PICKERING LABORATORIES
CATALYST FOR SUCCESS

SULFONAMIDE ARTIFICIAL SWEETENERS IN FOOD PRODUCTS

ANALYSIS OF ACESULFAME, SACCHARIN AND CYCLAMATE BY HPLC WITH POST-COLUMN DERIVATIZATION

Nonnutritive sweeteners are widely used in foods and beverages. Since some studies raised questions about long-term safety of these compounds, their concentration in food products is regulated. Among the artificial sweeteners used worldwide Saccharin and Cyclamate cause most controversy and their use is restricted in many countries, including the US. Liquid chromatography is a method of choice for artificial sweeteners but Cyclamate analysis is complicated by the fact that this compound does not exhibit noticeable UV absorbance.

This method allows for simultaneous analysis of Acesulfame, Saccharin and Cyclamate by LC with post-column derivatization followed by fluorescence detection. Since the sweeteners are commonly used in combination, a single method of analysis is preferred.

METHOD

Analytical Conditions

Analytical Column: Reversed-phase column, C_{18}, 2x100 mm

Temperature: 50 °C

Flow Rate: 0.2 mL/min

Mobile Phase:
0.02 M Potassium Phosphate Monobasic in water. Isocratic for 8 min, followed by washing the column with 70 % ACN – 30 % 0.02 M KH_2PO_4

Post-Column Conditions

Post-Column System: Pinnacle PCX

Reagent: Hexadecyltrimethyl ammonium bromide (10^{-3} M), 1,6 Diphenyl-1,3,5-hexatriene ($4x10^{-6}$ M)

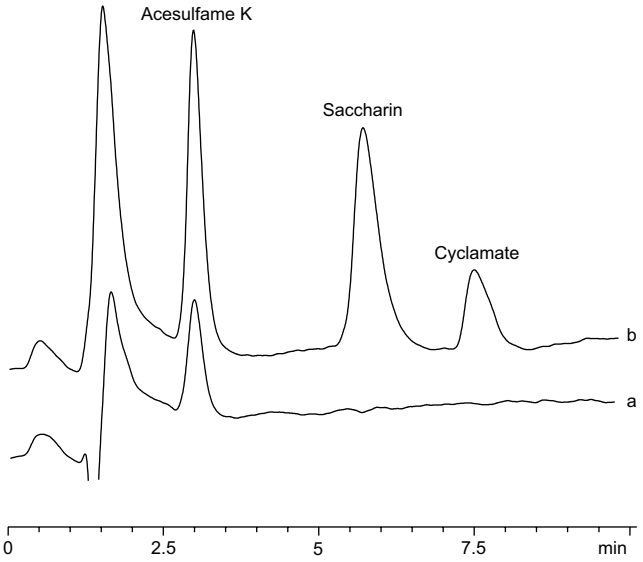
Reagent Preparation:
To 250 mL of DI water add 0.09 g of Hexadecyltrimethylammonium bromide and sonicate until fully dissolved. Add 300 uL of 1,6-diphenyl-1,3,5-hexatriene (DPH) stock solution (i), mix well. Protect the reagent from light.

(i) Dissolve 0.007 g of 1,6-diphenyl-1,3,5-hexatriene (DPH) in 10 mL of dry THF. Store the stock solution in refrigerator, protected from light.

Reactor: 40 °C, 0.1 mL

Flow Rate: 0.3 mL/min

Detection: Fluorescence,
λ_{ex} = 365 nm, λ_{em} = 460 nm



Chromatograms of a) Diet cola containing Acesulfame K; b) Soft drink spiked with 60 ppm of artificial sweeteners.

REFERENCES

James F. Lawrence, Analyst, vol. 112, No 6 (1987), 879-881

James F. Lawrence, Claudette F. Charbonneau, J. Assoc. Anal. Chem., vol. 71, No 5 (1988), 934-937

1280 Space Park Way / Mountain View, CA 94043
sales@pickeringlabs.com / support@pickeringlabs.com
800-654-3330 / 650-694-6700 / Fax: 650-968-0749