Waters
Lab Highlights
An Internal Communication of Applications and Techniques
LAH 0134 10/83
AN/LS,ES/MD/TX/OT

SEPARATION OF PYRIDINIUM ALDOXIMES ON BARE SILICA USING REVERSED-PHASE ELUENTS

In an earlier Lab Highlight, the novel use of silica in reversed-phase eluents was presented (1,2). This recent report is an application of that approach.

Pyridinium aldoximes are a class of compounds which are cholinesterase reactivators. Because of this property of reactivating the enzyme cholinesterase, one of the compounds, pyralidoxime chloride (Structure 1 in Table I), is used as an antidote for nerve gas by removing the phosphoryl groups from the enzyme. The structures of the compounds studied are shown in Table I.

The compounds have been separated on silica based ion-exchange columns (e.g. a Radial-PAK™ SCX type material). However, it is generally accepted that these ion-exchangers are not "rugged" and often require special attention to insure long life.

Another approach is to separate these compounds on bare silica using a typical reverse phase eluent. This was done by Kientz, Verweij and Boter of Prins Mauritis Laboratory TNO in the Netherlands (3) and is shown in Figure 1. Clearly a good separation is available with all of the benefits of using silica (1). They also did a similar separation on a silica based ion exchange packing.

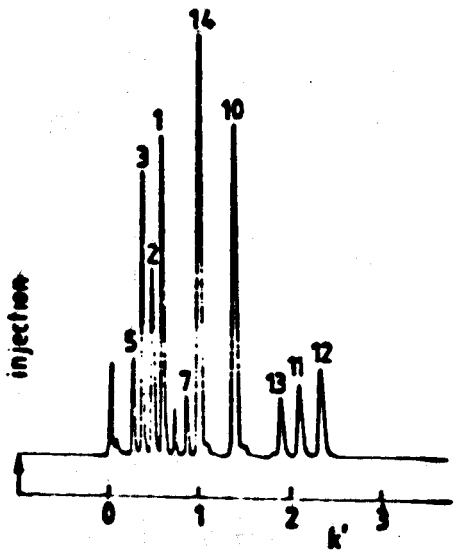

FIGURE 1: Separation of pyridinium aldoximes and P_2-amide on bare silica 5 µm. Solvent - MeOH (80%): H_2O (20%), 0.5 M potassium formate, pH 6.3. UV at 290 nm.

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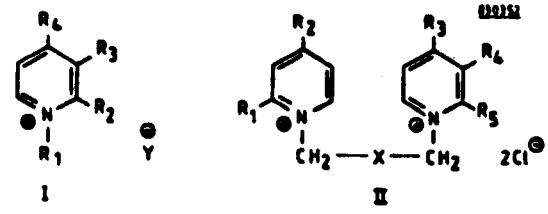
TABLE 1

STRUCTURES OF PYRIDINIUM ALDOXIMES AND P_2-AMIDE



I

II

Code	Compound	R_1	R_2	R_3	R_4	Y^-
		I (mono-quaternary)				
1	P_2S	CH_3	CH=NOH	H	H	$CH_3SO_3^-$
2	ethyl-P_2A	C_2H_5	CH=NOH	H	H	Cl^-
3	n-propyl-P_2A	C_3H_7	CH=NOH	H	H	Cl^-
4	n-pentyl-P_2A	C_5H_{11}	CH=NOH	H	H	Cl^-
5	benzyl-P_2A	$C_6H_5CH_2$	CH=NOH	H	H	$CH_3SO_3^-$
6	n-heptyl-P_2A	C_7H_{15}	CH=NOH	H	H	Cl^-
7	P_2-amide	CH_3	$C(O)NH_2$	H	H	Cl^-
8	P_3AM	CH_3	H	CH=NOH	H	Cl^-
9	P_4AM	CH_3	H	H	CH=NOH	Cl^-

		II (bis-quaternary)					
		R_1	R_2	R_3	R_4	R_5	X
10	TMB-4	H	CH=NOH	CH=NOH	H	H	CH_2
11	HI-6	CH=NOH	H	$C(O)NH_2$	H	H	O
12	HS-6	CH=NOH	H	H	$C(O)NH_2$	H	O
13	2,2-LüH-6	CH=NOH	H	H	H	CH=NOH	O
14	Toxogonin	H	CH=NOH	CH=NOH	H	H	O

1. LH0095, 0096
2. Bidlingmeyer, B. A., Del Rios, J. K. and Korpi, J. Anal. Chem 54, 442 (1982).
3. Drs. Kientz, Verweij and Boter (of Prins Mauritis Laboratory TNO), The Netherlands, presented at 7th Symposium of LC at Baden-Baden, 4 May, 1983.