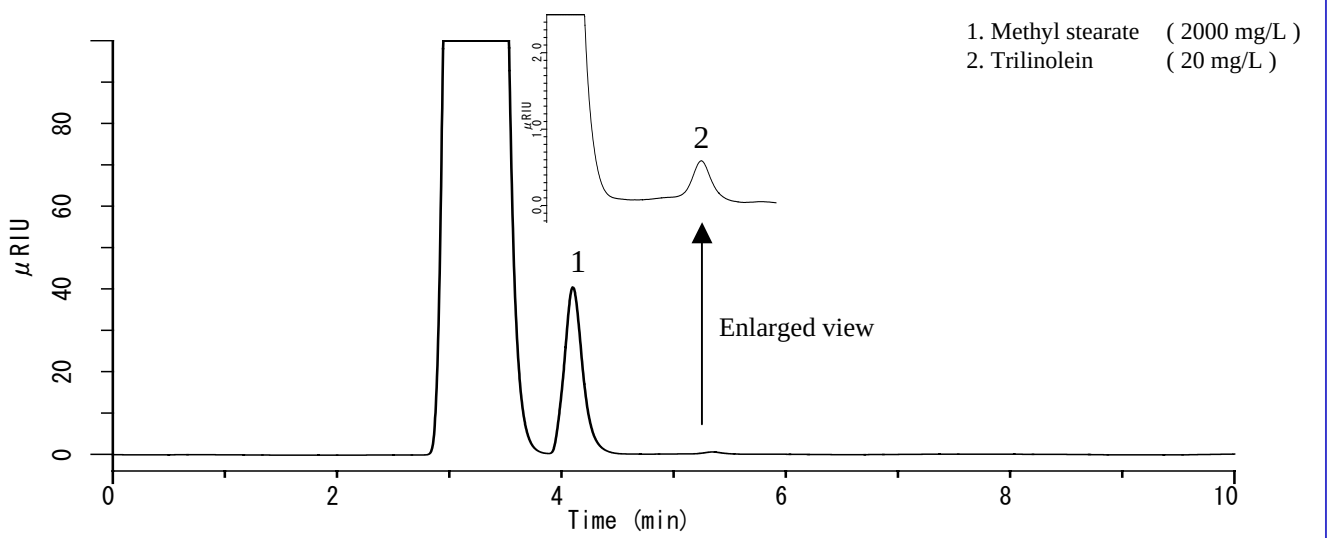
Analysis of Bio-Diesel Fuel (BDF) by HPLC

In Japan, Agency for Natural Resources and Energy is considering to amend the law “Enforcement Regulation of controlling the quality of volatile oils”, which is to strictly control the quality of biodiesel fuels (BDF).

As a result, a regulation of the compounds shown in the right table has been added. FAME (Fatty acid methyl esters) and TG (Triglycerides) in BDF are required to be analyzed using the HPLC method. Concentrations of FAME and TG are obtained from their calibration curves that have been already prepared using methyl stearate and trilinolein as their standard, respectively. (K.Suzuki)

Target	Method
FAME (Fatty acid methyl esters)	HPLC-RI
TG (Triglycerides)	HPLC-RI
Methanol	GC-oxygen detection
Acid Number (Value)	Potentiometer Titration
Formic acid, acetic acid, propionic acid	Ion chromatography
Oxidation stability (Increased volume of acid number)	Potentiometer Titration

A chromatogram obtained from standard solution

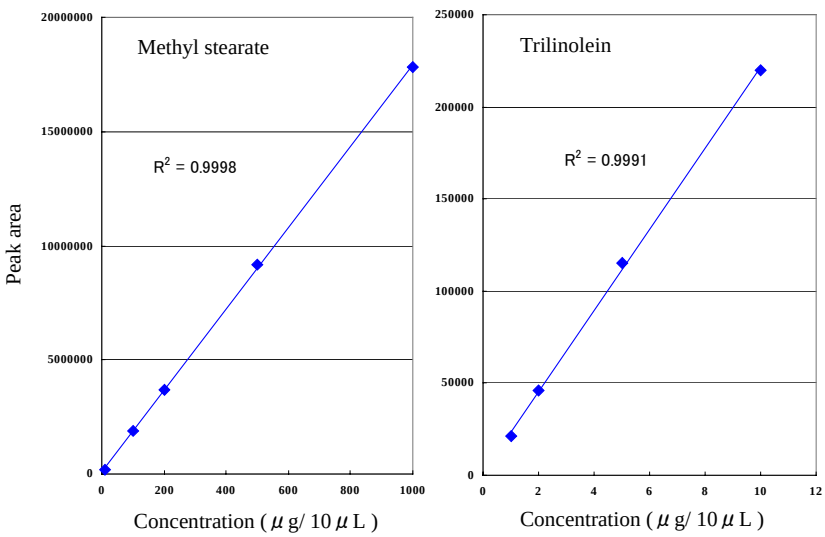


Conditions

Column : Inertsil SIL-100A (5 μm, 250 x 4.6 mm I.D.)
Column Cat. No. : 5020-01712
Eluents : A) n-Hexane
B) 2-Propanol
A/B = 996 / 4, v/v
Flow rate : 1.0 mL/min
Column Temp. : 40 ℃
Detector : RI
Injection volume : 10 μL

