

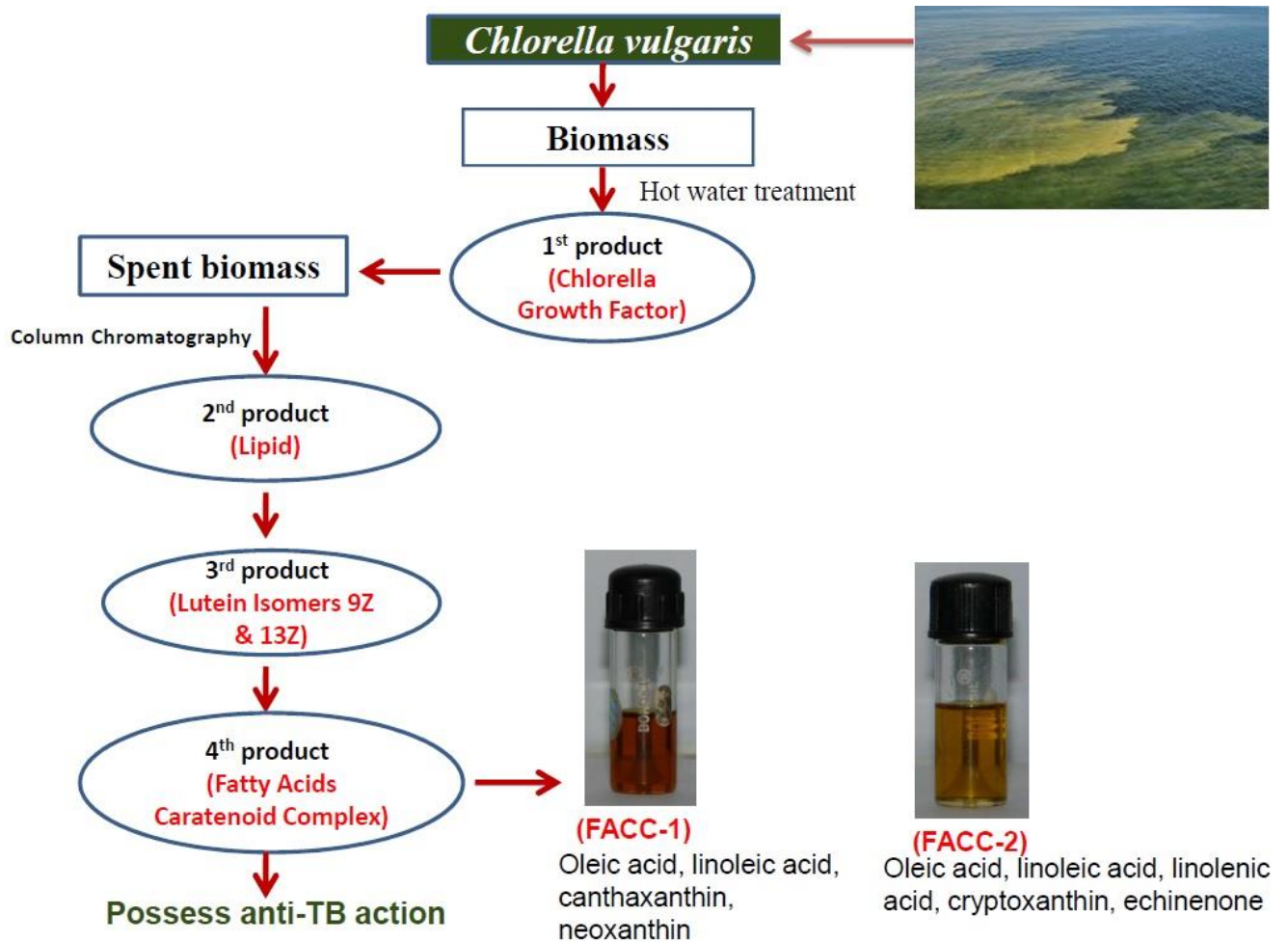
**Cost-effective method for extraction of effective anti-TB agents from Marine microalgae developed by Indian scientists**

Keywords: Tuberculosis, anti-TB agent, Marine microalgae, Cost effective method, NIOT, New medicine

Marine Biotechnology Division, National Institute of Ocean Technology (NIOT) have discovered a potential new weapon in the fight against tuberculosis (TB) by successfully isolating the biomolecules of pharmacological importance from a marine microalgae *Chlorella Vulgaris*.

“To our knowledge, this is the first time that a promising anti-TB agent from the single biomass of marine microalgae *Chlorella Vulgaris* is developed through a low cost extraction process.”, said NIOT scientists. Tuberculosis is a highly contagious bacterial disease, which is still one of the biggest threats to the 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 penetrating and a protein in the bacteria makes it resistant to treatment. Sometime bacteria can hide within the immune system and become dormant, only to reappear after treatment ends with mutated strains resistant to antibiotics and vaccines. "Most of the drugs we have only kill bacteria that are trying to replicate, "so we need drugs that can kill those dormant ones too" scientists said,

The marine natural compounds isolated from the microalgae using a cost-effective method by the NIOT scientists would contribute to the development of new medicines to kill the dormant tuberculosis bacteria. Scientists said 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 which allies with HIV related disorder, where the immunity is lost and oxidative stress boosts up.

*Chlorella Vulgaris* (C. Vulgaris) exhibited protection against oxidative stress, cancer, and chronic obstructive pulmonary disease due to presences of micro-and macro-nutrients such as proteins, polysaccharides, omega-3 polyunsaturated fatty acids, vitamins, and minerals. In the 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 Chlorella Growth Factor (CGF) extracted from C. Vulgaris. The hot water extracts from C. Vulgaris are known as chlorella growth factor (CGF) and are rich in amino acids, peptides, vitamins, minerals

and nucleic acids. Scientists found the potential therapeutic agent comprising of a complex of an anti-TB agent (fatty acids) and antioxidants (carotenoids) with no significant synergistic effect. Scientists found that recent medications act as an effective therapeutic candidate due to the presence of naturally complex rich in valuable anti-TB agents such as polyunsaturated fatty acids together with powerful antioxidants such as carotenoids. Scientists added oxidative stress is the causative agent for most of the diseases. Therefore, recent medications are always concentrated on reducing oxidative stress by supplementing an antioxidant.

Led by Dr. Dharani G, the research team comprised of Kumar T.S., Kirubakaran R, 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

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