Analysis of Vitamin A in Foods by HPLC

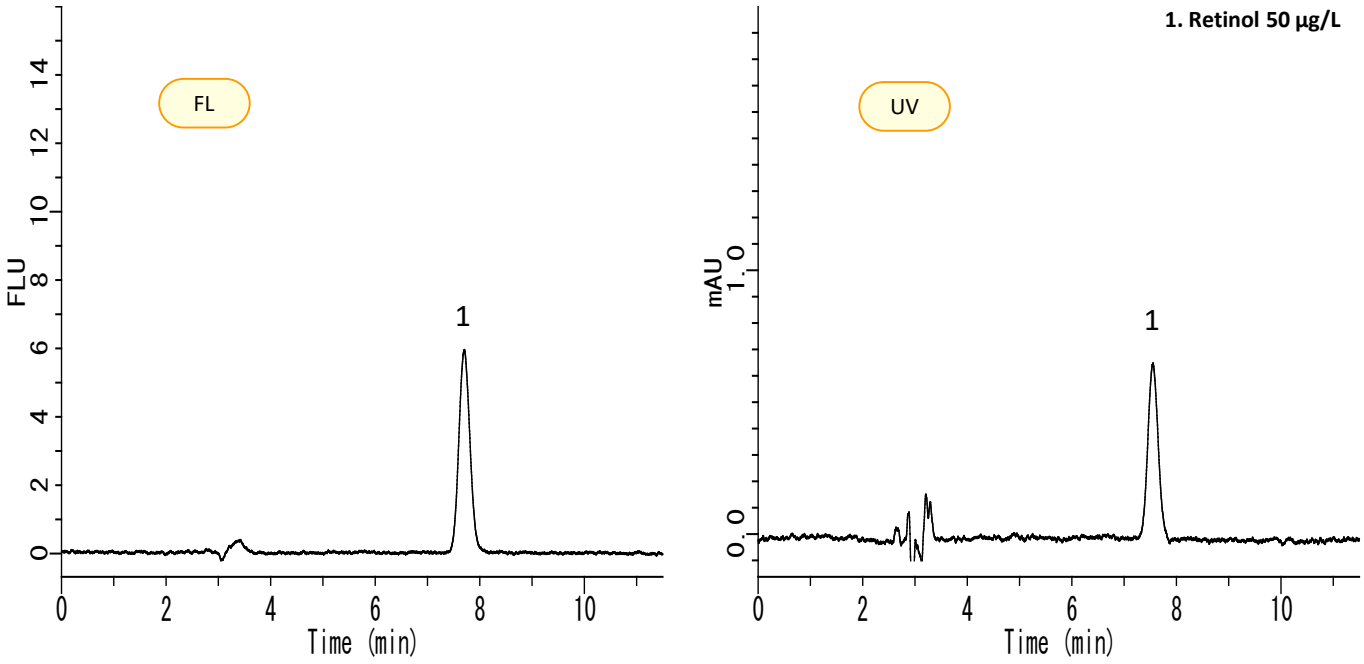
Vitamin A is a micronutrient found in foods, in addition there are other compounds that have vitamin A activity; retinols such as alcoholic retinol and esterified palmitate retinol, carotenoids such as β-carotene and cryptoxanthin.
See Technical Note No. 28 for An Analysis of Carotenes.

In this report, retinol was analyzed as an ingredient in accordance with the Food Sanitation Inspection Guidelines. Retinols in samples were saponified and hydrolyzed to retinol. A liquid-liquid extraction was then performed, the concentrated sample was injected onto an HPLC with UV and fluorescence (FL) detectors.

The analysis of vitamin A in foods, as shown in the following pages, can be performed well with UV detection. However, FL detectors are more sensitive for samples with trace amounts of vitamin A.

