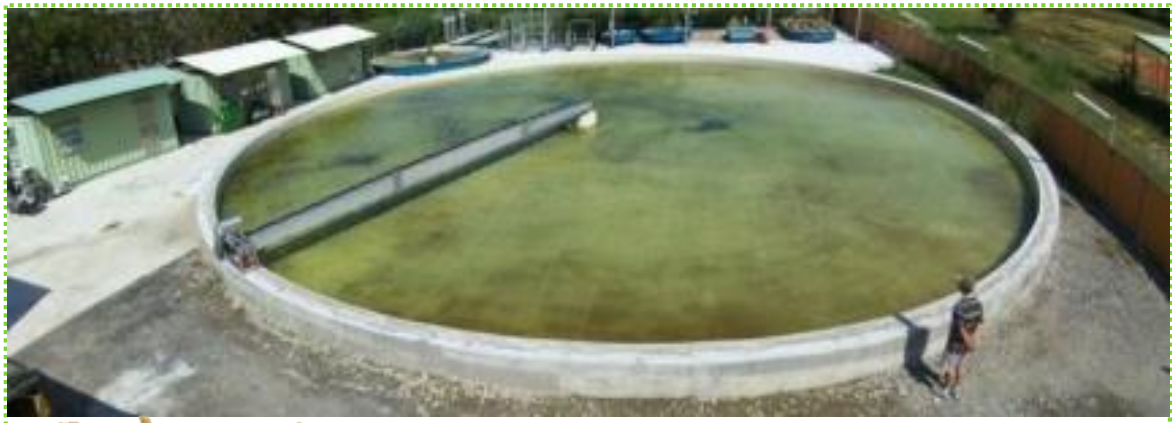
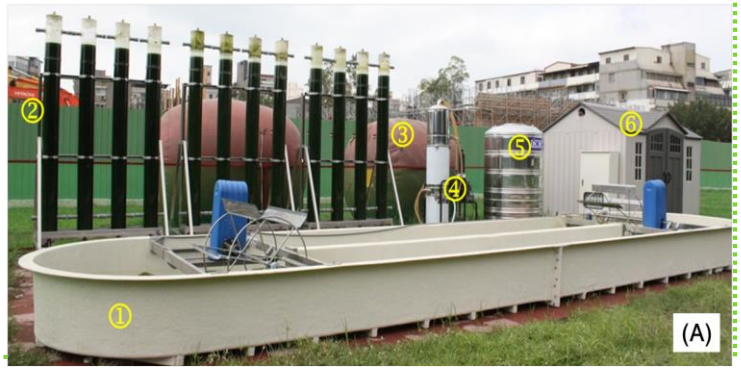
以藻類固碳與生物精煉平台進行二氧化碳高值化利用及商業化技術開發(1/2)

執行單位	國立成功大學	計畫主持人	張嘉修教授

- 建立高環保、低耗能之生物性固碳與CO2 再利用平台，並藉由開發低成本、高價值且可商業化之藻類產品，創造CO2 再利用之極大化價值。
- 以中油公司冷排水進行馬尾藻養殖及固碳、開發固碳微藻飼料並成功養殖蝦類上市販售。

【2項已獲證】
固定二氧化碳用之小球藻及使用其固定二氧化碳之方法、耐鹼微藻株及使用其減量與再利用二氧化碳的方法
【3項申請中】
利用突變方法開發具耐高溫及耐煙道氣之小球藻藻株、油品精煉技術、以馬尾藻進行褐藻多醣之萃取、純化及生物活性技術





- 以工業廢氣與廢水(農業排放水)進行商業化規模之微藻養殖量產平台，提升固碳效率，並結合連續式藻漿萃油及轉酯系統生產生質柴油，而微藻殘渣則將繼續轉換成高值特用化學品(如琥珀酸、丁醇等)或其他生質燃料(如酒精)
- 以較純淨之CO_2 (如醱酵製程排氣及CCS 再生之CO_2)養殖可高價應用之藻類，開發成保健食品及水產與家禽飼料添加劑等產品
- 開發高效率藻類機能性成分(例如蝦紅素、褐藻多糖)提取技術及商品化配製技術，以加速藻類產品之商業化應用
- 利用中油液化天然氣(LNG)廠冷排水養殖大型藻類，並將大型藻生物質發展為各項生質燃料及各種高值化產品之原料。
- 利用藻類固碳養殖及生物精煉製程之相關實場操作程序數據，進行生命週期評估，分析符合減碳與經濟效益之系統操作組合

