Carbohydrate analysis of hemicelluloses by gas chromatography-mass spectrometry of acteylated methyl glycosides

A method based on gas chromatography–mass spectrometry analysis of acetylated methyl glycosides was developed in order to analyze monosaccharides obtained from various hemicelluloses. The derivatives of monosaccharide standards, arabinose, glucose, and xylose were studied in detail and 13C-labeled analogues were used for identification and quantitative analysis. Excellent chromatographic separation of the monosaccharide derivatives was found and identification of the anomeric configuration was feasible through a prepared and identified pure methyl 2,3,4,6-tetra-O-acetyl-β-D-glucopyranoside. The electron ionization mass spectrum and fragmentation path was studied for each monosaccharide derivative. Fragment ion pairs of labeled and unlabeled monosaccharides were used for quantification; m/z 243/248 for glucose, 128/132 for xylose, and 217/218 for arabinose. Using the intensity ratios obtained from the extracted ion chromatograms, accurate quantification of monosaccharide constituents of selected hemicelluloses was demonstrated.

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