Biofuel and biorefinery production by marine haptophytes

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WHEN: THURSDAY 27th June, 2019

TIME: 12:00 for BBQ and Seminar at 12:30-13:10

WHERE: Lismore Campus U Block ESM Staff Room (GoPro recording proposed)

BBQ: The cost for the BBQ is $5 which covers eggs, bacon, mushrooms, sausages, salads (inc. beetroot, greens, pasta salads, etc) and drinks.

RSVP: If you wish to attend the lunch PLEASE email EAL by 9:30am on 27th eal@scu.edu.au

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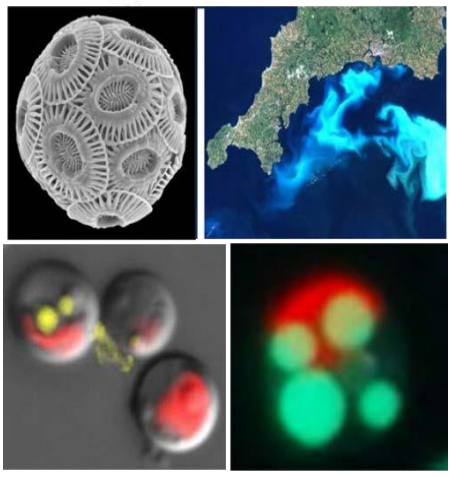
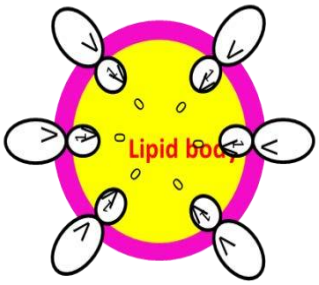
Haptophyte algae are one of major biomass producers in the ocean and produce huge blooms that are frequently observed in emerald green color by satellite. Most microalgae produce triacylglycerol (TAG) as storage neutral lipid compound, but different in haptophytes. The secondary symbiotic eukaryotic microalgae "haptophytes" are categorized into two groups due to neutral lipids either TAG or alkenones. Among them, the coccolithophore *Emiliania huxleyi* has been known to be alkenone-producer and produce huge amount of biomass and then transported into deep oceans by biological pump to be precipitated as sediments. The coccolithophore cells are covered by calcium carbonate crystals as cell-covering, named as coccolith. Therefore, huge amounts of lipids and calcium carbonate which had been accumulated in the sediments in the Cretaceous era have been considered to become sources of petroleum and limestones in far-east countries and Dover, UK. Our previous studies showed experimentally that crude oils and natural gasses can be produced by pyrolysis of alkenone-producing haptophytes. However, metabolic pathways of lipid biosynthesis are known for neither neutral lipids alkenones nor long-chain fatty acid DHA yet. The present talk will introduce you our research results on the mechanisms how alkenones are metabolically produced in the cells and how such compounds can be used for biofuel production.





Topics are: (1) How much carbons are fixed by photosynthesis and distributed into metabolites such as polyunsaturated fatty acids and neutral lipids, (2) How intracellular oil droplets (named as "alkenone body") are formed, (3) How such unique lipids can be processed to direct usable biofuel and biorefinery candidates by cellular metabolic engineering using genetic transformation. Finally, future prospects on biofuel and biorefinery production by haptophytes will be discussed.