


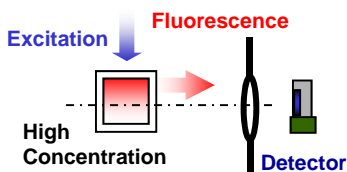
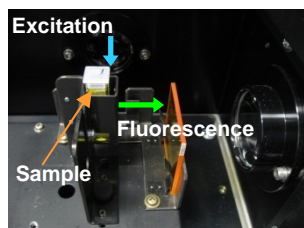
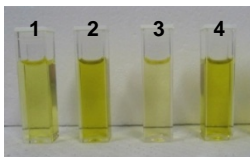
3D Fluorescence Spectrum of High concentration Samples (Olive oil)

INTRODUCTION

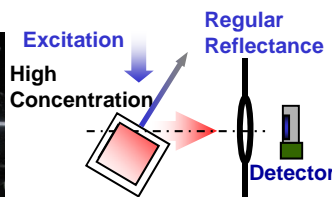
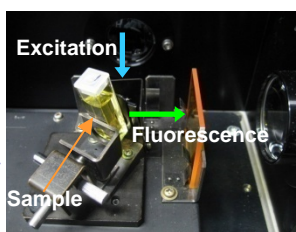
Olive oil is extracted from olives and is commonly used in Italian and Spanish cuisine. The olive oil that is currently available in Japan is largely divided into 2 groups as classified by the International Olive Oil Council (IOOC): virgin olive oil extracted from olives, which has superior flavor and fragrance, and refined olive oil, which is chemically extracted and blended with virgin olive oil.

In this study, we measured the 3D fluorescence spectra of commercially available olive oil and virgin olive oil and compared the intensity of fluorescence.

Sample	Accessory
Sample: 1. Brand A Olive oil 2. Brand A Virgin olive oil 3. Brand B Olive oil 4. Brand B Virgin olive oil	Solid Sample Holder (P/N: 650-0161) 



Fluorescence on liquid surface
 → Disappearance of fluorescence by self-absorption
 Failure to detect all fluorescence



Fluorescence on liquid surface
 → Surface-measurement system
 Detect all fluorescence

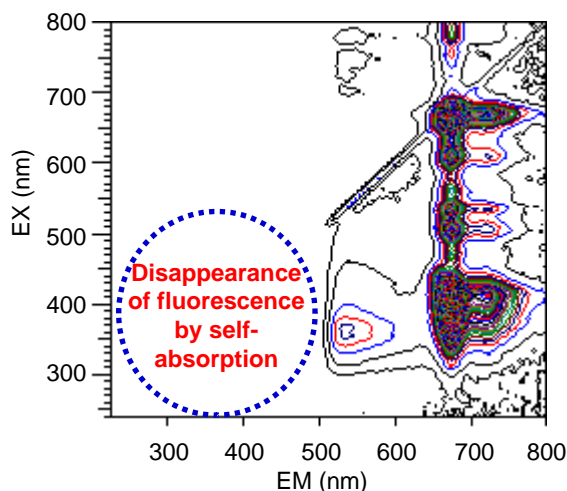


Figure 1. Measurement in 10-mm rectangular cell

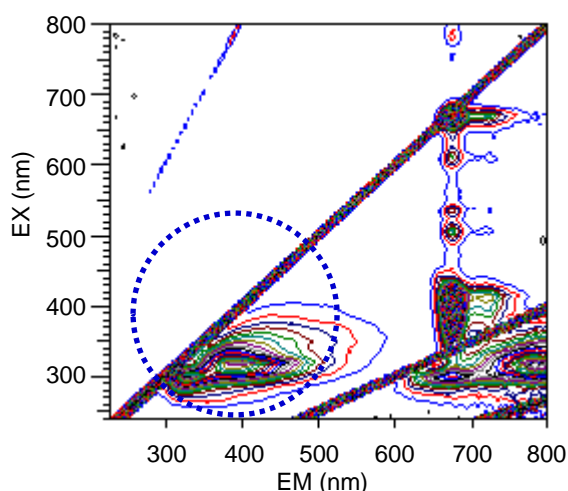


Figure 2. Measurement in solid sample holder

When a 10 mm rectangular cell is used to measure highly concentrated samples (higher absorption), excitation light does not reach the liquid interior and fluorescence tends to be generated on the liquid surface. Due to the phenomenon known as self-absorption, the absorption of fluorescence by the sample itself, the expected fluorescence with a shorter wavelength also disappears (Fig. 1). When dilution of the sample is not appropriate, a solid sample holder with the surface-measurement method may be used to examine highly concentrated samples (Fig. 2). By monitoring the liquid surface, fluorescence that was not captured with a 10-mm rectangular cell was successfully measured.

