Alkyl benzenes test on Armen SCPC-250

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Introduction

A simple test proposed by A.Berthod and al [1] is used to evaluate the performance of the Armen 250 mL CPC instrument. The methanol–water–heptane biphasic system is used with heptane as the mobile phase in the ascending mode. After equilibration, an alkylbenzene mixture is injected and the retention factors, peak efficiencies and resolution factors are measured for each solute [**Fig.1**]. Alkylbenzenes are easily detectable solutes at 254 nm and commonly used to check the performances of C18 column in HPLC.
5 injections of the same volume of mixture are done at different flow rates and the same rotation speed for evaluations

Results and discussion

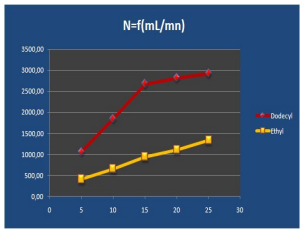

Figure 2: Plate number of ethyl and dodecyl benzene according to flow rate

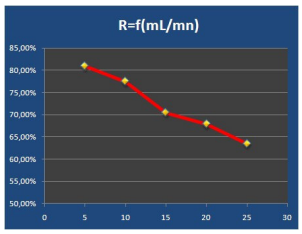

Figure 3: Stationary phase retention according to flow rate

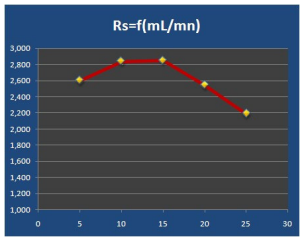

Figure 4: Resolution between dodecyl and ethyl benzene according to flow rate

Table 2 CPC conditions

CPC column volume	:250 mL
Elution flow rate	:5,10,15,20,25 mL/mn
Extrusion flow rate	:30 mL/mn
Rotation speed	:3000 rpm
Solvent system	:Heptane/MeOH/W 50/47.5/2.5
Injection volume	:0.5 mL
Mode	:Ascending, upper phase as mobile phase
Sample	:Toluene, ethyl, butyl, hexyl, dodecyl benzene 100g/L in heptane
Detection	:254 nm

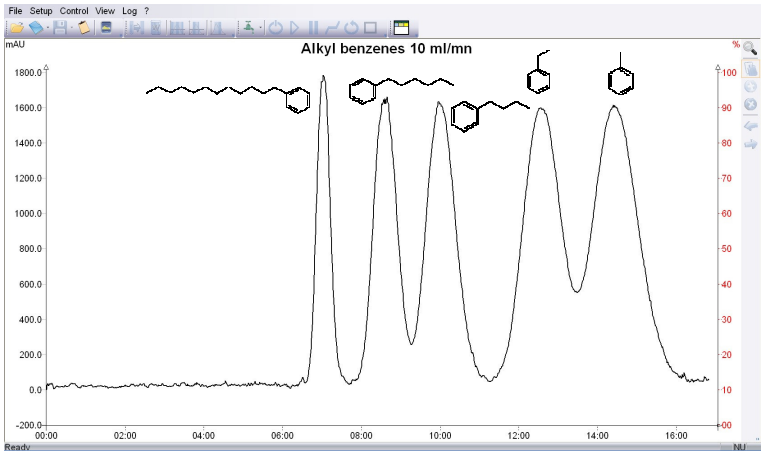

Figure 1: CPC chromatogram of 0,5 mL injections of a solution of 5 alkyl benzene in heptane 100 g/L at 3000 rpm and 10 ml/mn.

Plate numbers of dodecyl and ethyl increase with flow rate (X3 from 5 to 25 ml/mn) [**Fig.2**] but in opposition, retention decrease from 81% at 5 ml/mn to 64% at 25 ml/mn [**Fig.3**] so less stationary phase are available at high flow-rate for good resolution. This lead to an optimum resolution between 10 and 15 ml/mn for this separation of non polar alkyl benzenes [**Fig.4**]. This comparison shows that it is possible to work at high flow rate without reducing significantly the resolution on this column. In this case the SCPC-250 is able to work up to 15 ml/mn to perform the separation in less than 15 mn.

Conclusion

The alkyl benzene test is done with success on the Armen SCPC-250 with good resolution. This machine allows determining solvent system for all kind of applications very quickly and to develop CPC method with low solvent consumption and small sample injection in very short time. Scale up of the developed method to preparative or industrial CPC machine can be thereafter done directly.

[1] A. Berthod, B. Billardello J. of Chromatogr. A, 902 (2000) 323–335.

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