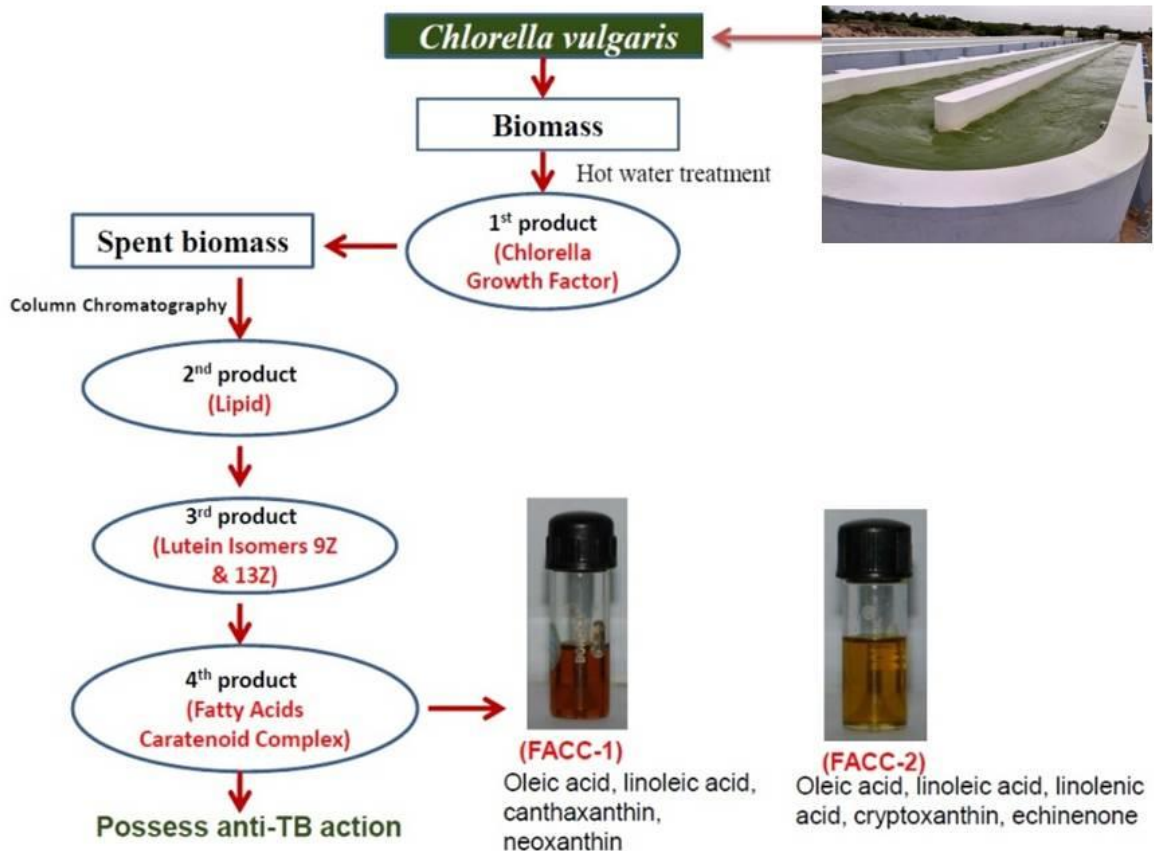


## Scientists devise frugal method to extract anti-TB agents from marine microalgae

New Delhi, Oct. 02 (India Science Wire): Marine Biotechnology Division of National Institute of Ocean Technology (NIOT) has discovered a potential anti-TB agent to fight against tuberculosis (TB) by successfully isolating the biomolecules of pharmacological importance from a marine microalgae *Chlorella vulgaris*.



This is possibly the first time that a promising anti-TB agent from the marine microalgae *Chlorella vulgaris* is developed during the production of Chlorella Growth Factor (CGF), lipid and lutein through a low cost extraction process. The hot water extract of *C.vulgaris* is also known as CGF. The study also highlights a cost-effective technology for the production of multiple biomolecules, sequentially from marine micro-alga biomass.

Tuberculosis is a highly contagious bacterial disease, which is still one of the biggest threats to humanity. Despite the availability of live attenuated vaccine and their effectiveness against the disease is proven, the treatment of TB is difficult because the TB bacteria have thick cell walls that drugs have difficulty in penetrating and a protein in the bacteria makes it resistant to treatment. Sometimes bacteria can hide within the immune system and become dormant and reappear after treatment ends with mutated strains resistant to antibiotics and vaccines. "Most of the drugs currently used, only kill bacteria that are trying to replicate," so we need drugs that can kill those dormant ones too," scientists opined.

The marine natural compounds isolated from the microalgae using a cost effective method by the NIOT scientists would contribute to the development of a new compound to kill the dormant tuberculosis bacteria. Scientists held that as the microalgae possess sophisticated chemical structures, it has potential in the pharmaceutical and medical areas, including development of drugs for other neglected tropical diseases.

The present study revealed that Fatty Acid-Carotenoid Complex (FACC) of potent anti-TB agents such as oleic, linoleic, and linolenic acids with effective antioxidants such as carotenoids would be an effective approach for tuberculosis treatment which allies with HIV related disorder, where the immunity is lost and oxidative stress boosts up.

The CGF is rich in amino acids, peptides, vitamins, minerals and nucleic acids. Number of studies reported that *Chlorella vulgaris* exhibited protection against oxidative stress, cancer and chronic obstructive pulmonary disease due to the presences of micro-and macro-nutrients such as proteins, polysaccharides, omega-3

polyunsaturated fatty acids, vitamins and minerals. In the present study, NIOT scientists have isolated two types of fatty acids-carotenoid complexes (FACC) namely, FACC-1 (red oil) and FACC-2 (brown oil) in addition to lipid and lutein from the spent biomass of *C.vulgaris* after the extraction of CGF. The study further revealed that these fatty acid-carotenoid complexes are an effective anti-TB agent, due to its potential to act at lower concentrations. The mechanism behind this significant effect is that these oils are rich in many potent anti-TB agents (oleic, linoleic and linolenic acids) that are indeed effective individually as well as in complex with carotenoids that act as potent antioxidants (canthaxanthin, neoxanthin, cryptoxanthin and echinenone).

This research work was led by Dr. Kirubakaran R., Dr. Dharani G., and a team comprised of Kumar T.S., Josephine A, and Sreelatha T. of NIOT, Ministry of Earth Sciences, Raja Kumar S. of Bharathidasan University and Azger Dusthacker VN, and Mahizhaveni B of National Institute for Research in Tuberculosis, Chetpet, Chennai, The research paper is published in the Journal of Ethnopharmacology. (India Science Wire)

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