



Metamorphic

The bioactive air rejuvenator.

Context

What is climate change?

Need of CO₂ mitigation

CCS(Carbon capture and storage)
and DAC(direct air capture)

Geological Vs biological methods



Ray of hope



Safe & biological

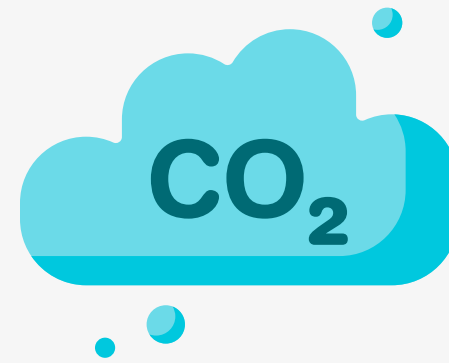


Economical

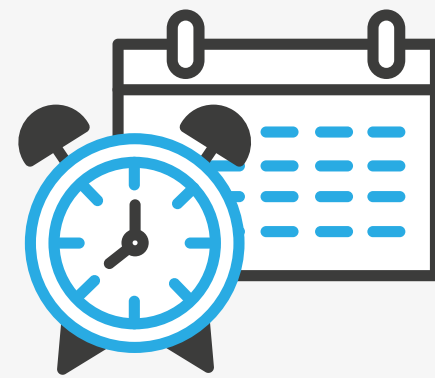


Socially acceptable

no silver
bullet



Rate : 22kg/Year



Time : 10 year old



Space : ~150 sq. ft.

An aerial photograph showing a rugged, dark rock coastline on the left. The water to the right is a brilliant, swirling green, indicating a massive bloom of algae. The contrast between the dark rocks and the vibrant green water is striking.

Inspired by Nature

Nearly 50% of total
carbon dioxide fixation is
carried out by algae
through photosynthesis.

The parracea

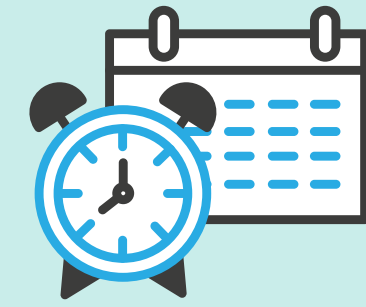
A microfluidic high density photobioreactor that converts CO_2 into Oxygen and filter VOC.



Artificial Photosynthesis for algae cultivation



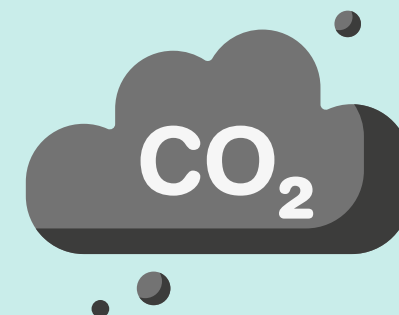
It produces 250kg wet biomass annually. Which is equivalent to ~half tonne recycled carbon dioxide.