* Referred to FL130001-02 for the analysis condition.

KEY WORDS

Bio/Medical Science/Food/Pharmaceuticals, Food,
 Olive oil, Virgin olive oil, Fluorescence Fingerprint, Food Inspection,
 3D Fluorescence Spectrum, FL, F-7000

Fluorophotometer (FL)

Sheet No. FL130002-01

3D Fluorescence Spectrum of Olive Oil

INTRODUCTION

In this study, 3D fluorescence spectra of commercially available olive oil and virgin olive oil were measured and fluorescent intensities were compared. In each figure, (a) and (b) show the 3D fluorescence spectra of short- and long-wavelengths, respectively (Y52 filter was used). The Hitachi F-7000 Fluorescence Spectrophotometer performs throughput analysis at the highest level of its class, and measures multiple samples smoothly.

INSTRUMENT CONDITIONS

Instrument	: F-7000			
Excitation wavelength	: 240 - 800 nm	Slit on Excitation Side	: 5 nm	Photomultiplier Voltage: 400 V
Fluorescence wavelength	: (a) 250 - 620 nm (b) 620 - 800 nm	Slit on Fluorescence Side:	5 nm	Filter : Y52 *Only used in (b)
Scan speed	: 60000 nm	Response	: Automatic	Full Scale : 2000
		Detector	: R928F	Counter Interval: 10

