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INDOLE HYDROXYLATION OF THE MEMBERS OF THE COMMELINACEAE FAMILY

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Abstract

It can be ascertained from our experiments that at eight members of the Commelinaceae family the 5- and 6-OH-indole derivatives were produced. A difference manifested itself in the quantities of the hydroxy-indole derivatives produced.

Introduction

In the process of hydroxylation, the reactions were studied by us by means o-indole transformation because the compounds of indole structure are of very conf siderable importance in metabolism and in the constitution of organism. We have also determined the quantity of the indole-hydroxy derivatives produced in the same manner as in literature when the endogenous indole was isolated from maize seedlings and also purified (REVIN, 1971). On the basis of the indole-hydroxy derivatives it may perhaps be possible that the members of a plant family can be separated by means of the quality of derivatives and, possibly, Phylogenetic connections can also by established. In another domain of problems, the developmental phases of seedlings could be separated by means of the hydroxy derivatives of anthranilic acid (MATKOVICS *et. al.*, 1972).

Materials and Methods

Our experiments were performed with the leaf and stem samples of the follwing members of Commelinaceae family: TRADESCANTIA ALBIFLORA BRÜCKN. (syn., *Tradescantia viridis* hort., *Tradescantia venezuelensis*, *Tradescantia fluminensis* VELL. em. BRÜCKN., *Tradescantia blossfeldiana* MILDBR., *Tradescantia sillamontana*, *Zebrina purpusii* BRÜCKN., *Seterasia purpurea* BOOM.).

We have investigated into the indole hydroxylating capacity of the tissue of leaves and the tissues of stem, according to the following method: The indole (1000 γ/10 ml) was dissolved in a 6 pH phosphate buffer, weakly warmed over a water bath. One g fresh vegetable tissue, leaf or stem was cut in 3—4 mm steraks and infiltrated for 3 minutes. After being infiltrated, the vegetable parts were dried in room air and 1 g matter was homogenized in a 10 ml indolic buffer. The homogenizate was incubated at room temperature for five hours, then the system was stopped with ether. After ethereal precipitation and distillation, the dry remainder was dissolved in 1 ml ether, and — with a papillary tube made of Pasteur's pipette — it was applied on a Kieselgel — G 10×20 cm plate, plated in a benzol-acetone mixture (90:10). After 30 to 40 min. plating, the front-line was indicated, and, after blowing on it warm air, we developed it with van Urk's reagent. The chromatogram, after standing for twelve hours, was photographed, and drawn, and the Rf. values were calculated. The spots were scraped off and dissolved in 5 ml ethanol, then — after being dissolved for two hours —

they were centrifuged and — against the supernatant ethanol — measured at 540 mmikron wavelength. On the basis of the calibration curve, the indole quantity of the indole derivatives and the remainder was determined for γ/g fresh weight. The identification of derivatives took place by reason of Fenton—Cier's system (Eich-Rochelmeyer, 1966).

Discussion of the experimental results

We have investigated into the hydroxylating capacity of eight members of the Commelinaceae family. The behaviour of leaves and stem was followed with particular attention because even the leaves of *Tradescantia* are able to regenerate roots (HORVÁTH—KOVÁCS, 1969). The general multiplication takes place with leafy shoots although root and shoot can be regenerated by the stem without leaves, too. The separate investigations into both organs are justified by this. In the Table, the quantity of derivatives coming about on the carbon atoms 5 and 6 is shown. In another situation, the hydroxylation could not be demonstrated at these plants, resp. plant-parts.

In the Table, the average values of eight repetitions are shown. It is to be established that the leaves and stems of the eight kinds of Tradescantia behaved in the same way, on the basis of the produced quantity of 5—OH and 6—OH indoles. We could not establish any difference between the members of the Commelinaceae family, at the indole-hydroxylation.

In the chromatograms, we are demonstrating the derivatives produced in the leaf of *Zebrina pendula* SCHNIZL. and FENTON—CIER's comparative system.

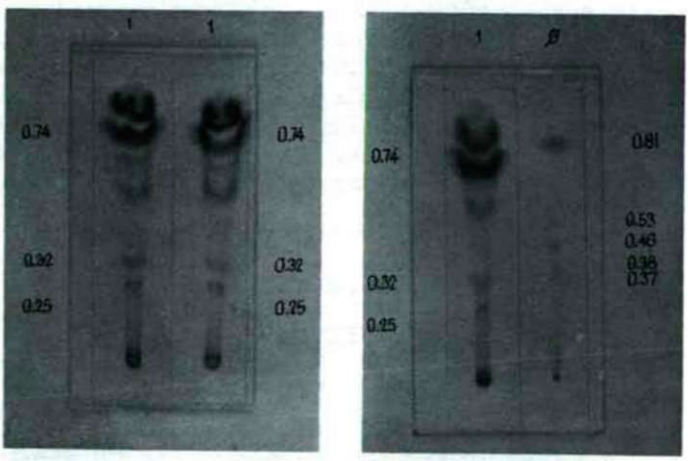

Fig. 1. Cromatogram and Rf, values of the indole-hydroxy derivatives produced in the leaf of Zebrina pendula Schnizl (1, 1, 1) and of Fenton-Cier's system.

At marks 1—1—1 the quantities produced in leaves can be seen. The 0.32 Rf values of 6—OH, the 0.25 Rf values of 5—OH are indicating the uniformity of our experiments at the three repetitions shown here, as well. The Rf value of the remaining indole is also identical in all the three cases, 0.74. By the Rf values of FENTON—CIER's system (under mark ∅) the reliability of the evaluation may also be supported.

Table 1. Quantity of the indole-hydroxy derivatives of genus *Tradescantia*, reckoned γ/g fresh weight

Species	5—OH—indole		6—OH—indole	
	leaf	stem	leaf	stem
Tradescantia albiflora	1.45	2.35	1.70	2.30
Tradescantia venezuelensis	2.05	2.10	2.70	2.55
Tradescantia fluminensis	2.55	3.65	3.10	3.10
Tradescantia blossfeldiana	2.30	1.55	2.85	2.75
Tradescantia sillamontana	2.05	2.25	1.60	1.60
Zebrina pendula	1.75	1.85	2.15	2.55
Zebrina purpusii	2.10	1.95	2.1	2.05
Seterasia purpurea	1.60	1.30	2.00	1.55

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