Analysis of Parabenes in Body Lotion by Capillary Electrochromatography

Tomoyoshi Soga and Gordon Ross

Chemical

Abstract

Cosmetics may contain a number of additives in addition to the active ingredients which convey color or other properties of the product. They also contain preservatives so that the shelf life may be extended. Parabenes are used in many cosmetics because of their ability to retard microbial growth and prolong the shelf-life of the cosmetic products. Subsequently the levels of preservatives in cosmetics need to be monitored.

Capillary Electrochromatography (CEC) is a fusion of liquid chromatography and capillary electrophoresis, which preserves the best aspects of both techniques. This application brief describes the application of CEC to the quantitative analysis of parabenes in body lotion.

The method needed minimal sample preparation and provided quantitative data.

Experimental

All experiments were performed using the Agilent Capillary Electrophoresis system equipped with diode array detector and computer controlled via Agilent ChemStation software. CEC capillary columns were Agilent CEC C18. The Agilent CE system is uniquely designed for operating CEC in that it can apply up to 12 bar pressure simultaneously to both vials in order to suppress bubble formation and maximize reliability.

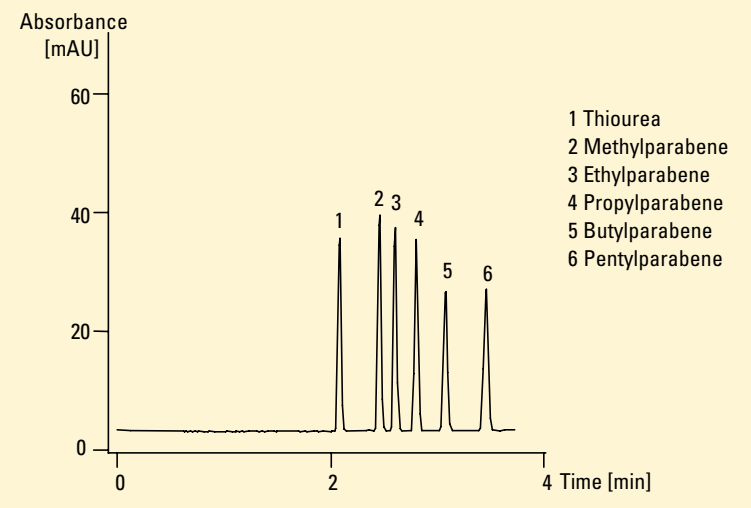

Figure 1
CEC separation of a standard mixture of 5 parabenes at a concentration of 5 mg/ml each

Conditions

Column
CEC C18 3 µm, 250 (335) × 0.1 mm i.d.
Mobile Phase
80/20 ACN/TRIS 25 mM pH 8.0
Detection 254/10 nm
(All spectra in peak were recorded)
Injection 10 s at 5 k
Run 25 kV, 20 °C
Pressure 8 bar both sides

Sample preparation
Body lotion diluted with mobile phase and filtered through 0.45 µm

Results

Figure 1 shows the CEC separation of a standard mixture of 5 parabenes at a concentration of 5 mg/ml each. The first eluting peak is thiourea, and as a non-retained marker can be used to indicate the linear velocity of the mobile phase through the column. Such a marker for is necessary since the flow is physico-chemically dependent. Reproducibility of migration time was sufficient to identify the 4 peaks apparent in the body lotion analysis as parabenes (figure 2). This was confirmed by spectral analysis which also indicated that the peak for ethylparabene contained an unknown component. Response was linear over the range 2 to 20 mg/ml and methyl-, propyl- and butyl parabene were calculated at concentrations of 276 mg/ml, 19 mg/ml and 49 mg/ml respectively.

