



Measurement of the structural components of an intraocular lens

A cataract is a disease in which the crystalline eye lens becomes cloudy. Seeing through a cloudy lens is a bit like looking through a fog or mist. The common treatment is to surgically remove the clouded lens, but since the function of the lens is to provide focusing, it was necessary in the past to wear thick glasses or contact lenses after surgery. In recent years, a new technique has been developed in which, following lens removal, an artificial intraocular lens approximately 6 mm in diameter is inserted in its place. Because such a lens remains in the eye for many years, it is important to control the purity of the materials it is made from. Here we present measurements on six components that comprise mainstream acrylic intraocular lenses.



Chromaster® High Performance Liquid Chromatograph

Measurement on six raw materials

- ✓ The six components that comprise an acrylic intraocular lens can be separated by use of a gradient analysis method.
- ✓ Because component D had a distribution of molecular weights, three separate peaks were detected.
- ✓ Measurements were performed on samples prepared with 1, 10, 20, and 40 mg/L of each component. A linearity of 1.000 was obtained for all components.

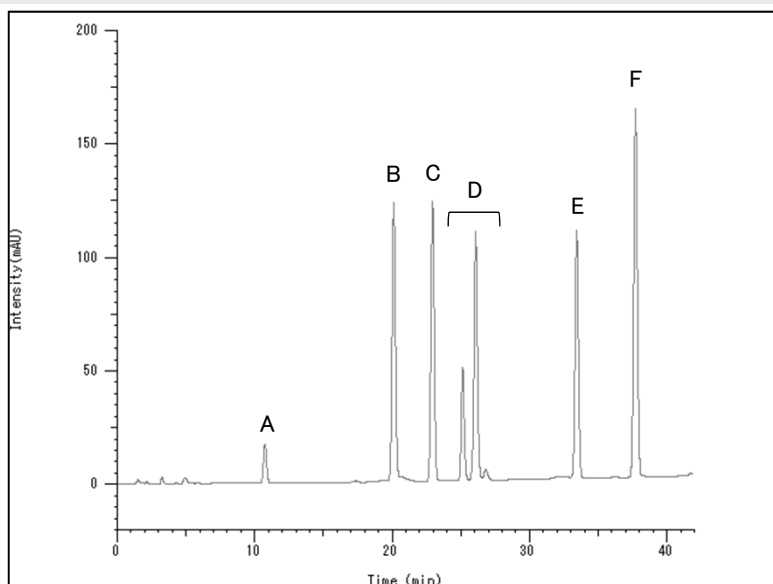


Figure 1 - Chromatogram of mixed sample (100 mg/L of components A and D, 10 mg/L of others)

Table 1 - List of components and their function in intraocular lens

Component name	Function
A	Polymerization initiator
B	Aryl group-containing monomer
C	Aryl group-containing monomer
D	Multifunctional acrylate
E	Yellow reactive colorant
F	Reactive ultraviolet light absorbing material

Samples were:

- (1) Dissolved in acetonitrile to 1000 mg/L.
*Component E alone was dissolved in tetrahydrofuran.
↓
- (2) Diluted by stages in 50% (v/v) acetonitrile aqueous solution.
↓
- (3) Filtered with 0.45 μm filter and measured.

Figure 2 - Sample preparation procedure

Table 2 - Measurement conditions

Eluent	A: 0.1% (v/v) phosphoric acid aqueous solution, B: acetonitrile
Pumping rate	1.0 mL/min
Column	Hitachi LaChrom II C18 (5 μm) (4.6 × 150 mm)
Column temperature	50°C
Injected amount	50 μL
Detection wavelength	210 nm

Table 3 - Liquid delivery program

min	%A	%B
0.0	70	30
40.0	30	70
40.1	70	30
50.0	70	30

[KEY WORDS]

“Chromaster” is a registered trademark of Hitachi High Technologies Corporation.

Chromaster, HPLC, acrylic intraocular lens

