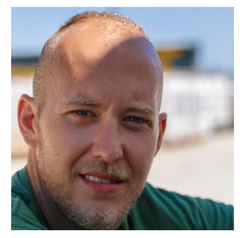
Antifungal properties of aqueous microalgal extracts



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GOALS

1. Preparation of aqueous extracts from ***Nannochloropsis* sp.**, ***Phaeodactylum tricornutum***, ***Scenedesmus obliquus***, ***Chlorella vulgaris*** and ***Arthrospira platensis*** *in vitro*
2. Evaluate antifungal properties of aqueous microalgal extracts towards the phytopathogenic fungi ***Sclerotium rolfsii***, ***Rhizoctonia solani***, ***Botrytis cinerea*** and ***Alternaria alternata***
3. Assessing **dose-response relationships** and identifying concentrations with the highest antifungal activity (0.1, 0.5, 1.0 and 2.0 g/L)

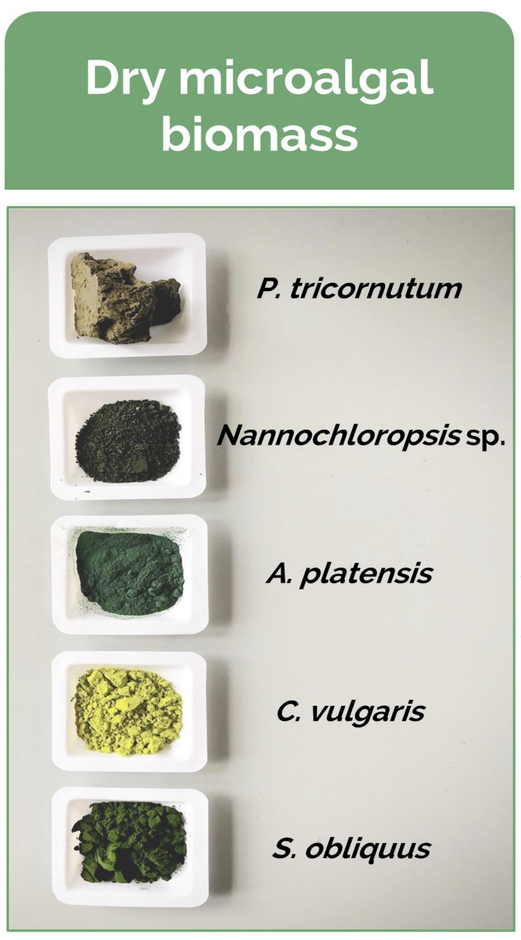
STUDY HIGHLIGHTS

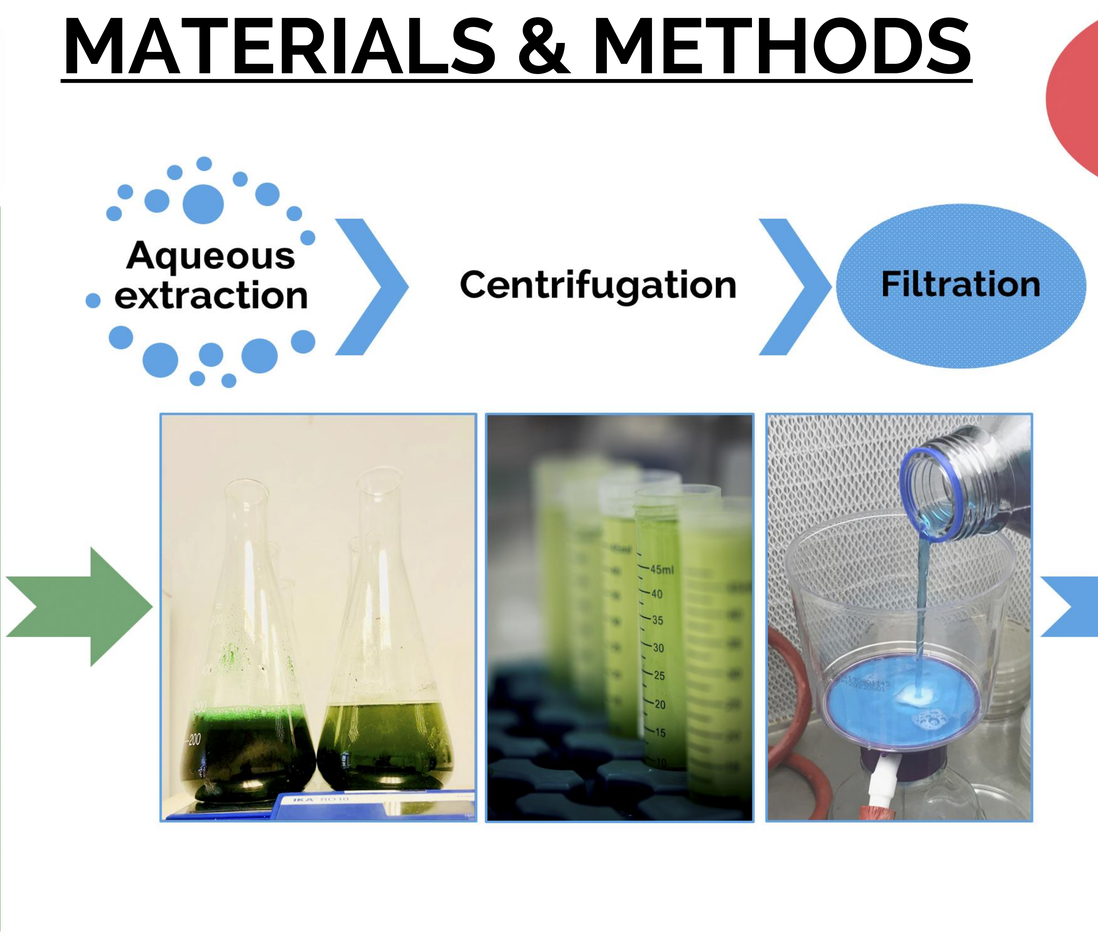
- *S. obliquus* inhibited *S. rolfsii* growth by up to **32.01 ± 4.82%**
- *P. tricornutum* inhibited *R. solani* growth by up to **18.35 ± 3.45%**
- *Nannochloropsis* sp. inhibited *S. rolfsii* by up to **13.96 ± 5.26%**
- *P. tricornutum* inhibited *B. cinerea* growth by up to **11.47 ± 2.06%**
- ***S. obliquus*** had the **highest antifungal activity** of all microalgal strains

