26(2004), pp. 329–335.