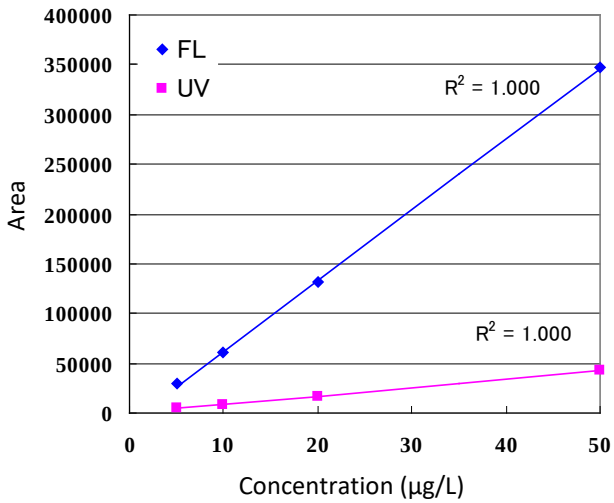
(K.Suzuki)

Example: Measurement of Standard



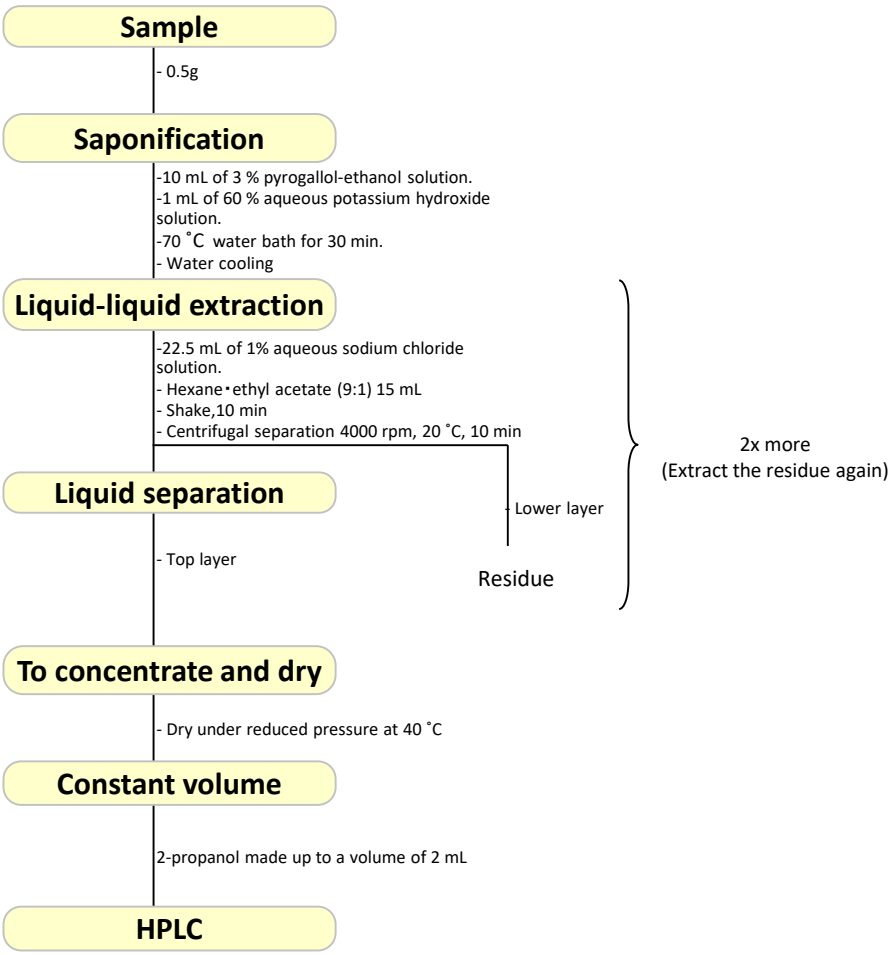
HPLC conditions

Column	: Inertsil ODS-3 (5 µm, 250 x 4.6 mm I.D.)
Eluent	: A) CH_3OH B) H_2O A/B = 95/5, v/v
Flow rate	: 1.0 mL/min
Column temperature	: 40 ˚C
Detected	: UV 325 nm FL Ex 340 nm Em 460 nm
Injection volume	: 20 µL