Just in time installation



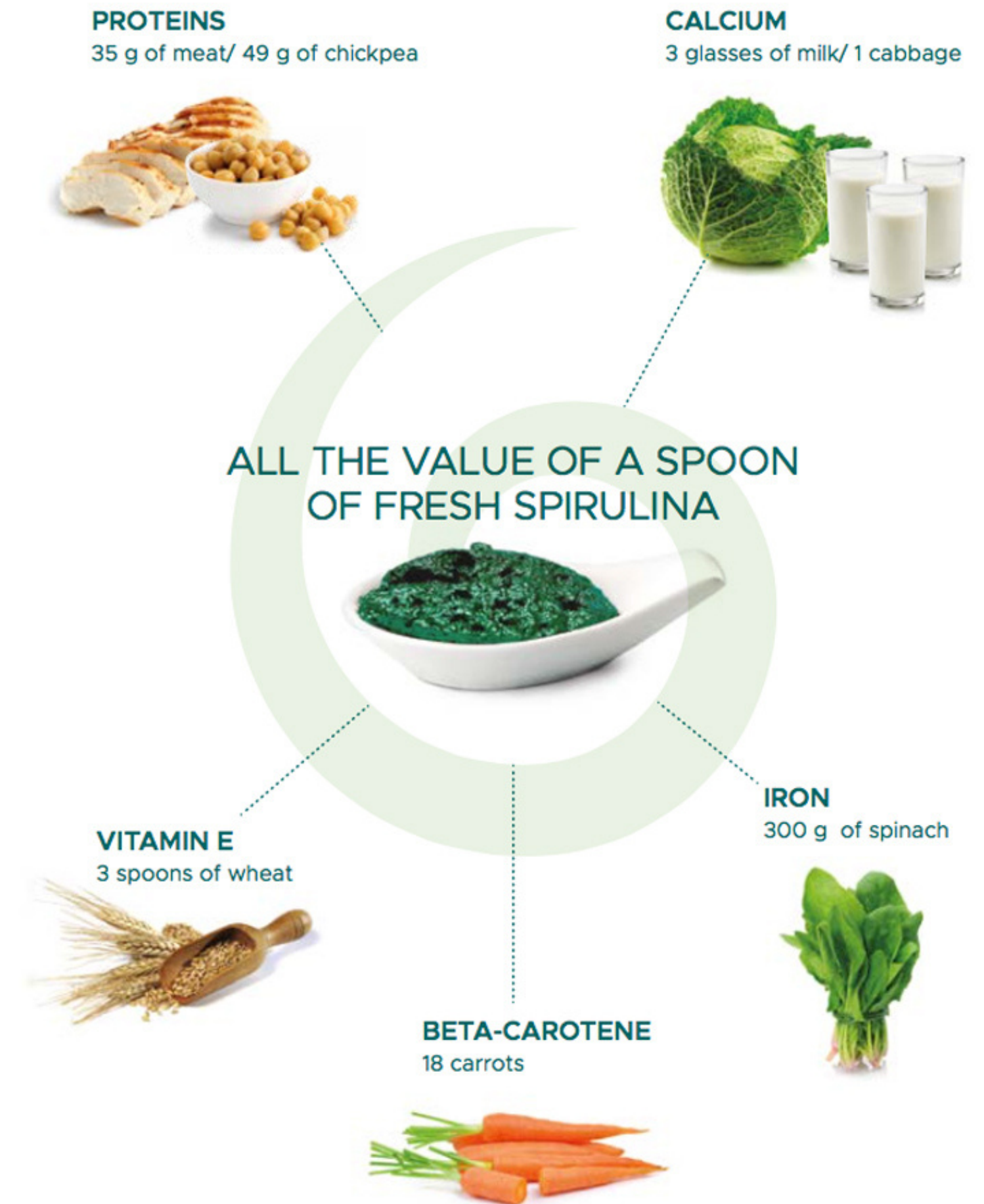
98% less space than tree



Equivalent to 20 trees

good & Green

- Spirulina was successfully used by NASA as a dietary supplement for astronauts on space missions.
- The United Nations World Health Organisation (WHO) found Spirulina able to be administered to children without any risk.





Fights climate change and malnutrition. Comply with UN SDG 3, 11 and 13



Annually one PBR array(10litre x 10) can yield up to ~30kg of dry biomass, which can be sold for 2.5 lakhs in retail market.



Self reliant and asset light business model helps to scale and optimise supply chain.

The utopia

Distributed algae farm in Public private partnership(PPP) with governments globally.

Reference

- The international Council for Clear Transportation (ICCT-2019), HEALTH IMPACTS OF AIR POLLUTION FROM TRANSPORTATION SOURCES IN DELHI, https://theicct.org/sites/default/files/ICCT_factsheet_health_impact_airpollution_Delhi_20190705.pdf (accessed on 18/02/20)
- Ramanan R, Kannan K, Deshkar A, Yadav R, Chakrabart T, Enhanced algal CO₂ sequestration through calcite deposition by *Chlorella* sp. and *Spirulina platensis* in a mini-raceway pond *Bioresour Technol*, 101 (8) (2010), pp. 2616-2622.
- Sajilata MG, Singhal RS, Kamat MY. Supercritical CO₂ extraction of γ-linolenic acid (GLA) from *Spirulina platensis* ARM 740 using response surface methodology. *J Food Eng* 2008;84:321–6. <https://doi.org/10.1016/J.JFOODENG.2007.05.028>.
- Guterman H, Ben-Yaakov S, Exchange rates of O₂ and CO₂ between an algal culture and atmosphere, *Water Res*, 21 (1) (1987), pp. 25-34.
- Rinanti A. Biotechnology Carbon Capture and Storage by Microalgae to Enhance CO₂ Removal Efficiency in Closed-System Photobioreactor. *Algae - Org. Imminent Biotechnol*, 2016. <https://doi.org/10.5772/62915>.
- Sydney EB, Sturm W, Carvalho JC, Soccol VT, Larroche C, Pandey A, Soccol CR, Potential carbon dioxide fixation by industrially important microalgae *Bioresour Technol*, 101 (2010), pp. 5892-5896.
- Wang B, Li Y, Wu N, Lan CQ. CO₂ bio-mitigation using microalgae. *Appl Microbiol Biotechnol* 2008;79:707–18. <https://doi.org/10.1007/s00253-008-1518-y>.
- BIOS-3 – BIOlogical closed life support System <http://www.ibp.ru/science/bios3.php>
- Chang EH, Yang SS. Some characteristics of microalgae isolated in Taiwan for biofixation of carbon dioxide. *Bot Bull Acad Sin* 2003;44:43–52. <https://doi.org/10.7016/BBAS.200301.0043>.
- Gonçalves AL, Rodrigues CM, Pires JCM, Simoes M, The effect of increasing CO₂ concentrations on its capture, biomass production and wastewater bioremediation by microalgae and cyanobacteria, *Algal Research* 14, March 2016, Pages 127-136.
- Bhola V., Swalaha F., Ranjith Kumar R., Singh M., Bux F., Overview of the potential of microalgae for CO₂ sequestration, *Int. J. Environ. Sci. Technol.* (2014) 11:2103–2118
- A Controlled Exposure Study of Green and Conventional Office Environments <https://ehp.niehs.nih.gov/doi/10.1289/ehp.1510037>
- Ho SH, Chen CY, Lee DJ, Chang JS, Perspectives on microalgal CO₂-emission mitigation systems--a review. *Biotechnol Adv.* 2011 29(2):189-98.
- APPLICATION OF ALGAE IN AIR POLLUTION CONTROL TECHNIQUE <https://www.irjet.net/archives/V7/i3/IRJET-V7I3727.pdf>