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Diptamine and Diptalin is a Sulfur-Containing Alkaloids

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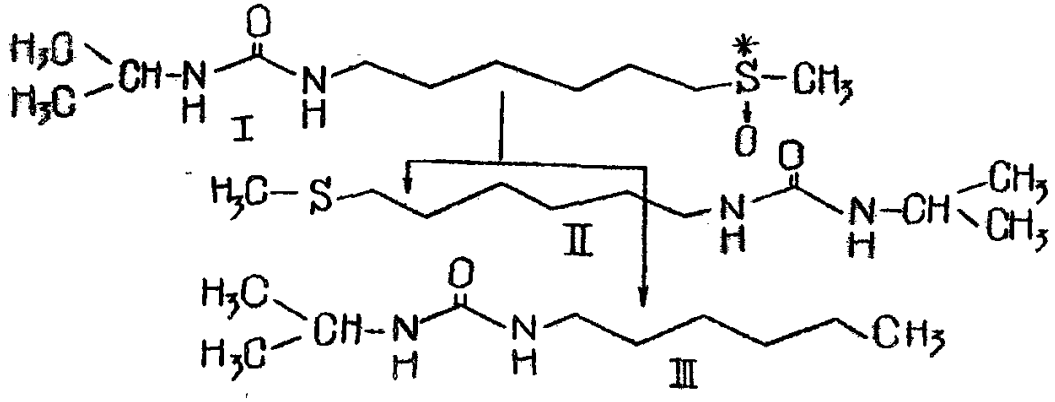
Abstract – Sulfur is a biogenic element and is an important class of substances such as amino acids (cysteine, methionine), vitamins (biotin, thiamine), enzymes. Each kilogram of human body weight contains 2 grams of sulfur. About 100 sulfur-containing alkaloids are known.

Keywords – Diptamine, Alkaloids, Diptocarpamine, Molecular.

Diphtychocarpus strictus is a species from the family Dipthychocarpus strictus that grows in Central Asia, the Caucasus and southern Europe. The quality and quantity of plant alkaloids in its organs differ depending on the growing season and place of growth. Thirteen S-protective alkaloids were isolated from Dipthychocarpus strictus. One of them is diptamine.

Diptamine. Diptamine in the IR spectrum $C_{12}H_{26}N_2O_2S$ (IV), M + 262, 3320, NH at 3370 cm-1 (1630 cm-1 (amide group C = O) and 1035 cm-1 (sulfoxide group), IV mass spectrum 262 (5)%), 247 (II), 204 (30), 199 (28), 16 (10), 132 (28), 114 (16), 101 (7), 84 (27), 77 (7) , 69 (52), 58 (100) m /.



The NMR spectrum of diptamine contains the signals of the protons of the following functional groups:

—C (CH_3) 2 (1.13 mx, 6H, d, J = 8Gs); - (CH_2) 5- (1.25-1.75; 10H, m);

-S- O CH_3 (2.52; 3H, s); -S- OCH_2- (2.63; 2H, k, J = 8Gs); > CH_2-N <(3.07; 2H, t); CH-N <(3.79; 1H, m); 2NH group (5.07 and 5.26); IH, d, J = 8 Gs and IH, t).

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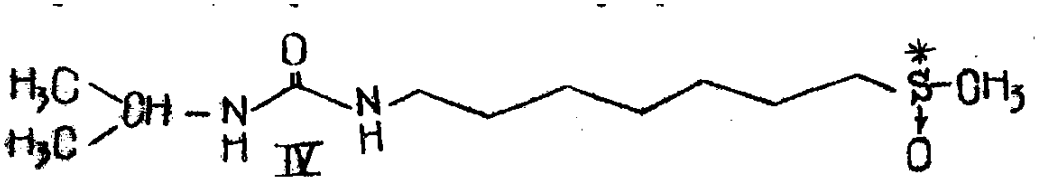
The maximum ion (signal) in the mass spectrum of IV (similar to the mass spectrum of isopropylurea) indicates that this is a property of the N-alkyl of diptocarpamines.