Calibration curve for retinol

Example of pretreatment

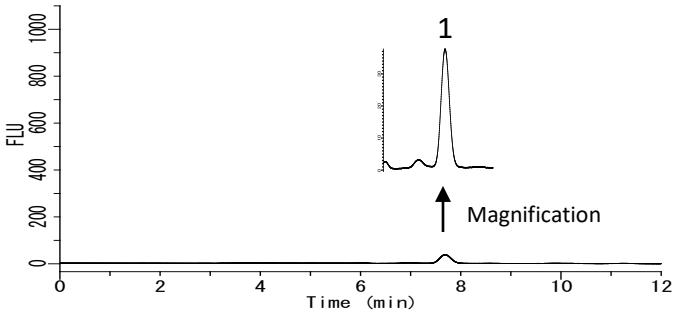


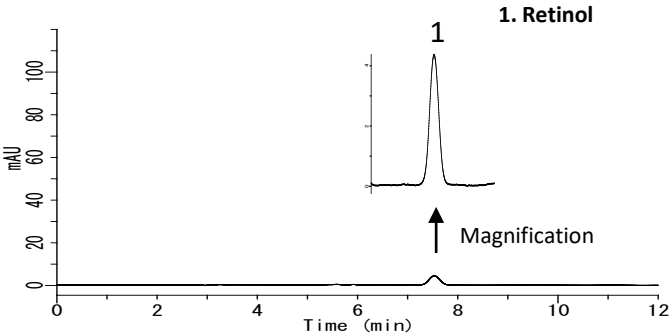
Example: Sample Measurement

FL

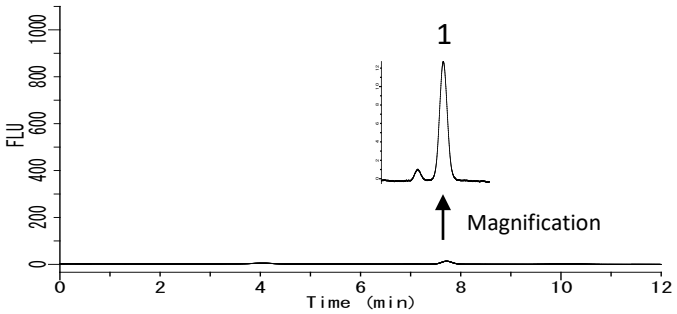
UV

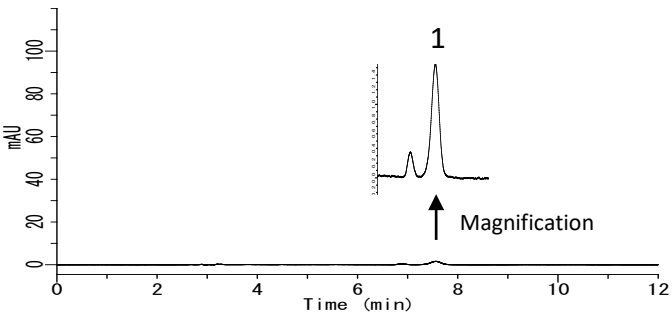
Powdered milk



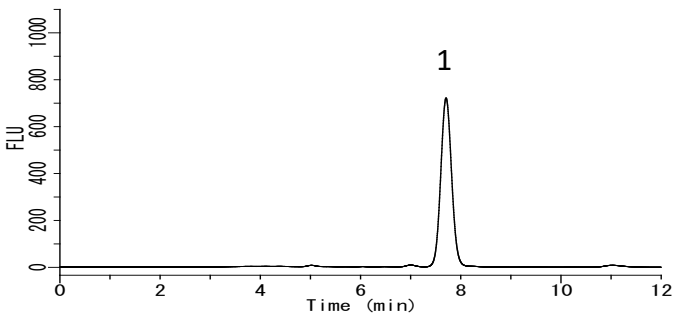


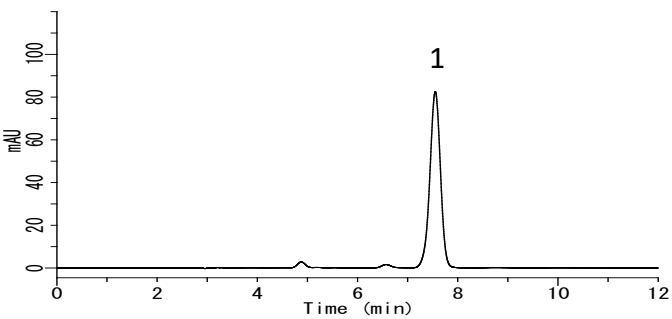
Chicken



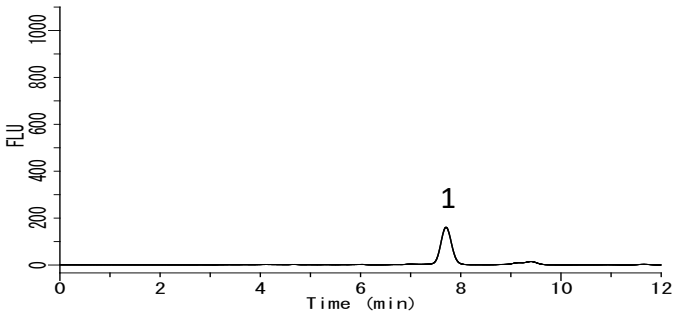


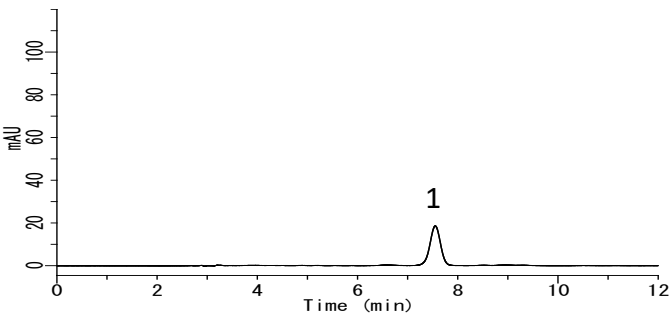
Broiled eel



