

Microalgae Oils Mitigate Inflammation and Oxidative Stress Triggered by *Helicobacter pylori* Infection

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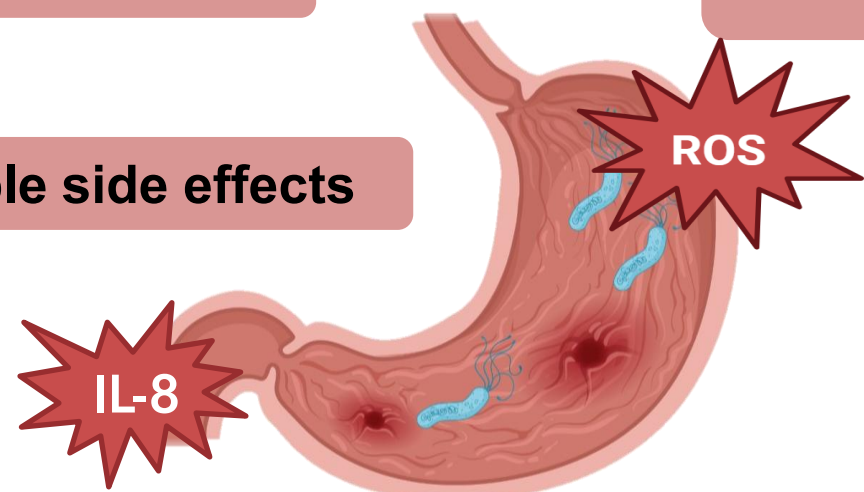
INTRODUCTION & AIM

Helicobacter pylori

Multidrug-resistant bacteria

Risk factor of gastric ulcers, cancer, gastritis [1]

Treatments with multiple side effects

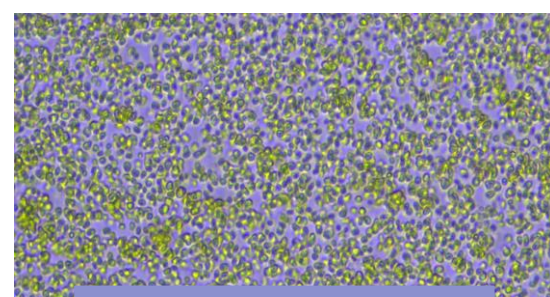


MICROALGAE

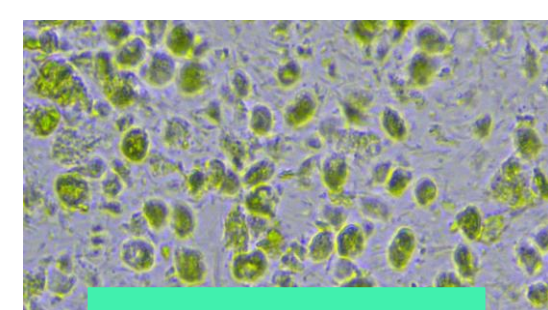
OILS



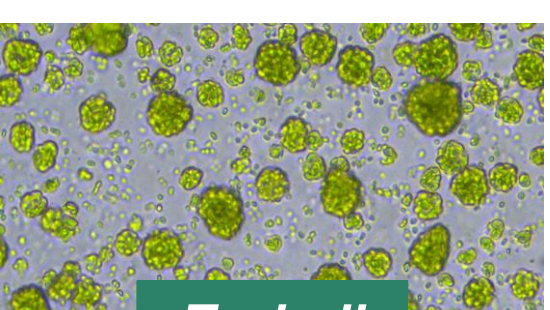
A. platensis



N. gaditana



C. vulgaris



T. chuii

Sustainable source of nutritional and bioactive compounds [2]

Search of antibacterial, anti-inflammatory and antioxidant sources for the treatment of *H. pylori* infection [3]

To evaluate the **antioxidant**, **anti-inflammatory**, and **antibacterial** properties of lipid extracts from various microalgae species (*Arthrospira platensis*, *Chlorella vulgaris*, *Nannochloropsis gaditana* and *Tetraselmis chuii*) against *H. pylori* infection

METHOD

Biomass Pretreatment
Freeze/thaw cycles + US

SOXHLET
extraction

LIPID
EXTRACT

ANTIOXIDANT activity

ABTS and DPPH

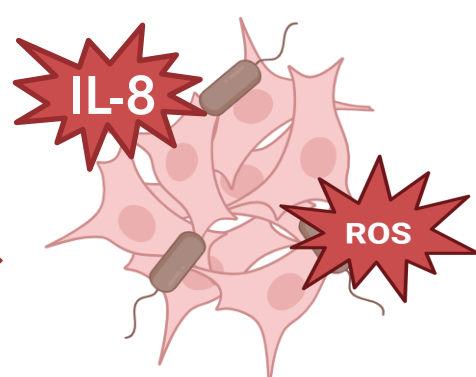
ANTIBACTERIAL activity

Log UFC/mL

ANTIOXIDANT AND ANTI-INFLAMMATORY activity in human gastric cancer cells (AGS)