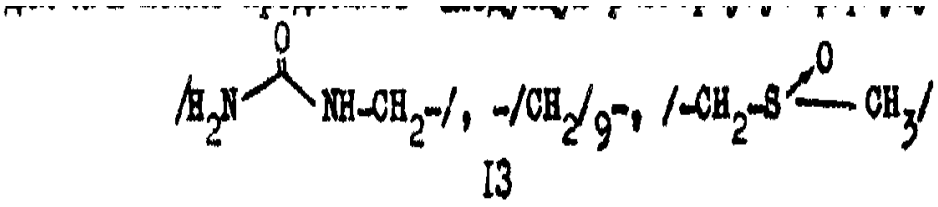
An important difference in substance 14m.b. means that diptamine is a homologue of diptocarpamine, which is distinguished by the -CH_2- group. Therefore, diptamine is N-isopropyl-N^1-7-methylsulfoxy-n-heptylurea.



Diptalin is an optically active oily liquid, composition $C_{13}H_{28}N_2O_2S$, M + 276, soluble in chloroform, methanol and water, poorly soluble in ether, benzene, acetone.

IR spectrum of diphthalene: 3220, 3380 cm^{-1} (> NH, -NH_2), 1660 cm^{-1} (amidecarbonyl), 1030 cm^{-1} (sulfoxide group). Mass spectrum: 276/M(5%)/$^+$, 261(13), 259(5), 213(24), 188(46), 142(100), 126(33), 114(86), 83(38), 71(33), 64(54).

Diptalin reacts biuret with urea, which means that it is an N-alkyl derivative of urea. Based on the above, the most common Diptalin formula is:



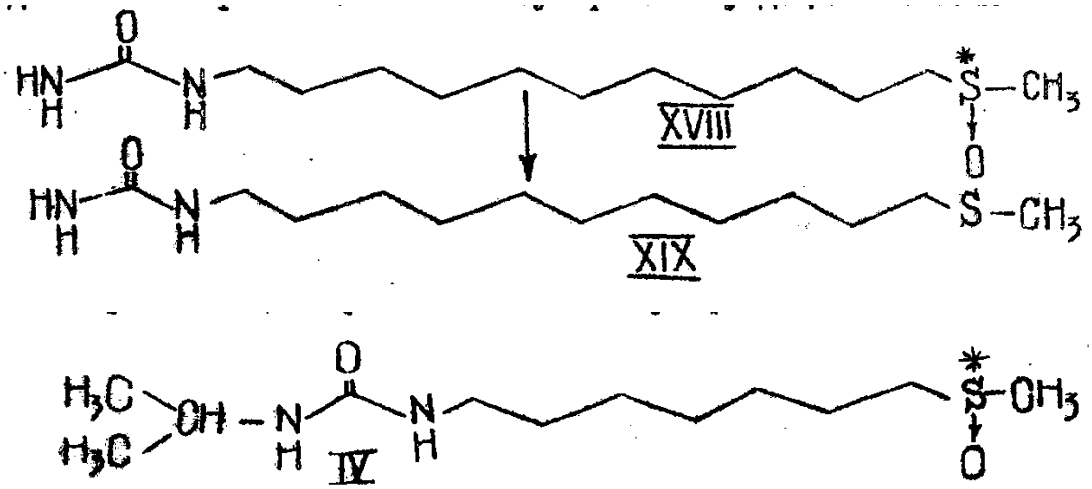
The alkaloid dipthaline (XVIII) was recovered by Zn in the presence of HCl to give an optically inactive substance (XIX), M + 260.

NMR Spectrum of Article XIX: (1.10-2.10 mx, 18H, m); protons of the sulfoxymethyl group (2.52; 3H, s); -CH_2-S → O (2.70; 2H, k, J = 6Gs); -CH_2-N <(3.03; 2H, t); > NH and –NH_2 (6.87; 1H and 5.49; 2H).

When comparing the PMR spectra of substances XVIII and XIX, the signals of the CH_3-group protons bound to S are 0.54 μm, with a diamagnetic shift. The difference in molecular weights is 16 mb. indicates that the sulfo group is returning.

The spectral data for diptalin are close to those for the alkaloid diptocarpaine. The difference in the molecular weights of these substances is 70 mb. indicates that diphthalene is a homologue of diptocarpaine, which differs into groups 5 - CH_2.

Thus, the structure of diptalin indicates that it is N-11-methylsulfoxy-n-undecylurea.



The amount of alkaloids depends on the place of growth, conditions and plant organs. The accumulation of alkaloids is observed during the weeding period.

The main biological activity of these alkaloids is the presence of antioxidant activity. These alkaloids prolong the life of animals. These are the main types of hypoxia, hypobaric hypoxia, hypoxic hypoxia, cytotoxic hypoxia are biologically active.

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