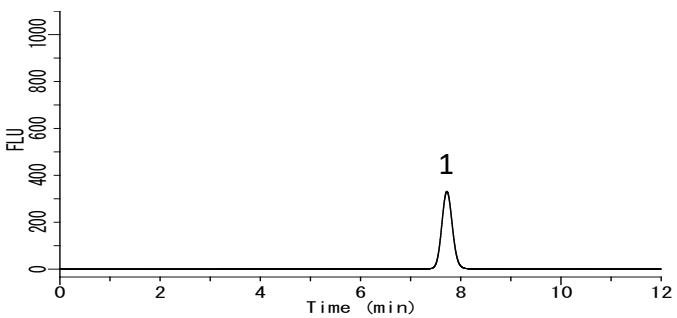


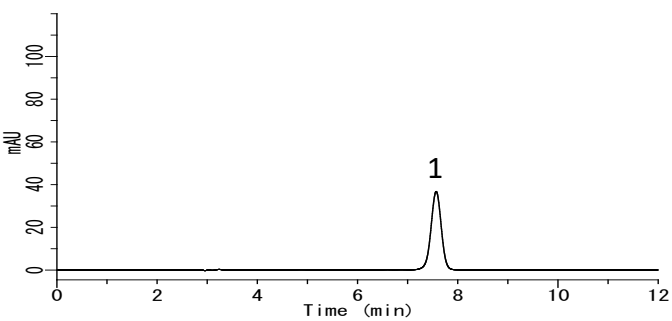
Butter





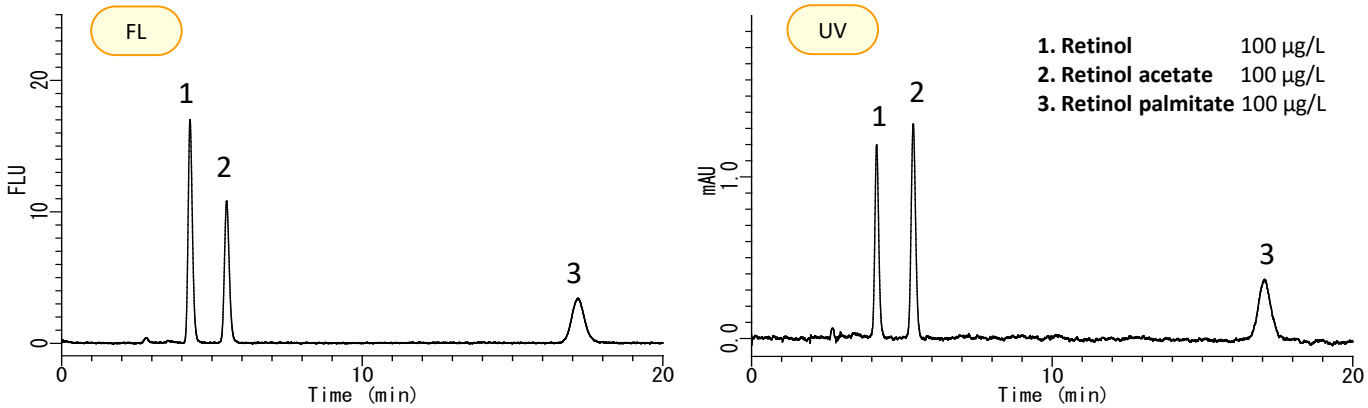
Pork (liver)





Example: Measurement of Standard

It has been reported that the retinol can be separated and detected by extracting and analyzing samples without saponification.



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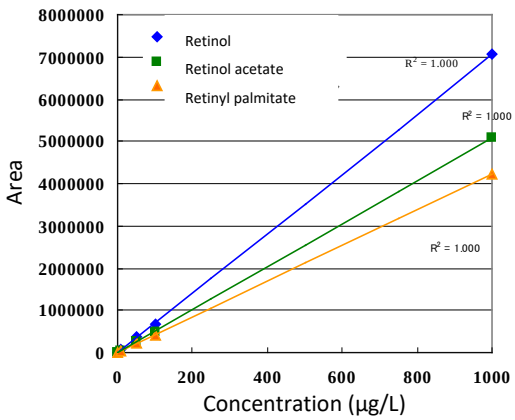
A/B = 95/5, v/v

Flow rate : 1.0 mL/min.

Column temperature : 40 ˚C

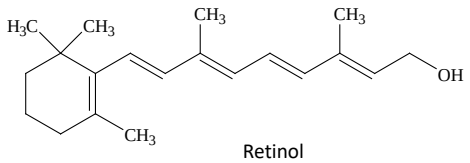
Detected : UV 325 nm
FL Ex 340 nm Em 460 nm

Injection volume : 20 µL

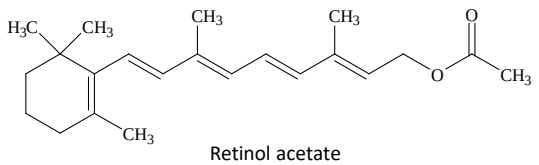


Example of a calibration curve using a fluorescence detector.

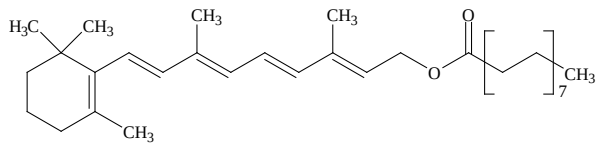
Structural formula



Retinol



Retinol acetate



RETINYL PALMITATE

Structures are created using Chemistry 4-D Draw provided by ChemInnovation Software, Inc.

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