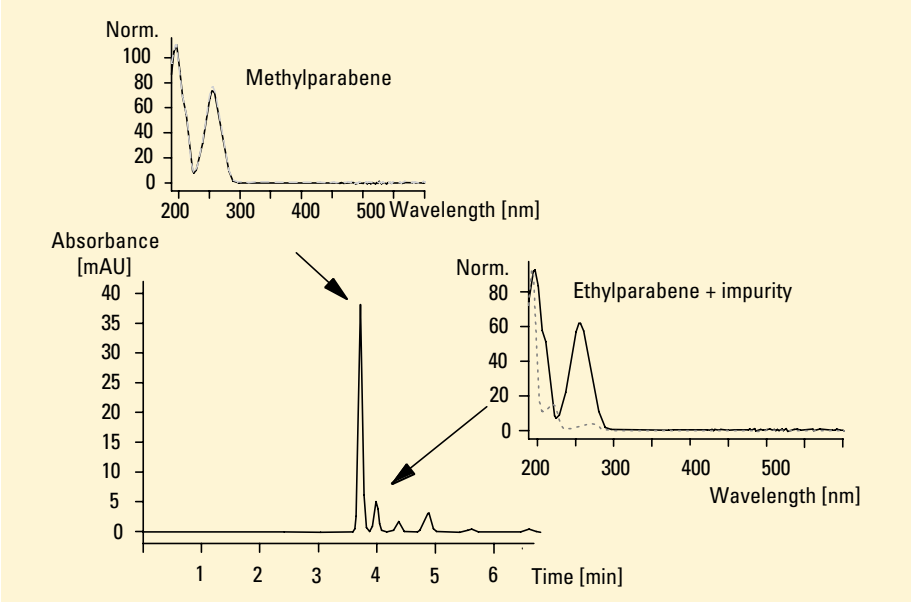

Figure 2
Spectral identification of parabenes in body lotion

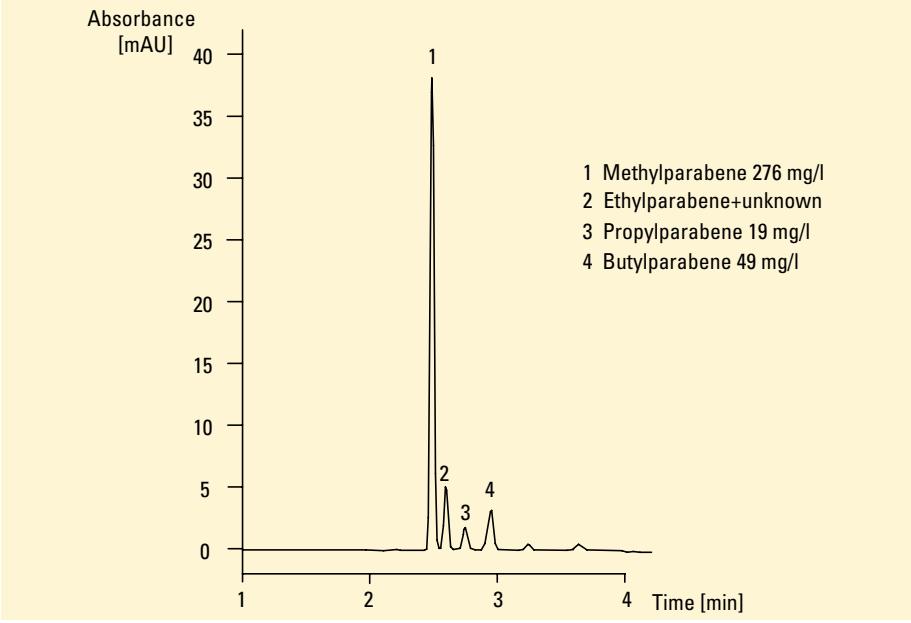

Figure 3
Quantitation of parabenes in body lotion by CEC

Conclusions

CEC can be used for the facile determination of parabenes in body lotion. The method is quick and simple and can provide quantitative determination of parabene levels in the cosmetic sample.

Equipment

- Agilent Capillary Electrophoresis System
- Agilent ChemStation + software

Gordon Ross is application chemist at Agilent Technologies, Waldbronn, Germany. Tomoyoshi Soga is application chemist at Yokogawa Analytical, Tokyo, Japan

For more information on our products and services, visit our worldwide website at http://www.agilent.com/chem

Released 06/97
Publication Number 5965-9028E

Agilent Technologies
Innovating the HP Way