



**APEC 21st Century Renewable Energy Development Initiative
(Collaborative IX):
Establishment of the Guidelines
for the Development of Biodiesel Standards in the APEC Region**

EWG 02/2007A

Proposing APEC Economy: 1) Thailand

Co-sponsoring APEC Economies:

**2) Australia 3) Chinese Taipei 4) New Zealand
5) USA**

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Objective of the Project

- To establish the guidelines for development of biodiesel standards in the APEC region for enhancing the trade of biodiesel among APEC member economies.
- To offer the possibility for a sustainable energy source with a neutral effect on greenhouse gas emissions.



Introduction

- Biodiesel, renewable fuel, produced from animal fats and vegetable oils**
- The quality of biodiesel produced depend on the natural characteristics of feedstocks**
- EN 14214:2003 and ASTM D 6751:2003 are the standards currently used**
- The feedstocks used in EU and US are different from those used in APEC region**



Feedstocks for biodiesel production

Soybean oil

Jatropha oil



**Sunflower
oil**

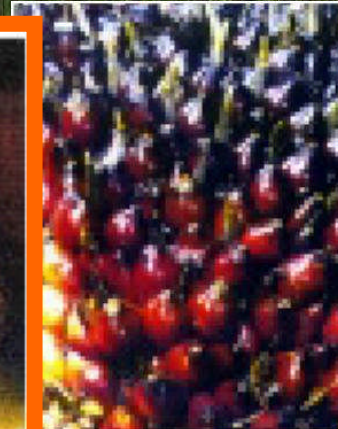


Rapeseed oil

**Waste
cooking
oil**



Coconut oil



**Palm
oil**



Fatty acid composition of BDF from various feedstocks in Thailand

Fatty acid	BDF from						
	Crude palm oil	Crude coconut oil	Jatropha oil	Palm stearin	Palm olein	Soybean oil	Sunflower oil
Caproic acid, C8:0	-	7.42	-	-	-	-	-
Capric acid, C10:0	-	5.78	-	-	-	-	-
Lauric acid, C12:0	0.35	49.75	-	0.25	0.37	0.1	-
Myristic acid, C14:0	0.92	18.75	-	1.27	0.91	0.2	0.1
Palmitic acid, C16:0	44.11	8.60	14.85	59.19	38.53	10.7	6.0
Stearic acid, C18:0	4.36	2.65	7.43	4.43	0.08	3.9	4.0
Arachidic acid, C20:0	0.09	0.18	0.08	0.31	0.13	Other = 0.2	Other = 1.1
Sum of Saturated FA	49.83	93.13	22.36	65.45	40.02	15.1	11.2
Palmitoleic acid, C16:1	-	-	-	0.08	-	0.3	<1.0
Oleic acid, C18:1	38.97	5.53	47.65	28.61	58.13	22.8	16.5
Linoleic acid, C18:2	11.21	1.26	29.80	5.86	1.78	50.8	72.4
Linolenic acid, C18:3	-	0.07	0.19	-	0.07	Other = 6.8	Other = 0.6
Sum of Unsaturated FA	50.18	6.86	77.64	34.55	59.98	80.7	90.5



THAILAND: Standard Specifications of Biodiesel - FAME

Item	Fuel properties	Unit	Standard limit	
1.	Methyl Ester	% wt.	min	96.5
2.	Density at 15° C	kg/m ³	min	860
			max	900
3.	Viscosity at 40°C	CSt	min	3.5
			max	5.0
4.	Flash Point	°C	min	120
5.	Sulphur	% wt.	max	0.0010
6.	Carbon Residue, on 10% distillation residue	% wt.	min	0.30
7.	Cetane Number		min	51
8.	Sulfated Ash	% wt.	max	0.02
9.	Water	% wt.	max	0.050
10.	Total Contaminate	% wt.	max	0.0024
11.	Copper Strip Corrosion		max	No. 1
12.	Oxidation Stability at 110°C	hours	min	6



THAILAND: Standard Specifications of Biodiesel - FAME

Cont.

Item	Fuel properties	Unit	Standard limit	
13.	Acid Value	mg KOH/g	min	0.50
14.	Iodine Value	g Iodine/100 g	min	120
15.	Linolenic Acid Methyl Ester	% wt.	min	12.0
16.	Methanol	% wt.	min	0.20
17.	Monoglyceride	% wt.	min	0.80
18.	Diglyceride	% wt.	min	0.20
19.	Triglyceride	% wt.	min	0.20
20.	Free glycerin	% wt.	min	0.02
21.	Total glycerin	% wt.	min	0.25
22.	Group I metals (Na+K)	mg/kg	min	5.0
	Group II metals (Ca+Mg)	mg/kg	min	5.0
23.	Phosphorus	% wt.	min	0.0010
24.	Additive		Approved by DG of DOEB	



Task of Work(1)

Phase 1:	<p>Review the current biodiesel standards applied in both APEC economies and non-APEC economies.</p> <p>Review the potential feedstocks and evaluate how their natural characteristics may affect the quality of biodiesel.</p>	3 month
Phase 2:	<p>Review the applicability of lessons learnt on the affect of biodiesel on the diesel engines and vehicles including their emissions.</p> <p>Review the opportunities, gaps, barriers and lessons learn from using biodiesel as fuels with engine and automobile manufacturers in order to adopt biodiesel specification and its blends.</p> <p>Investigate the additives and antioxidizers necessary for biodiesel.</p> <p>Organize the first workshop in Thailand</p>	7 month



Task of Work (2)

Phase 3:	Integrate and synthesize the information obtained from phase 1 and 2.	10 months
Phase 4:	Organize the second workshop in Chinese Taipei with representatives from energy sector among APEC economies. The recommendation and the lessons learned from stakeholders will be shared for future practice.	13 months



Task of Work (3)

Phase 5:	Integrate and synthesize the information for final report.	17 months
Phase 6:	Develop the draft final report on the guidelines	20 months



APEC Support Fund

Phase 1	\$ 4,000
Phase 2	\$16,600
Phase 3	\$ 4,000
Phase 4	\$12,600
Phase 5	\$ 7,000
Phase 6	\$ 5,800
Total	\$ 50,000



Thank you