THE DISTRIBUTION COEFFICIENT OF FOETIDINE

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Among the known methods for the isolation of foetidine [1], the ion-exchange method has proved to be economically rational for industrial production [2, 3]. One of the stages of this method is liquid extraction. We have studied the process of the distribution of foetidine in the eluate—organic solvent system.

For the complete exhaustion of the eluate, seven contacts of the phases are required, with a ratio of eluate and organic solvent of 3 : 1 in each contact.

In the first three contacts of the phases, about 90% of the desired product is obtained, and in the remaining contacts, in addition to the combined alkaloids, a large amount of foreign substances is extracted the elimination of which is associated with great losses of foetidine. Consequently it would be desirable to extract three times.

Table 1 gives information on the extraction of foetidine by organic solvents and mixtures of them in the eluate—organic solvent system at definite values of the pH of the eluate. The amount of foetidine was 0.07% of the total weight of the raw material.

Thus, it has been shown that the distribution coefficient of foetidine in the organic solvents studied is fairly high; with an increase in the pH of the eluate the distribution coefficient falls, which is explained by the formation of an emulsion and the incomplete separation of the phases. A good solvent for the extraction of foetidine from the eluate proved to be gasoline—chloroform (4 : 1).

TABLE 1. Distribution Coefficients of Foetidine in Organic Solvents as Functions of the pH

Solvent	Alkaloids, % wt. of raw material	Foetidine, % alkaloids	K_p	Alkaloids, % wt. of raw material	Foetidine, % alkaloids	K_p
	pH 8			pH 10		
Benzene	0,133	31,2	2,7	0,106	38	2,5
Gasoline	Very small amount isolated					
Chloroform	0,108	33	1,8	0.106	36	2,1
Dichloroethane	0,15	28,5	3,3	0.095	42,1	2,5
Gasoline – chloroform (4 : 1)	0,135	33	3,7	0,085	50	3,1
Gasoline – chloroform (2 : 1)	0,102	40,8	2,9	0,104	41	3,2
Gasoline – benzene	0,125	31,8	2,5	0,073	54	2,3
Gasoline – benzene (1 : 1) Gasoline – benzene (1 : 2)	0,141	30,3	3,1	0,085	47,4	2,5
Gasoline – dichloroethane (4 : 1)	0,119	36	3,3	0,085	50	3,1
Dichloroethane – benzene (1 : 4)	0,128	31	2,4	0,09	42,5	2,1
Dichloroethane – chloroform (2 : 1)	0,175	24	3	0,175	23	2,5

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