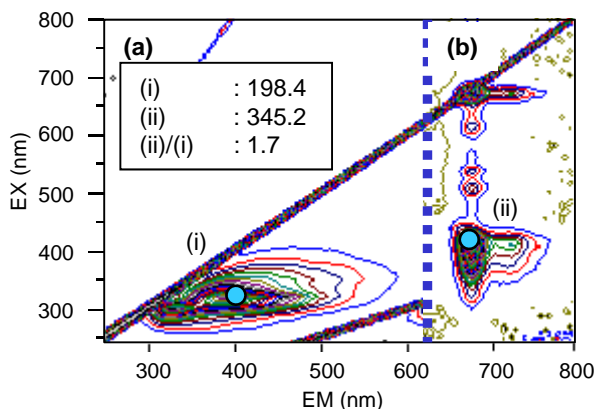


Figure 3. 3D fluorescence spectrum of brand A olive oil

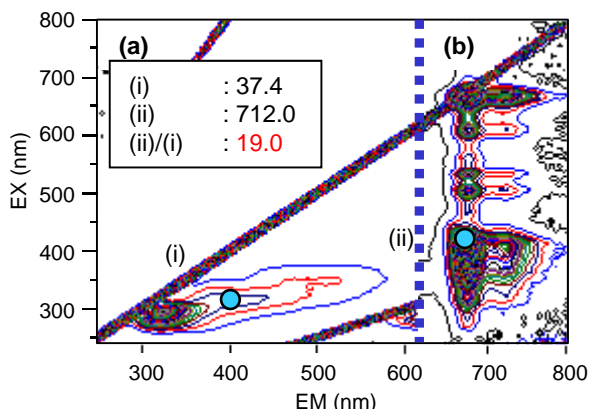


Figure 4. 3D fluorescence spectrum of brand A virgin olive oil

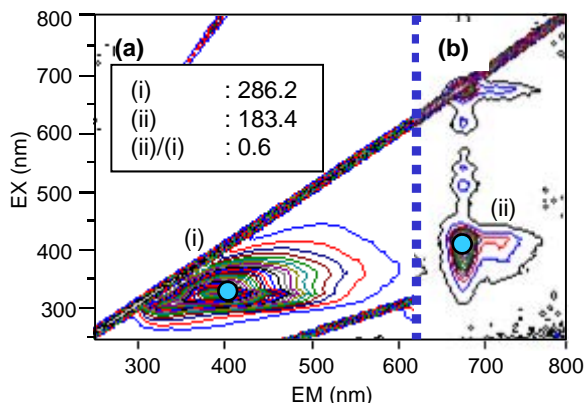


Figure 5. 3D fluorescence spectrum of brand B olive oil

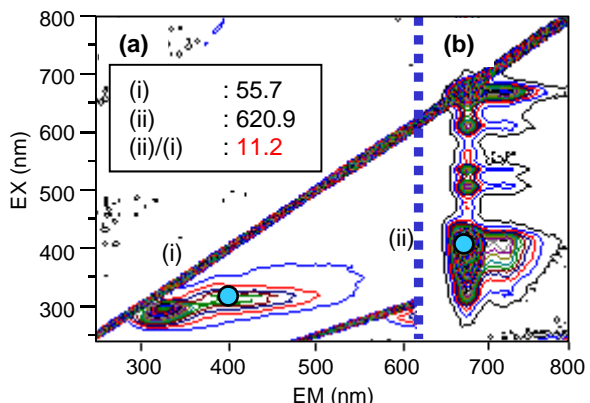


Figure 6. 3D fluorescence spectrum of brand B virgin olive oil

In all the tested olive oils, fluorescence was observed in two areas: at around Ex 250 - 450 nm, Em 300 - 600 nm and at around Ex 300 - 700 nm, Em 650 - 750 nm. The calculated ratio of fluorescence intensity, (ii)/(i), indicates a higher value in virgin olive oil, in comparison to olive oil ((i): area of Ex 320 nm and Em 400 nm, (ii): area of Ex 415 nm and Em 675 nm).

Note: 3D fluorescence spectra in (a) and (b) were obtained by individual measurements and are combined as shown. They do not represent the data shown in the FL Solutions program.

KEY WORDS

Bio/Medical Science/Food/Pharmaceuticals, Food, Olive oil, Virgin olive oil, Fluorescence Fingerprint, Food Inspection, 3D Fluorescence Spectrum, FL, F-7000

Fluorophotometer (FL)

Sheet No. FL130002-02

Absorption Spectrum of Olive oil

INTRODUCTION

The olive oil that is currently available on the market in Japan is virgin olive oil, which is extracted by pressing olives and has superior flavor and fragrance, and refined olive oil, which is chemically extracted and blended with virgin olive oil. The absorption spectra of olive oil were measured with the UH5300 Spectrophotometer. Absorption peaks were observed at around 400 - 500 nm and virgin olive oil showed a higher absorption intensity compared to olive oil.

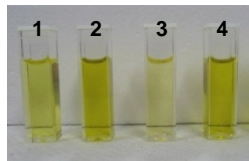
INSTRUMENT CONDITIONS

Instrument : UH5300 Slit : 1 nm
Scan speed : 400 nm/min Range of measurement wavelength : 350 - 720 nm



Sample

- Sample: 1. Brand A Olive oil
2. Brand A Virgin olive oil
3. Brand B Olive oil
4. Brand B Virgin olive oil



Appearance of 6-cell turret

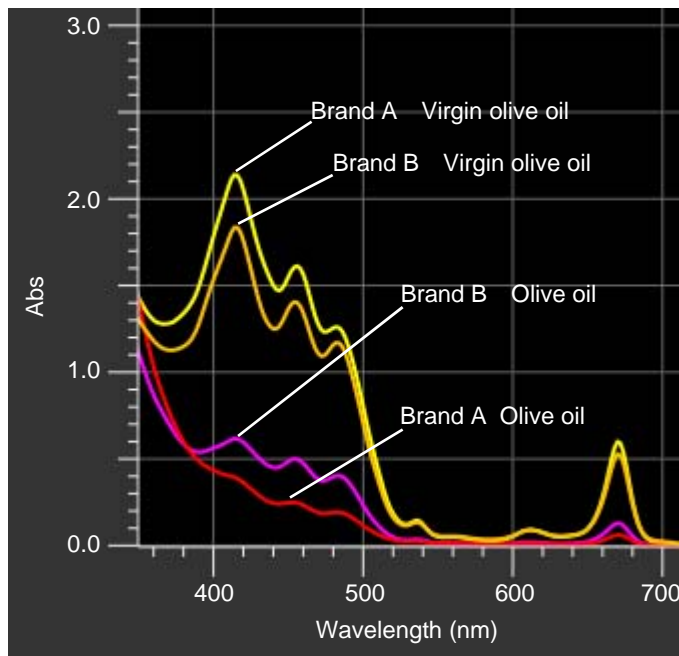


Figure 7. Absorption spectra of olive oil

The automatic switching of 6 cells using an automatic 6-cell turret is expected to enable efficient measurement.

KEY WORDS

Bio/Medical Science/Food/Pharmaceuticals, Food,
Olive oil, Virgin olive oil, Absorption Spectrum, UV, UH5300

Fluorophotometer (FL)

Sheet No. FL130002-03