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USE OF VARIOUS MODIFYING AGENTS FOR INTRODUCTION OF AN ISOTOPIC LABEL INTO CELLULOSE

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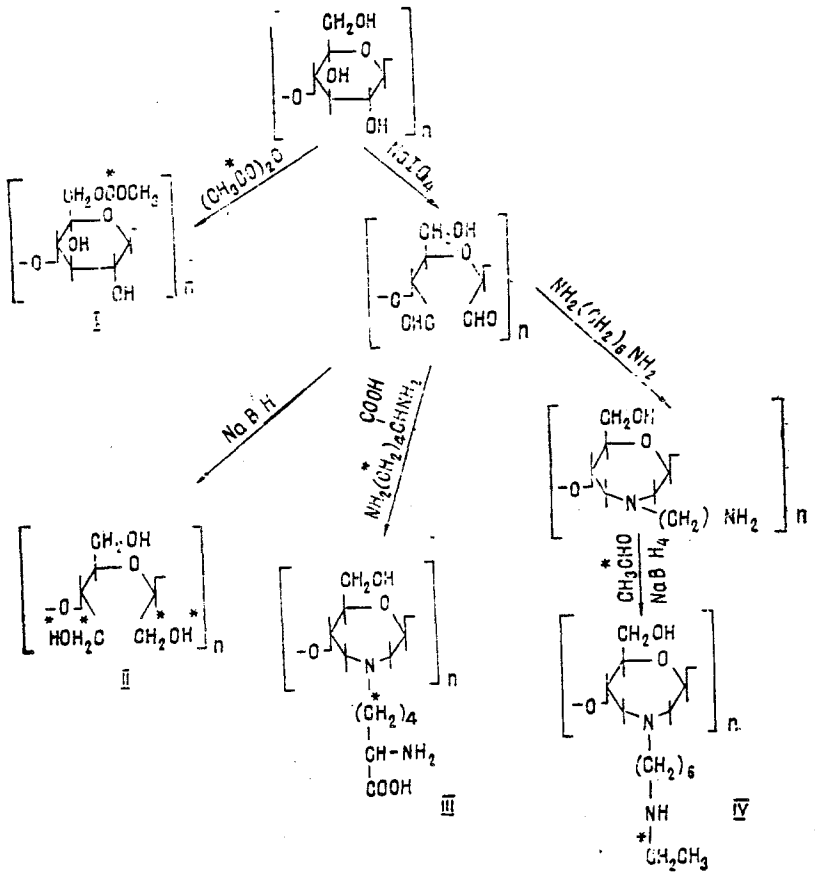
The introduction into the cellulose molecule of a number of radioactive modifying agents makes it possible to investigate various aspects of its interaction with biospecific systems of the organism. [1-^{14}C]Acetic anhydride, [1-^{14}C]acetaldehyde, [2-^{14}C]lysine, and sodium [^{3}H]tetrahydroborate have been used as labeled modifying agents. A 1% cellulose [sic] from cotton lint was used in the synthesis. The reaction was performed by the following scheme:



Cellulose [^{14}C]acetate was obtained by the acetylation with [1-^{14}C]acetic anhydride in the presence of catalytic amounts of zinc chloride of 20 ml of a suspension of cellulose from cotton lint with a molecular mass of 50,000-70,000 Da. The specific radioactivity of the product obtained was 600-800 MBq/g, which corresponds to 14% of modified groups in the cellulose suspension.

To obtain compounds (II), (III), and (IV), 15, 25, and 20 ml, respectively, of a 1% suspension of cellulose previously activated with a 0.2 M solution of sodium periodate for 1 h were taken.

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Reduction of the aldehyde groups with sodium [^{3}H]tetrahydroborate (0.6 GBq/mmole) led to the formation of (II) with a specific activity of 1.2-1.4 GBq/g, i.e., corresponding to 0.2% of modified groups of the cellulose. The reaction was carried out in physiological solution for an hour, and then a 1% solution of unlabeled sodium tetrahydroborate was added. Compound (III) was obtained by the interaction of activated cellulose with [2-^{14}C]lysine (1800 MBq/mmole) followed by reduction with sodium tetrahydroborate to stabilize the bond formed between the amino acid and the polysaccharide and to reduce residual aldehyde groups. The specific activity of compound (III) was 120 MBq/g, which corresponds to 1% of modified groups of the cellulose.

To obtain (IV), the oxidized cellulose was coupled with hexamethylenediamine, and then the aminohexylcellulose formed was treated with [1-^{14}C]acetaldehyde (200 MBq/mmole) in 0.01 M sodium bicarbonate buffer and was reduced with sodium tetrahydroborate. The specific activity of (IV) was 100-120 MBq/g, and the percentage of modified groups in the cellulose was 4.0.

The (IV) preparation obtained was injected into mice of the line (CBA × C57B/6)G with a total radioactivity of 0.185 MBq per animal. It was found that 6.3% of the label in the dose administered was excreted in the course of two weeks. In an investigation of the tissues of the animals it was found that the radioactivity was localized mainly at the site of injection of the preparation and in the liver and the spleen. The results obtained show that in the excretion of cellulose the main role is played by the RES.

Thus, a series of radioactive forms of cellulose has been obtained which provide the possibility of investigating the mechanism of the cooperative response of immune cells to the introduction of a natural polymer into the organism.

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SELECTIVE BINARY MOBILE PHASE FOR HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY OF 12,13-EPOXYTRICHOTHEC-9-EN-8-ONES

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In the present paper we consider questions of the optimization of the composition of the mobile phase (MP) for HPLC of the group of 12,13-epoxytrichothec-9-en-8-ones (I-V) formed by the fungus Fusarium graminearum Schw., which are contaminants of fusarial grain [1, 2]. It is known that a MP containing 30% of methanol in water ensures the separation of trichothecenes (I), (III), and (IV) [3], but the separation of (II) and (III) is achieved only at methanol concentrations of 7 and 10% [4, 5], which makes the combined determination of the whole group of substances impossible because of the extreme increase in the capacity coefficients for trichothecenes (IV) and (V).

The chromatographic analysis of the mixture consisting of nivalenol (I), 4,7-dideoxynivalenol (II), 4-deoxynivalenol (III), 15-acetyl-4-deoxynivalenol (IV), and 3-acetyl-4-deoxynivalenol (V) was carried out on a Milikhrom chromatograph fitted with a 2 × 62 mm microcolumn filled with the sorbent Nucleosil C18 (5 μm) at a rate of flow of eluent of 50 μl/min. The substances were detected UV-spectrophotometrically at a wavelength of 224 nm, and as organic modifiers for the MP we used ethanol, acetonitrile, and tetrahydrofuran (THF).

On the use of a MP containing ethanol in amounts of 15 and 20%, the values of the capacity coefficients K' of the substances being analyzed were in the acceptable interval of 1.4 to 15.2 but trichothecenes (IV)/(V) were not separated satisfactorily (α = 1.05), and (II)/(III) were not separated.

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