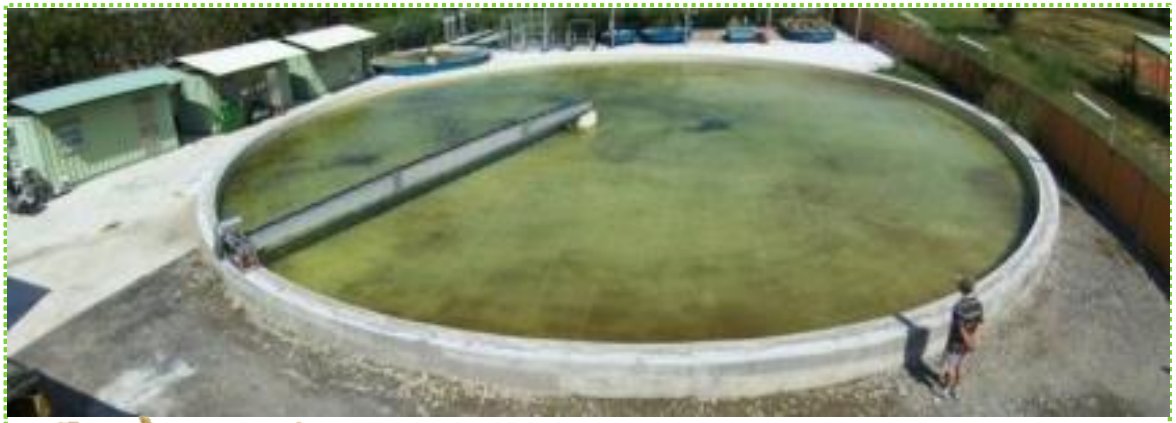
Developing commercialization technology for high-value CO_2 utilization using algae-based CO_2 fixation and biorefinery platform

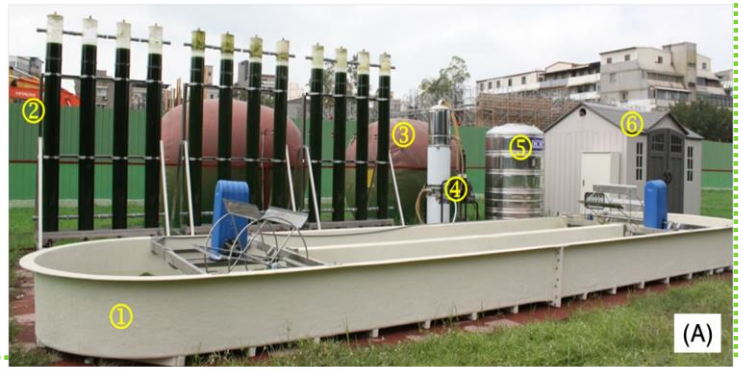
Execution Unit	National Cheng Kung University
Project PI	Jo-Shu Chang

- Develop an eco-friendly and energy-efficient CO_2 capture and re-utilization platform to develop algae-based products that have low production cost, high product value, and are commercially viable.

【2 approved】
Chlorella sp. for fixing CO_2 and method of fixing CO_2 by using the same species, Alkali-tolerant microalgal strain and application of the same

【3 applying】
Chlorella sp. mutation method for high temperature and flue gas tolerance, oil refinery technology, Technology of fucoidan extracting, purifying and bioactive keeping from Sargassum.





- Developing microalgae mutants with the enhancement in their growth rate, temperature tolerance and carbon dioxide fixation efficiency
- Developing a large scale outdoor microalgae cultivation system using industrial flue gas CO_2 as carbon source and employing different operation strategies to further improve the CO_2 fixation efficiency
- Developing effective methods to produce microalgae-based biofuels as well as high-value products (e.g., feed supplements); the algae residues or by-products (e.g., glycerol) are converted to value-added products via fermentation processes to enhance the commercial viability of the overall process
- Establishing highly efficient method to disrupt the cell wall and to extract the functional components from microalgal cells for follow-up biorefineries
- Utilizing wastewaters to capture CO_2 via alkaline absorption and to subsequently use the CO_2-absorbed wastewater to grow microalgae.