BRIEF COMMUNICATIONS

A STUDY BY THE LUMINESCENCE METHOD OF THE PROPERTIES OF PYROGENAL — A BACTERIAL LIPOPOLYSACCHARIDE

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Pyrogenic substances are substances of bacterial origin and of lipopolysaccharidic nature which cause a rise in body temperature in warm-blooded animals, including Man, together with other changes [1, 2].

The use of various physicochemical methods in the study of the properties of pyrogens have been described in the literature [3, 4].

We have studied the interaction of a bacterial lipopolysaccharide that possesses pyrogenic properties — pyrogenal — with Rhodamine 6G.

Bacterial lipopolysaccharides may form a component part of the outer cell wall of bacteria and can also be secreted by microorganisms into the external medium in the process of their vital activity. Consequently, to exclude the possibility of contamination from the external medium of the solutions investigated by microorganisms and the products of their vital activity and decomposition, a solution of Rhodamine 6G taken in a concentration of $2 \cdot 10^{-6}$ g/ml was prepared in sterile apyrogenic water under aseptic conditions. All the glassware used was first sterilized at 180°C for 2 h. The Rhodamine 6G, of ChDA ["pure for analysis"] grade, was twice recrystallized from ethanol.

We studied the luminescence spectra of an aqueous solution of Rhodamine 6G (λ_{max} 555 nm) in the presence and in the absence of various amounts of pyrogenal. As can be seen from Fig. 1, when pyrogenal was present in the solution in a concentration of $2.5 \cdot 10^{-6}$ g/ml the intensity of the luminescence of the Rhodamine 6G rose. To increase the sensitivity of the determination, the luminescence spectra of Rhodamine 6G were recorded on a SDL-1 diffraction spectrophotometer for measuring luminescence with incomplete compensation of the photocurrent of the luminescence spectrum by a rheostat with subsequent amplification, which enabled the effect of a change in the luminescence spectra of Rhodamine 6G to be increased, i.e., it provided the possibility of determining pyrogenal down to a concentration of $5 \cdot 10^{-8}$ g/ml.

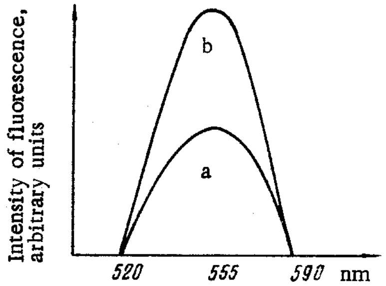

Fig. 1. Luminescence spectrum of Rhodamine 6G: a) in a concentration of $2 \cdot 10^{-6}$ g/ml; b) with the addition of pyrogenal in a concentration of $2.5 \cdot 10^{-6}$ g/ml.

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The phenomenon studied may subsequently find use for detecting pyrogenic substances in various media.

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COUMARINS OF THE ROOTS OF *Ferula iliensis*

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Continuing a study of coumarins of plants of the genus *Ferula* [1], we have investigated the roots of *Ferula iliensis* Krasn. collected in the Alma-Ata oblast of the Kazak SSR.

A concentrated methanolic extract of the roots was diluted with water (1:2) and treated with diethyl ether. The ether extract was washed with 3% sodium carbonate solution and the aqueous washings were acidified with 10% sulfuric acid and shaken with ether. Elimination of the solvent yielded crystals of substance (I) with the composition $C_9H_6O_3$, mp 229-232°C.

The mother ethereal solution was concentrated, 30 g of the extract was deposited on a column (93 × 4 cm) of silica gel (900 g) and elution was carried out with hexane—ethyl acetate (9:1) and the mixtures of the same solvents with increasing concentrations of ethyl acetate. This yielded four crystalline coumarin derivatives: (II), $C_{24}H_{30}O_3$, mp 60-61°C; (III), $C_{24}H_{30}O_4$, mp 189-190°C; (IV), $C_{24}H_{30}O_4$, mp 78-80°C; (V), $C_{24}H_{32}O_4$, mp 141-142°C.

By a comparison of IR and NMR spectra and mixed melting points with authentic samples, substances (I)-(V) were identified as umbelliferone, umbelliprenin [2], kamolone [3], moschatol [4], and kamolol [5], respectively.

It must be mentioned that umbelliferone derivatives have also been isolated previously from giant fennels of the Pachycarpa group [6], of which *Ferula iliensis* is also a representative [7].

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