Cell viability

H. pylori-infected cells



ACKNOWLEDGEMENTS

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RESULTS & DISCUSSION

ANTIOXIDANT ACTIVITY

Microalgae	ABTS	DPPH
	TEAC (μmol TE/g extract)	IC ₅₀ (mg/mL)
<i>A. platensis</i>	7.75 ± 0.59 ^d	ND
<i>C. vulgaris</i>	89.97 ± 3.33 ^b	0.52
<i>N. gaditana</i>	44.51 ± 2.31 ^c	0.81
<i>T. chuii</i>	218.35 ± 6.23 ^a	0.65

Higher **TEAC** value of *T. chuii* extract

Lower **IC₅₀** value of *C. vulgaris* extract

TEAC: Trolox equivalent antioxidant capacity

ANTIBACTERIAL ACTIVITY

Microalgae	MIC (mg/mL)	MBC (mg/mL)
<i>A. platensis</i>	0.25	ND
<i>C. vulgaris</i>	0.25	0.5 – 1
<i>N. gaditana</i>	0.125	0.75 - 1

HIGHER BACTERICIDE EFFECT of *C. vulgaris* extract

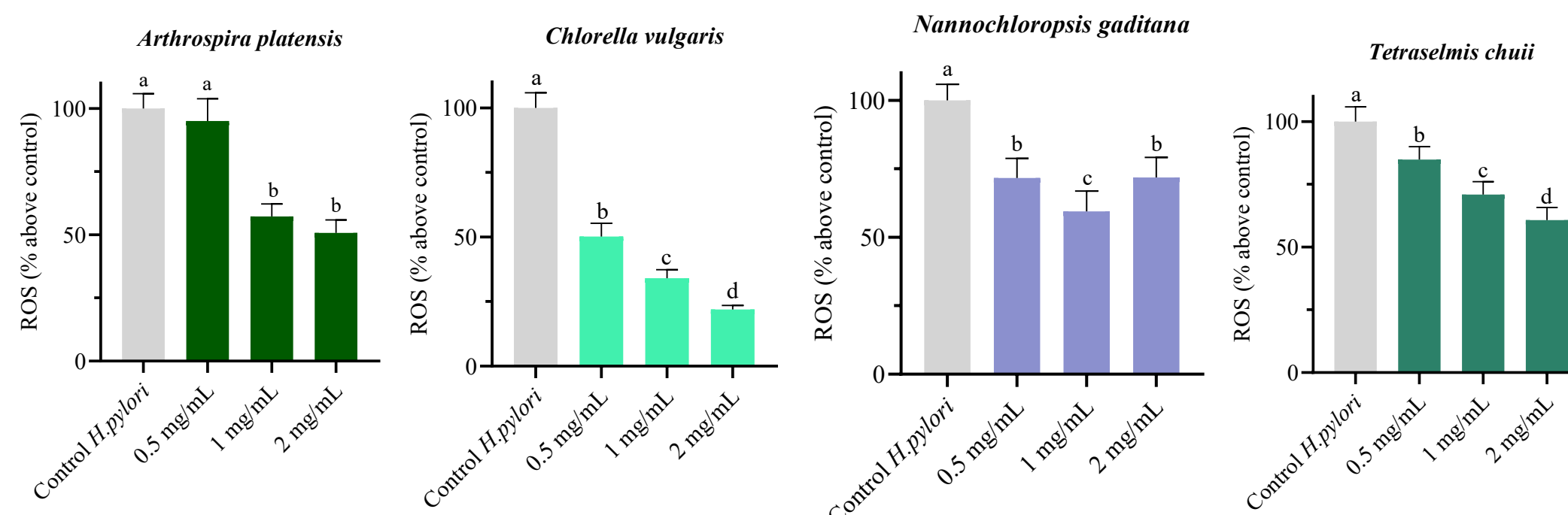
LOWER MIC of *N. gaditana* extract

ND: non detectable

MIC: Minimum Inhibitory Concentration

MBC: Minimum Bactericide Concentration

ANTIOXIDANT ACTIVITY- INFECTED CONDITIONS



Microalgae extracts reduce ROS production under *H. pylori*-infected conditions

C. vulgaris extract

Higher ROS neutralization

ANTI-INFLAMMATORY ACTIVITY- INHIBITION OF IL-8 PRODUCTION (%)

Concentration	<i>A. platensis</i>	<i>C. vulgaris</i>	<i>N. gaditana</i>	<i>T. chuii</i>
0.5 mg/mL	ND	86.07 ± 1.01 ^a	67.10 ± 3.55 ^b	18.40 ± 0.09 ^c
1 mg/mL	ND	88.40 ± 0.10 ^a	88.70 ± 0.25 ^a	22.60 ± 3.62 ^b
2 mg/mL	30.24 ± 6.78	88.70 ± 0.05 ^a	88.50 ± 0.30 ^a	34.40 ± 10.13 ^a

ND: non detectable

C. vulgaris extract

N. gaditana extract

Higher anti-inflammatory capacity

CONCLUSION

✓ The lipid extract of the microalgae *Arthrospira platensis*, *Chlorella vulgaris*, *Nannochloropsis gaditana* and *Tetraselmis chuii* exert modulating effects on the **antioxidant and inflammatory response** associated to *H. pylori* infection.

✓ *Chlorella vulgaris* and *Nannochloropsis gaditana* extracts have demonstrated the **higher antibacterial** and **anti-inflammatory capacity**.

REFERENCES

[1] Chen YC, et al. 2024. [2] Paterson, S. et al. 2023. [3] Silvan, J.M. et al. 2021.