DETERMINATION OF URONIC ACIDS BY GAS–LIQUID CHROMATOGRAPHY

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At the present time, for the GLC of hydrocarbons, in addition to a number of other derivatives (acetates of alditols, trimethylsilyl ethers, etc.), the acetates of the aldononitriles of the sugars are used [1-6]. However, it is known [3] that with the use of derivatives of this type uronic acids are not determined.

We propose, in the analysis of carbohydrates, to determine D-glucuronic acid in the form of the acetate of the aldononitrile of its methyl ester (I). For this purpose, D-glucuronic acid was converted into the lactone by evaporating its aqueous solution [7]. Methyl D-glucuronate was obtained by the action of sodium methoxide on D-glucuronolactone in methanolic solution [8]. The acetate of the aldonoitrile of methyl D-glucuronate was synthesized in a sealed tube [3]. The acetate of the aldononitrile (II) was obtained from methyl D-galacturonate similarly. The relative retention times of (I), (II), and the acetates of the aldononitriles of the sugars are shown on the next page.

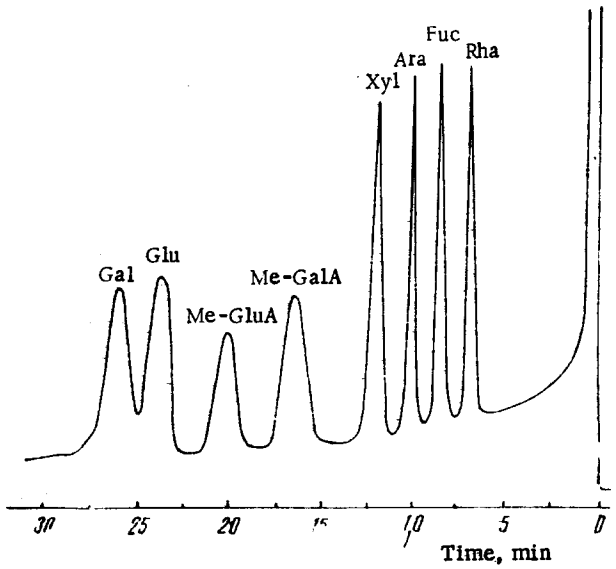

Fig. 1. Chromatogram of acetates of the aldononitriles of: L-rhamnose (Rha), D-fucose (Fuc), L-arabinose (Ara), D-xylose (Xyl) methyl D-galacturonate (Me-GalA), methyl D-glucuronate (Me-GluA), D-glucose (Glu), and D-galactose (Gal).

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Initial Compound	V_{rel}
L-Rhamnose	0.28
D-Fucose	0.36
D-Quinovose	0.36
D-Ribose	0.36
L-Arabinose	0.42
D-Xylose	0.50
D-Glucose	1.00
D-Galactose	1.10
Methyl D-galacturonate	0.69
Methyl D-glucuronate	0.84

Figure 1 gives a chromatogram of a mixture of (I), (II), and the acetates of the aldononitriles of the sugars most widely distributed in natural compounds. The retention times were calculated relatively to the retention time of the acetate of the aldononitriles of D-glucose.

The substances were separated on the liquid phase XE-60 (5% on Chromaton) at 220°C. LKhM-7A chromatograph, steel columns (2 m × 3 mm), flame-ionization detector, carrier gas helium (50 ml/min).

As can be seen from Fig. 1, compounds (I) and (II) are well separated from the acetates of the aldononitriles, both those of pentoses and hexoses. However, the peaks relating to (I) and (II) have sizes on the chromatogram respectively 4.2 and 6.3 times smaller than could have been expected on the basis of the weights taken.

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