ALTERAMINE—A NEW ALKALOID FROM THERMOPSIS ALTERNIFLORA

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By chloroform extraction we have isolated 3.35% of total alkaloids from the epigeal part of Thermopsis alterniflora (family Leguminosae) collected on April 16, 1968, in the period of incipient flowering in the environs of the village of Sidzhak (Tashkent region). This product was separated into ethereal and chloroformic fractions. The ethereal fraction yielded pachycarpine in the form of the perchlorate with mp 171° C. The acidic aqueous mother liquor from the perchlorate was separated into chloroform-soluble and chloroform-insoluble fractions.

The chloroform-soluble fraction, after being made alkaline, was separated into petroleum ether, ethereal, and chloroformic fractions. The latter gave N-methylcytisine in the form of the perchlorate, and the mother liquor yielded cytisine (base). When the petroleum ether fraction was concentrated, a new alkaloid deposited with mp 112° C (petroleum ether), $[\alpha]_D$ −43° (ethanol), composition $C_{15}H_{20}N_2O$, which we have called alteramine.

The base is monoacidic, forms a perchlorate with mp 234–235° C (ethanol), a hydriodide with mp 212–213° C (acetone), a picrate with mp 215–216° C (ethanol), and a hydrochloride with mp 185–186° C (methanol–acetone).

Alteramine forms a crystalline methiodide with mp 225–226° C (ethanol), which shows the tertiary nature of the basic nitrogen. The IR spectrum of the alkaloid has absorption bands due to the presence of a lactam carbonyl (1645 cm^{-1}), a conjugated double bond (1565, 1545 cm^{-1}) [1], and an isolated double bond in the form of a terminal methylene group (3070, 910 cm^{-1}) [2].

The UV absorption spectrum is characteristic for the α-pyridone chromophore (λ_{max} 234, 312 mμ; log ε 3.76, 3.79) [3].

The hydrogenation of alteramine in ethanolic solution in the presence of Raney nickel formed a liquid dihydro product with $[\alpha]_D$ −100° (ethanol), giving a crystalline perchlorate with mp 272° C (ethanol). The absorption curves of the alkaloid and its dihydro derivative were similar, and therefore the double bond is isolated from the α-pyridone chromophore.

The mass spectrum of alteramine is similar to those of cytisine derivatives, and the peaks of ions with m/e and 146 can be formed only if a disubstituted tetrahydroquinolizone grouping is present [4].

The oxidation of alteramine with chromic anhydride in H_2SO_4 gave formic acid, and the oxidation of dihydroalteramine under the same conditions gave butyric acid. Thus, alteramine has a tricyclic structure and belongs to the cytisine group with a normal C_3H_5 hydrocarbon residue.

REFERENCES

1. L. Marion, D. A. Ramsay, and R. N. Jones, J. Am. Chem. Soc., 73, 305, 1951.
2. W. F. Cockburn and L. Marion, Canad. J. Chem., 30, 92, 1952.
3. Hsü Jeng-Sen and A. D. Kuzovkov, ZhOKh, 33, no. 6, 2067-2071, 1963.
4. N. Neuner-Jehle, H. Nesvadba, and G. Spiteller, Mon., 95, 687, 1964.

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