Column performance test

In the HPLC method, following requirements should be fulfilled.
(Both values should be examined with 5-μL injection.)
1.The retention time of methyl stearate is more than 3.5 minutes.
2. Resolution facror (Rs) between the methyl stearate peak and trilinolein peak is more than 3.



Sample No.	Concentration (μg/10 μL)	
	Methyl stearate	Trilinolein
1	10	–
2	100	1
3	200	2
4	500	5
5	1000	10

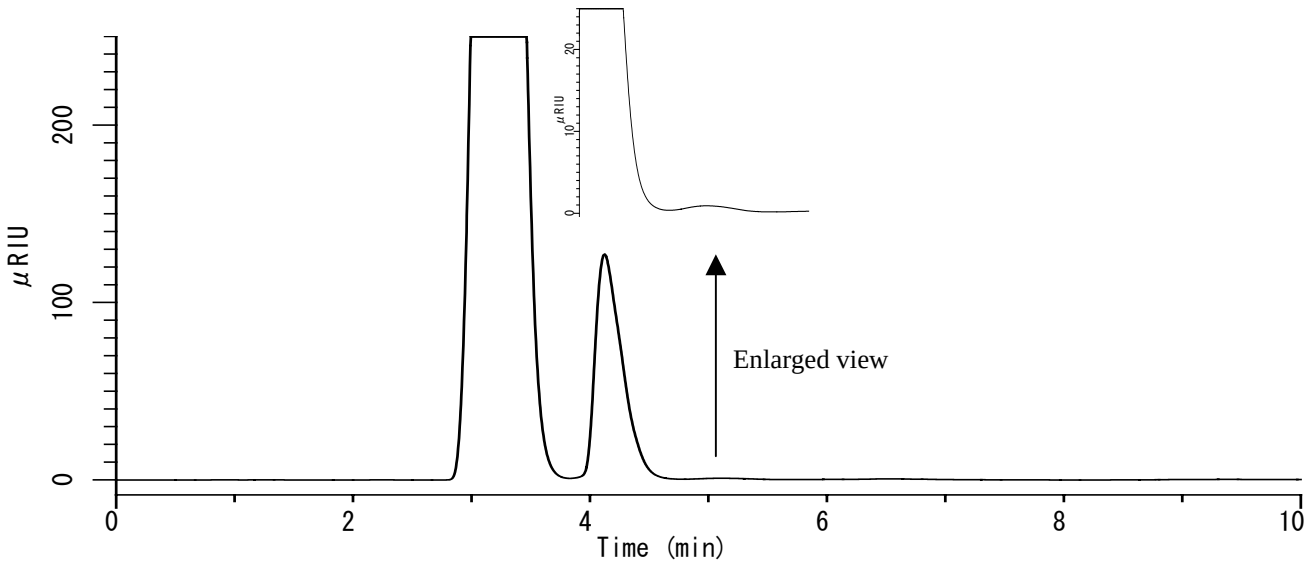
Calibration curves and concentrations of standard solutions

Results

Retention time of methyl stearate: **4.05 min**
Resolution factor: **4.7**

A chromatogram obtained from BDF

The sample solution was injected after filtration using a 0.45-μm membrane filter and dilution with light oil.



※ *The BDF sample was supplied from our customer, which is in a development stange.*

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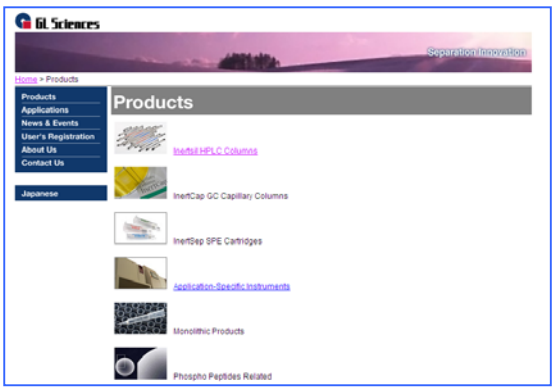

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