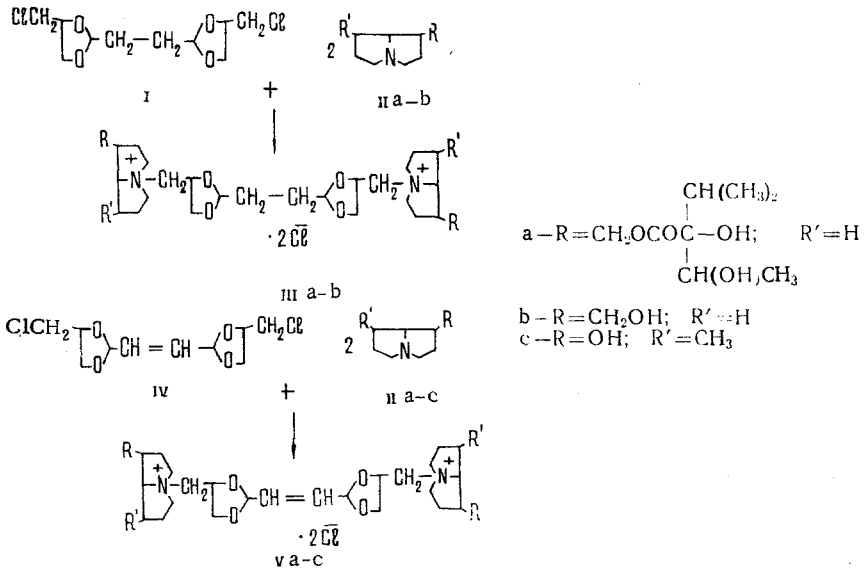

Pharmacological investigations showed that all the compounds synthesized possess curaremimetic action, but they are inferior to the known drugs diplacine and dioksonii.

LITERATURE CITED

1. G. P. Sokolov, V. E. Klusha, A. A. Kimenis, and S. A. Giller, Khim. Farmats. Zh., No. 3, 3 (1968).
2. M. S. Bainova, G. N. Bazilevskaya, K. M. Dyumaev, and N. A. Preobrazhenskii, Zh. Obshch. Khim., 30, 1120 (1960).
3. S. M. Makin and N. I. Telegina, Zh. Obshch. Khim., 32, 1104 (1962).

ALKALOIDS OF THE CAPSULES OF THE OPIUM POPPY

L. F. Mamochkina, A. V. Gaevskii, and A. I. Ban'kovskii

UDC 547.94+633.853

We have studied the alkaloid composition of the capsules of the opium poppy collected in the period of full biological ripeness in the Moscow and Poltava oblasts. The alkaloids were extracted from the comminuted capsules with methanol. The chromatography of the methanolic extract in a thin layer of silica gel W in the benzene–methanol (9:2) and chloroform–ethanol–acetone–ethyl acetate (6:2:1:1) systems revealed the presence of from 14 to 18 bases in different varieties of poppy. The combined alkaloids from the main industrial variety Novinka-198 were treated successively with various organic solvents. The fractions obtained were chromatographed on columns of alumina (activity grade II-V). The alkaloids were eluted from the columns with diethyl ether, chloroform, mixtures of chloroform and methanol with different concentrations, and pure methanol. The following alkaloids were isolated and were identified by their melting points, mixed melting points with authentic samples, and IR spectra: papaverine, narcotine, narcotoline, (+)-laudanidine, codamine, morphine, codeine, and thebaine [1]. In addition, we isolated a noncrystalline base which was identified by its UV, IR, mass, and NMR spectra and the properties of certain derivatives as (+)-reticuline [2-4].

All-Union Scientific-Research Institute of Medicinal Plants, Moscow. Translated from Khimiya Prirodnykh Soedinenii, No. 6, pp. 829-830, November-December, 1976. Original article submitted July 7, 1975.

It must be mentioned that (+)-reticuline is one of the components leading to high results in the method of determining morphine in opium poppy capsules according to VTU [Official Technical Standard] 37-58 [5]. The cause of the high results is that (+)-reticuline is not completely separated from morphine under the conditions laid down in the method and forms colored solutions with sodium nitrite and ammonia in the same way as morphine.

The combined alkaloids from the capsules of the new variety of the opium poppy Mayak were separated into three fractions according to their basic strengths (pH 4.5, 6.0, and 9.0). The fractions obtained were chromatographed on columns of alumina (activity grade II) followed by preparative chromatography in thin layers of alumina and of silica gel L.

The pH 4.5 fraction yielded papaverine, narcotine, thebaine, laudanidine, and narcotoline — the pH 6.0 fraction gave codiene and cotarnoline as the products of the cleavage of narcotoline [6, 7]; and the pH 9.0 fraction gave morphine. The yield of morphine from the capsules of poppies of variety Mayak was 20-30% greater than the yield of morphine from the capsules of the variety Novinka-198 grown under similar conditions.

LITERATURE CITED

1. A. P. Orekhov, The Chemistry of the Alkaloids [in Russian], Moscow (1955).
2. K. W. Gopinath, T. R. Govindahari, B. R. Pai, and N. Viswanathan, Chem. Ber., 92, 776 (1959).
3. E. Brochmann-Hanssen and T. Furuya, Planta Medica, 12, 328 (1964).
4. Tani Chiaki, Nagakura Naotaca, Hattori Shin, and Kao Muh-Tsken, J. Pharm. Soc. Jpn., 94, 844 (1974).
5. G. Ya. Khait, Med. Prom., 12, No. 8, 22 (1958).
6. S. Pfeifer and F. Weiss, Arch. Pharm., 289, 24 (1956).
7. S. Pfeifer, Arch. Pharm., 290, 261 (1957).

FORMATION OF BERBERRUBINE CHLORIDE IN THE DEHYDROGENATION OF DL-CANADINE

K. I. Kuchkova, A. A. Semenov, and M. O. Broitman

UDC 547.944/945:542.941.8

The alkaloid berberine possesses a broad spectrum of pharmacological, chemotherapeutic, and antitumoral activity [1, 2]. In view of this, we considered it of interest to synthesize a number of berberine analogs in order to investigate their physiological activity. At our disposal were the alkaloids β-allocryptopine and L-kanadine β-chloromethylate, isolated previously [3, 4] from the plant *Thalictrum minus* L. (family Ranunculaceae), which is fairly widely distributed in the territory of the Moldavian SSR and is characterized by a high alkaloid content. In the first place, we attempted to obtained dehydroberberinium chloride [5] from L-canadine β-chloromethylate. The latter was converted into canadine by treatment with sodium thiophenolate [6] and was then subjected to dehydrogenation. For this purpose, an ethylene glycol solution of the initial substance weakly acidified with concentrated hydrochloric acid was heated in an inert atmosphere with one of the following catalysts: 10% palladium on carbon (6 h, bath temperature 195-200°C), a Pd catalyst prepared according to Brown [7] (2 h, 180-185°C), and the triphenylphosphine complex of rhodium $Rh[(C_6H_5)_3P]_3Cl$ [8] (2.5 h, 170°C). In the use of the first two catalysts, maleic acid was added to the reaction mixture as hydrogen acceptor. In all cases, the same final product was formed [R_f 0.68 in chromatography on Silufol in the methanol—hydrochloric acid (9:1) system]. On heterogeneous catalysis it was possible to observe the formation during the reaction process of

Institute of Chemistry, Academy of Sciences of the Moldavian SSR, Kishinev. Irkutsk Institute of Organic Chemistry.

Translated from Khimiya Prirodnykh Soedinenii, No. 6, pp. 830-831, November-December, 1976. Original article submitted July 8, 1976.