INTRODUCTION

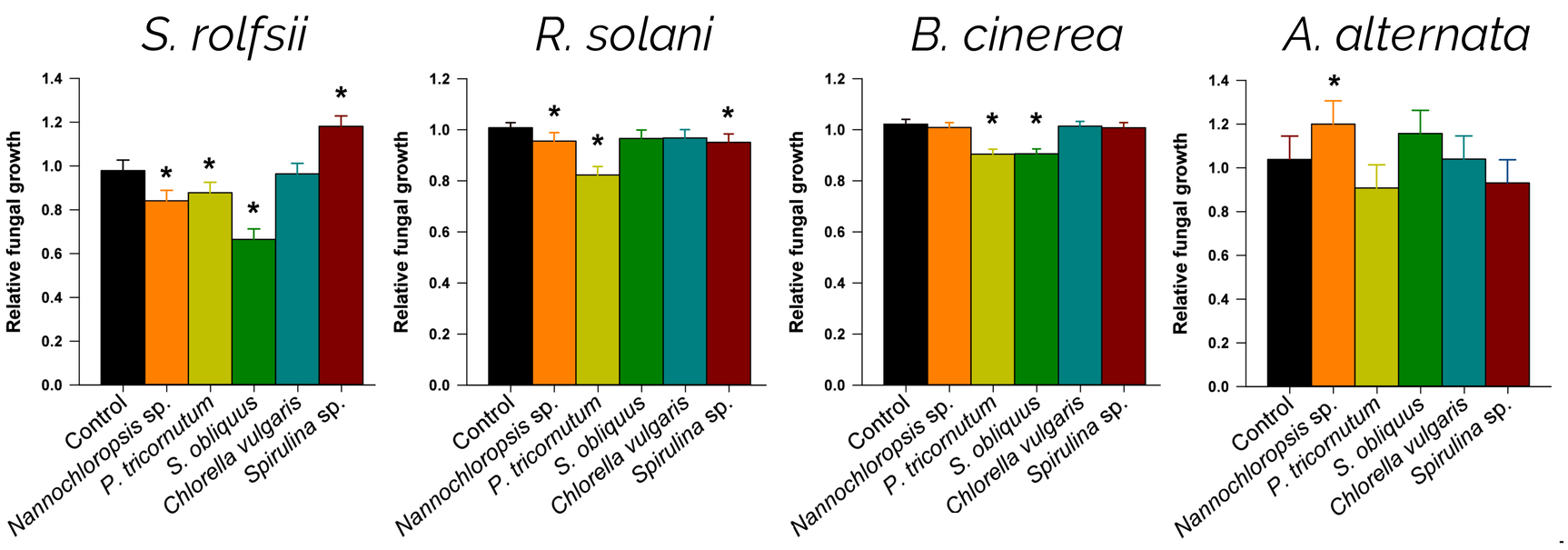
- **Phytopathogenic fungi** ▶ **major** economic **impacts** on global crops [1]
- Rapid rise in global food demand ▶ intensive use of **synthetic pesticides**
- **Agrochemical pollution** ▶ significant environmental and health issue [2]
- Urgent need for **higher crop yields at reduced ecological footprints** [3]
- **Microalgae** are considered **eco-friendly antifungal agents** [4]

MATERIALS & METHODS





RESULTS



Fungal pathogens exposed to microalgal extracts. Relative differences among algal strains on fungal growth at day 3 are given as adjusted means ±95% confidence interval obtained from Tukey's post hoc test (ANCOVA). Asterisks above bars indicate significant differences ($p < 0.05$) to the control group, as determined by Dunnett's two-sided posthoc test (ANOVA). Error bars represent standard deviations. Data points at each day (b-f) are shown as mean ± SD ($n = 3$).

BIBLIOGRAPHY: [1] Hua et al. (2018) , [2] Walt (2004) , [3] Carvalho (2017), [4] Chiaiese et al. (2018), [5] Renuka et al. (2018)

CONCLUSIONS

≠ **Antagonistic activities varied** widely **depending on the combination of microalga and target fungus.**

Strong target specificity requires further investigation to ensure the successful control of fungal pathogens.

Algal fungicides are a **promising eco-friendly alternative** to achieve **higher sustainability** in modern agriculture by **limiting the overuse of agrochemicals.**