Detection of acetic acid in collagen protein

Introduction:

Collagen is extracted from animal skin. In addition to collagen, the skin also contains protein polysaccharides such as hyaluronic acid and chondroitin sulfate, which contain a large number of polar groups and are moisturizing factors. They also have the effect of preventing the conversion of tyrosine into melanin in the skin. Therefore, collagen has pure natural moisturizing, whitening, wrinkle prevention, freckle removal, and other functions, and can be widely used in beauty products. Add a certain amount of acetic acid to cosmetic collagen to maintain its liquid state.

Detection items (Table 1):

Anion	Acetic acid

Keywords: Cosmetics，Acetic acid,Collagen protein, Ion chromatography

Instruments and equipment

- **Ion chromatograph**: CIC-D180
- **Ultra pure water machine**:ECO-S15

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Requirements

Reagents

Unless otherwise specified, all reagents used are superior grade. Acetic acid anions standard solution (1000 mg/L)

Deionized Water

When preparing standard samples manually or diluting real samples, please use ASTM filtration and deionization requirements that meet the specifications listed in the table 2.

Table 2: Deionized water specification.

Specification	
Ions Resistivity	≥18.25MΩ·cm
Organics-TOC	<10ppb
Iron/Transition Metals	<1ppb
Pyrogens	<0.03Eu/mL
Particulates（>0.2μm）	<1unit/mL
Colloids-Silica	<10ppb
Bacteria	<1cfu/mL

Chromatography conditions (Anions):

Table 3: Anions analysis conditions

Instrument	CIC-D180
Eluent	0-12 min 5 mM KOH 12-20 min 30 mM KOH 20.1-30 min 5 mM KOH
Flow rate	0.7 mL/min
Injection volume	25 μL
Analytical Column	SH-AP-1
Column oven temperature	35℃
Conductivity cell temperature	35℃
Suppressor current	45 mA

Sample preparation

Accurately weigh 0.1 g of the sample (accurate to 0.0001 g) and place it in a 50 mL centrifuge tube, with pure water brought to volume to 50 mL. 80 ℃ constant temperature water bath for 30 minutes, ultrasonic treatment for 10 minutes. Centrifuge at 5000 r/min for 5 minutes, take the supernatant and pass it through 0.22 μm filter membrane, start analysis.

Standard chromatogram

Standard chromatogram, As shown in below:

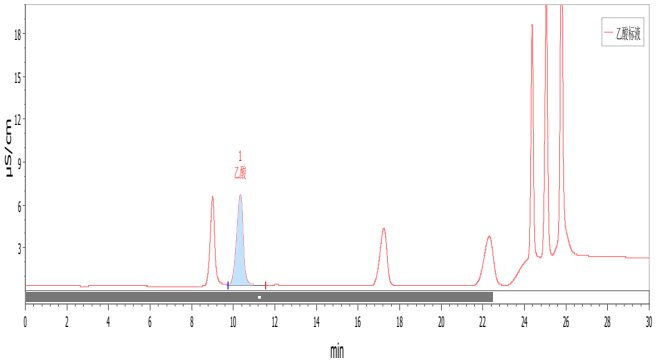

Figure 1. Chromatogram of standard sample.

Sample chromatogram

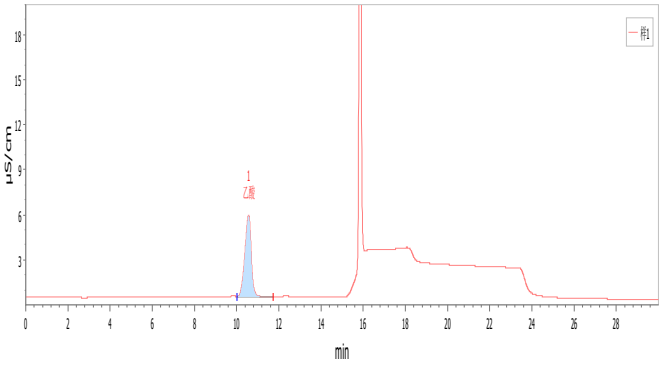

Figure 3. Chromatogram of sample 1#

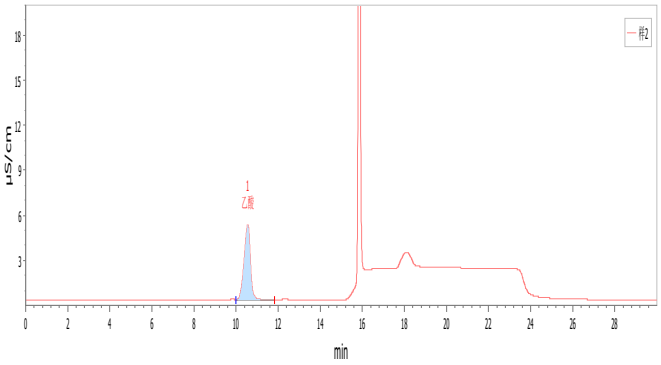

Figure 3. Chromatogram of sample 2#

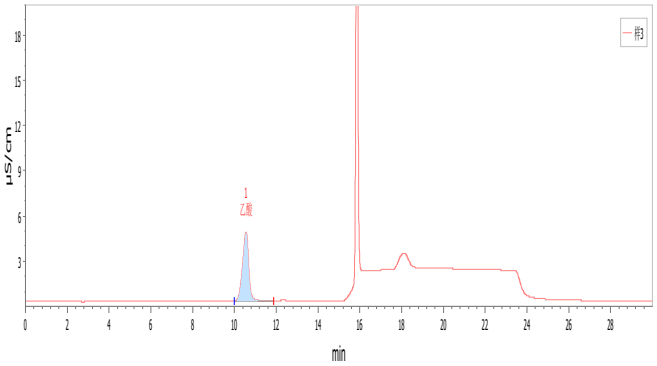

Figure 3. Chromatogram of sample 3#

Results and calculations

Table 4: Sample test result

Sample	Acetic acid （mg/kg）
1#	3990.31
2#	3654.28
3#	3323.44

Remarks: ① The measured value has been deducted from the blank value; ② There may be differences in testing results between different methods and laboratories.

Feasibility analysis and conclusion

The above experiments prove that the detection method has good resolution and is suitable for the determination of the content of the components to be measured in the sample.