

以新型高性能顆粒觸媒進行高水份高酸值低品質廢食用油之批式與連續式產製生質柴油

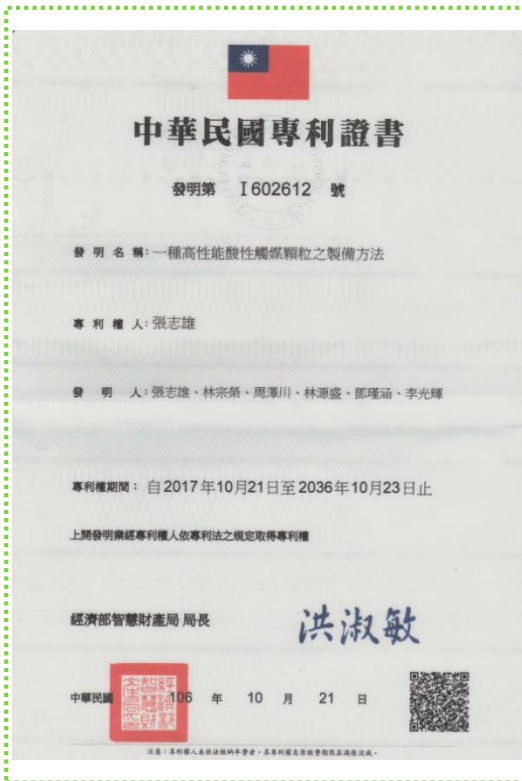
執行單位

大同、義守與長庚大學

計畫主持人

陳嘉明

- 將國內外企業餐廳之廢食用油製成生質柴油直接使用，推廣「**原地回收、原地生產、原地使用**」之概念，降低收集與運輸之成本，同時也能節省運輸時產生之碳足跡，可同時達到產能、節能與減碳之目標。



- 為發展具商用潛力的觸媒生產生質柴油之製程，將篩選與製備酸與鹼性固體顆粒觸媒，進行廢食油的酯化與轉酯化，檢測其產物產率與特性。本研究進行新嘗試如：「高效能觸媒顆粒開發」、「實驗室級批式與連續式反應系統開發」與「生質柴油製程系統之模擬與設計」。最終開發用於酯化與轉酯化反應之觸媒顆粒、建立批式與連續式反應器系統並進行生質柴油生產製程之模擬與設計，以廠商轉評估。
- 本計劃研發的酸性觸媒如：硫酸鋁、硫酸亞錫、硫酸鋯與鹼性觸媒如：氧化鈣、矽酸鋰等觸媒應用於子計畫所設計的批式與連續式觸媒進行酯化與轉酯化實驗，效果優異，其中硫酸亞錫觸媒已申請通過中華民國專利。

Batch and Continuous Production of Biodiesel from High Water Content High Acid Value Low Quality Waste Cooking Oil with Novel High Performance Granular Catalyst

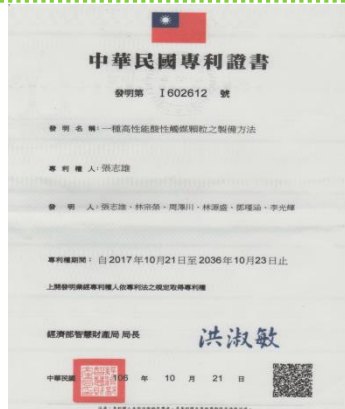
Execution Unit

Tatung、I-Shou and Chang Gung University

Project Director

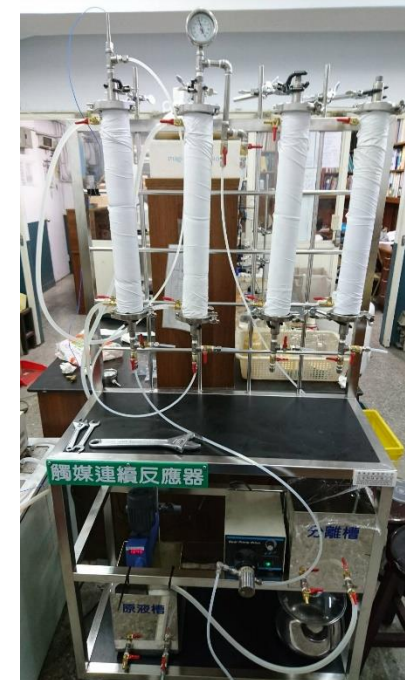
CHERN, JIA-MING

Waste cooking oil from the restaurants of local plants will be converted to biodiesel using our technology and used directly as boiler fuel. To promote the concept of "recycling in place, producing in place and using it in place", this project can reduce the cost of collection and transportation and save carbon footprint of transportation.



A PREPARATION METHOD
OF HIGH CATALYTIC
PERFORMANCE ACID
CATALYST PELLETS

(Taiwan Patent Number
I602612)



- The traditional transesterification of triglyceride uses homogeneous catalyst cannot be applied to convert waste cooking oil (WCO) to biodiesel. Therefore, new transesterification processes using heterogeneous catalysts that can be easily separated and recovered is highly desirable. Our team has been devoted to preparing acid solid catalyst that can be used to remove the free fatty acid from WCO and preparing base solid catalyst to produce biodiesel from waste cooking oil.
- The acid solid catalysts developed and tested in this project include aluminum sulfate, stannous sulfate, zirconium sulfate. The alkaline solid catalysts developed in this project include calcium oxide and lithium silicate. The stannous sulfate catalyst has been granted a Taiwan patent (Patent Number I602612).
- A catalyst batch evaluation system has been constructed to test the performance of the developed catalysts; a continuous packed-bed reaction system including esterification unit and transesterification unit has been constructed and will be used to produce biodiesel with the best acid solid catalyst and base solid catalyst.