ISOLATION OF LUPININE AND ANABASINE

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Khimiya Prirodnykh Soedinenii, Vol. 6, No. 2, p. 276, 1970

UDC 547.94

Many methods of isolating the low-boiling fraction of the alkaloids of Anabasis aphylla L. are known [1–3] but no method exists which permits the lupinine to be separated quantitatively from the total alkaloids in a single stage.

In order to isolate pure lupinine, and also anabasine, in high yield, the total alkaloids of Anabasis aphylla were treated with acetic anhydride, as a result of which the acetyl derivatives of lupinine and anabasine, having a wide range of boiling points, were formed.

With cooling and stirring, 320 g of acetic anhydride was added to 500 g of the total alkaloids obtained from technical anabasine sulfate and containing anabasine, lupinine, aphyllidine, and aphylline with R_f 0.50, 0.38, 0.75, and 0.66, respectively (in a thin layer of alumina, activity grade III, in the benzene–chloroform–methanol (8 : 22 : 2) system, the spots being revealed with iodine vapor [4]), and the mixture was heated in the water bath for 10 hr. The excess of acetic anhydride and the acetic acid were distilled off in vacuum up to 125° C, and the residue was fractionated. Fraction 1 contained mainly O-acetyllupinine with bp 115–117° C (2 mm), from which the impurities were washed out with ice water (it is insoluble in water); n_D^{20} 1.5550; R_f 0.81. Yield 90 g (93%). Saponification with 25% NaOH for 1 hr yielded lupinine with mp 68–69° C (from petroleum ether). The high-boiling fraction, consisting mainly of N-acetylanabasine with bp 198–200° C (2 mm) [5], R_f 0.58 (under the same conditions of chromatography) was not fractionated further but was hydrolyzed with 25% H_2SO_4 for 6 hr. Chromatographically pure anabasine with bp 105–106° C (1 mm) was isolated. Yield 340 g (85%). The resinous residue, containing aphyllidine, aphylline, and other alkaloids was not identified.

The proposed method permits the lupinine to be isolated in the form of the O-acetyl derivative from the total alkaloids isolated from technical anabasine sulfate in one stage and also enables pure anabasine to be obtained chromatographically via N-acetylanabasine.

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16 October 1969

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