

INVESTIGATION OF THE ALKALOIDS OF

Goebelia pachycarpa

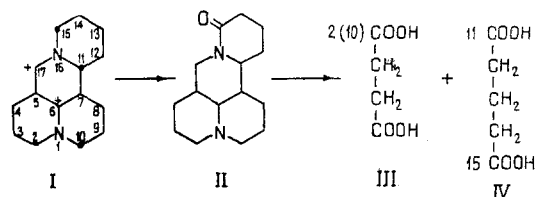
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At the present time several opinions exist on the formation of the quinolizidine alkaloids, especially those with the matrine skeleton [1-5]. However, in all cases a start is made from the fact that matrine (II) arises in the plant from the lupinine skeleton. From this point of view, the appearance of matrine (II) must precede the appearance of matridine (I) with the conversion of the latter into matrine (II) after oxidation.

To prove this hypothesis, we used the isotope method. Shoots of mature *G. pachycarpa* C. A. Mey, cut in the budding phase, were placed in Knop's solution ($1/2$ norms) containing $[1,5-^{14}\text{C}_2]$ cadaverine, which we synthesized by a method described previously [6]. After exposure for 5 days, the plant material was fixed and the combined alkaloids isolated from it were separated into the individual bases by a known method [7]. Having determined the positions of the labeled atoms in matrine (II) by oxidative degradation, we reduced it to matridine (I) by reduction with Adams catalyst.

Substance (I), after purification and identification, was reintroduced into the plant. After 5 days' exposure, the combined alkaloids were extracted from the experimental plants and the matrine (II) was isolated from it; as in the first case it should have had six radioactive C-atoms. The oxidation of the matrine (II) with chromic anhydride gave succinic acid (III) and glutaric acid (IV).



We established that the succinic acid contained one and the glutaric acid two radioactive C-atoms. This completely confirms the hypothesis of the possibility of the conversion of matridine into matrine in the plant. During the study of the biosynthesis of the alkaloid, we obtained a considerable amount of two unknown alkaloids. Both these bases formed pachycarpine on reduction with zinc in hydrochloric acid.

A comparison with reference samples that had been synthesized showed that the base with R_f 0.26 (TLC) and 0.5 (PC) was pachycarpine N_{16} -oxide and that with R_f 0.1 (TLC) and 0.3 (PC) was pachycarpine N_{15} -oxide. The chemical structures of the other alkaloids found in the investigation are being studied.

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