

植物性替代燃料產品之品質影響研究

執行單位

工業技術研究院

計畫主持人

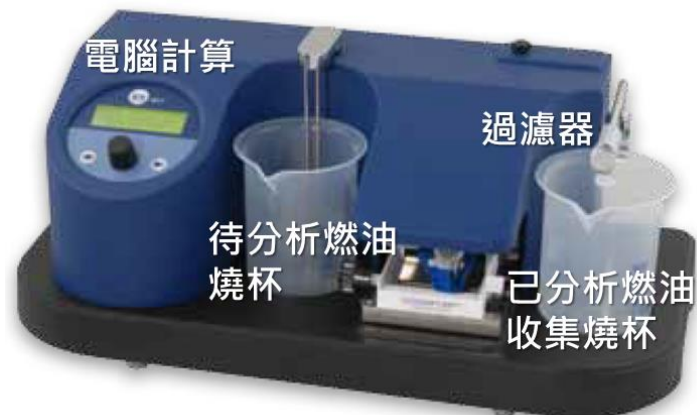
馬先正 博士

- 完成B2/B100生質柴油於國內儲存環境，累積14個月的品質分析資料庫，可供國內相關業者評估生質柴油品質參考。
- 建議檢驗生質柴油對油路堵塞風險的評估方法，Filter Blocking Tendency test (FBT test)，係參考ASTM D2068與紐澳車用柴油標準，可做為未來國內標準修訂與檢測生質柴油品質之參考。

第 14 個 月	B100								B2									
	單甘油酯0.1 %				0.90%				HDPE塑膠容器				低碳鋼金屬容器					
	BO1	BO2	BO3	BO4	BW3	BW4	PO2	PO3	PO4	PC4	MC1	MC2	MS3	MS4	MO1	MO2	MO3	MO4
	高溫	恆溫濕	臺北	高雄	臺北	高雄	恆溫濕	臺北	高雄	高雄	高溫	恆溫濕	疏臺北	疏高雄	高溫	恆溫濕	臺北	高雄
外觀	蝕		蝕	蝕	蝕	蝕							硫蝕	硫蝕				
密度																		
黏度	升				升	升												
水分		上升不符			上升不符				上升不符				含硫	含硫				
氧化		1個月後即不符			1個月後不符				3個月後即不符				3個月後即不符					不符
酸價	8 th 劣		緩升		10 th 後劣化				緩升									
生物	未			未		未			未				未		未檢出			未
FBT																		

累計14個月品質分析資料庫

建議參考檢測方法-FBT



Ref: ASTM D2068

建議FBT作為油路堵塞風險評估方法

- 針對廢食用油料源之生質柴油完成累積14個月儲存安定性分析：
 - 研究變因：油品種類、生質柴油製程、儲存容器材質、儲存容器密封性、環境溫/濕度、室內/戶外環境、與硫含量等。
 - 樣品檢測項目：外觀、密度、黏度、水分、氧化穩定性、酸價、微生物與FBT值。
- 參考ASTM D2068之油路堵塞風險評估方法Filter Blocking Tendency test(FBT test)，可用於規範生質柴油於任一時間的過濾性(filterability)品質。
- FBT做為評估100 %或摻配後之生質柴油品質的方法，已廣泛於國際各標準與研究機構中用以評估油路堵塞風險，並已有商用檢測儀器販售。
- 未來若能累積我國生質柴油品質與FBT檢驗值關聯數據並蒐集相關國家FBT檢驗統計資料，可做為我國車用柴油相關標準修訂參考。

Project of long term stability of used cooking oil methyl ester derived biodiesel in Taiwan

Execution Unit

Industrial Technology Research Institute

Project Director

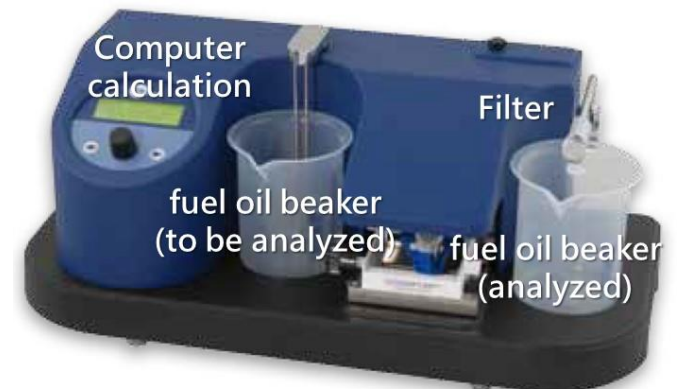
Dr. Ma, Hsien-Chen

- Complete B2/B100 biodiesel in domestic storage environment, accumulative 14 months quality analysis database as references to evaluate the quality of biodiesel in Taiwan.
- Suggest Filter blocking tendency test (FBT test) for biodiesel, which refers to ASTM D2068 and Australia and New Zealand's automotive diesel standards, can be used as the reference for the revision of the domestic standards and biodiesel quality inspection in the future.

14 months quality analysis database

14 th month	B100				B2													
	Monoglyceride 0.1 %				0.90%													
	HDPE plastic container				Low carbon steel metal container													
	BO1	BO2	BO3	BO4	BW3	BW4	PO2	PO3	PO4	PC4	MC1	MC2	MS3	MS4	MO1	MO2	MO3	MO4
High temp.	Const. temp. humidity	Taipei	Kao hsiung	Taipei	Kao hsiung	Const. temp. humidity	Taipei	Kao hsiung	Kao hsiung	High temp.	Const. temp. humidity	Taipei (sulfur)	Kao hsiung (sulfur)	High temp.	Const. temp. humidity	Taipei	Kao hsiung	
Appearance	corrosion		corrosion	corrosion	corrosion	corrosion							Corrosion (sulfur)	Corrosion (sulfur)				
Density																		
Viscosity	increased				increased	increased												
Water content	increased(fail)				increased(fail)				increased(fail)				contain sulfur	contain sulfur				
Oxidation	After 1 month fail				After 1 month fail		After 3 month fail				After 3 month fail							fail
Acid value	8 th deteriorated	slowly increased			10 th deteriorated		slowly increased											
Micro organism	Not			Not	Not			Not			Not		Not	Not				Not
FBT																		

Suggest Filter blocking tendency test -FBT



Ref: ASTM D2068

- Focused on used cooking oil source biodiesel to complete the stability analysis during 14 months domestic storage:
 - Research variables: oil type, biodiesel production process, storage container material, storage container sealing, storage temperature/humidity, indoor/outdoor environment, and sulfur contents.
 - Inspection items: appearance, density, viscosity, water contents, oxidation stability, acid value, microorganism and FBT value.
- Applied ASTM D2068 Filter blocking tendency test (FBT test), which can be used to regulate the filterability of biodiesel at any time.
- FBT as 100 % or blended biodiesel quality evaluation method, has been extensively used in various international standards and research institutes to evaluate the tendency of filter blocking, and commercial inspection equipment has been sold on the market.
- If the relationship between domestic biodiesel quality and FBT test value can be accumulated, and the statistical data of FBT test in related countries can be collected in the future, it can be used as the reference for the revision of the relevant standards of automotive diesel in our country.