

Analysis of Bisphenol A in Bottled Water Using the Hitachi LaChromUltra® HPLC System with Fluorescence Detection

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Bisphenol A, abbreviated as BPA, is a small phenolic molecule used in the production of many types of plastic, including the polycarbonates used in food storage plastics and epoxy resins that line the interior of many food and beverage cans. It is also used as a color developer in thermal paper, which is widely used to print sales receipts. Although BPA has many useful functions, it also has been shown that exposure to BPA affects a variety of systems within the human body, notably as an estrogen mimic¹. As such, many governments have instituted limits on the use of BPA in food and beverage containers, and especially in products for children.

Due to both the prevalence of BPA and the health concerns associated with it, it is important to have analytical methods to test for the presence of BPA. Described here is a method for the rapid analysis of BPA using the Hitachi LaChromUltra® HPLC system with fluorescence detection within four minutes.

Experimental Conditions

| Module | Conditions |
|-----------------------|---|
| Pump (L-2160U) | Mobile Phase: 12% CH ₃ CN, 48% CH ₃ OH, 0.1% formic acid Flow Rate: 0.4 mL/min |
| Autosampler (L-2200U) | Injection Volume: 2 µL |
| Oven (L-2300) | Temperature: 25 °C |
| Detector (L-2485U) | Fluorescence: λ_{Ex} = 275 nm, λ_{Em} = 313 nm |
| Column | Zorbax SB-C18 RRHT 1.8 µm, 3.0 x 50 mm |

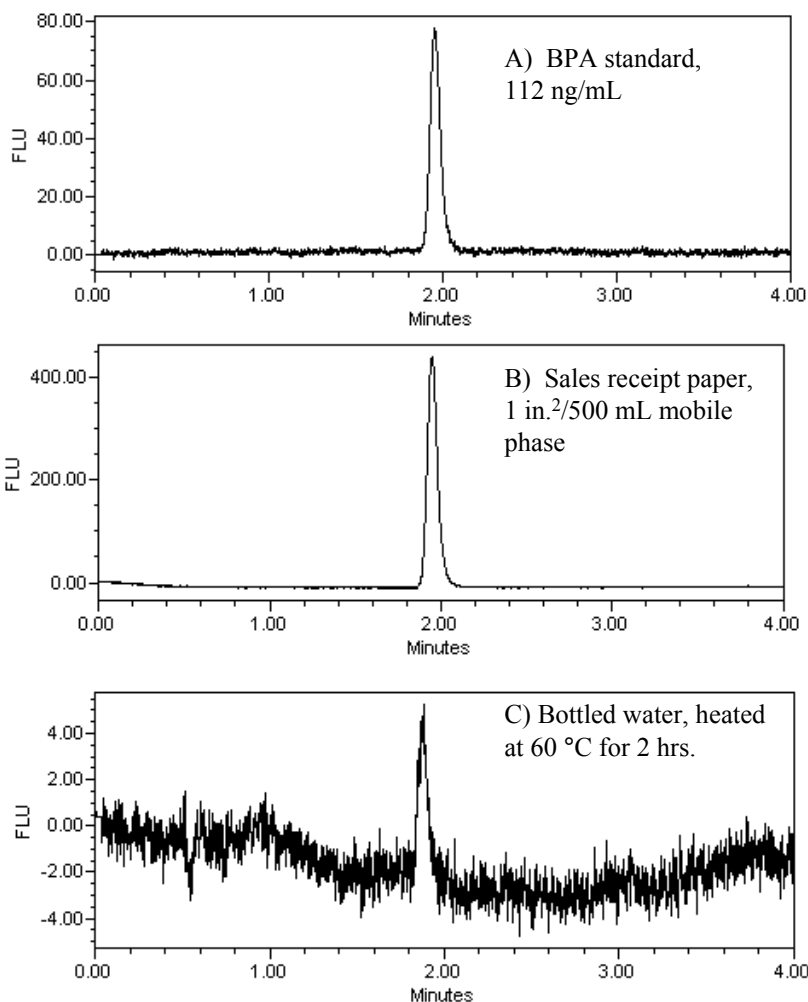
Results – Linearity, Reproducibility, and Detection Limit

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|--|----------------|
| Linearity (28-140 ng/mL) | $R^2 = 0.9991$ |
| Peak Area Reproducibility (112 ng/mL, N = 5) | RSD (%) = 0.7% |

Reference:

1-Takeshita, A.; Koibuchi, N.; Oka, J.; Taguchi, M.; Shishiba, Y.; Ozawa, Y. *Eur. J. Endocrinol.* **2001**, 145, 513.

Results – Chromatograms of A) BPA standard, B) sales receipt paper, and C) bottled water



Discussion

Hitachi's LaChromUltra® liquid chromatography system with fluorescence detection is extremely effective at rapid analysis of BPA in under 4 minutes with good reproducibility and linearity. The level of BPA in a sales receipt is determined to be 355 µg per square inch, and the water in a 500 mL plastic water bottle contains 5.3 ng/mL BPA after heat treatment at 60 °C for 2 hours.

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