THE DYNAMICS OF THE ACCUMULATION OF ALKALOIDS IN Peganum harmala

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Peganum harmala is a perennial herbaceous plant with a strong specific odor. The multistemmed shrub is most frequently about 50 cm high. The root is powerful and thick (about 3-4 cm wide) penetrating deeply into the soil (down to 3 m).

On the basis of established laws in the dynamics of the accumulation of alkaloids in plants [1], the information in the literature on the changes in the amounts of alkaloids in P. harmala during the phases of its development [2, 3] appeared to us to be unusual.

We have studied the dynamics of the accumulation of alkaloids in P. harmala collected by N. N. Sharakhimov in the Bukhara oblast, in the region of Ayak-Agitma, and in the Samarkand oblast on the Timiryazev collective farm. At these sites, the peganum began to vegetate at the end of March, budding and flowering took place in May, and the ripening of the seeds in July.

Information on the determination of the combined alkaloids in dependence on the phase of development and site of collection is given in Table 1. It can be seen from the table that the total amount of alkaloids in the epigeal part of the plant decreases during its development.

The mixture of bases from each sample was separated by methods similar to those described previously [4]. In spite of the fact that the separation work is not yet complete, it is already possible to conclude that the amount of peganine in the combined alkaloids decreases and the amount of harmine increases

TABLE 1

Time and site of collecting the plant	Phase	Total alkaloids, %	
		epigeal part	roots
	Beginning of the vegetation of epigeal part, height of		3.32m
1. IV, 1968, Samarkand oblast	the plant 5-10 cm	2.17	1.68o
18. IV, 1967, Samarkand oblast	15-20 cm	1.8	0.8
3-6. V, 1968, Samarkand oblast	Budding	2	–
10-11. V, 1968, Bukhara oblast		2.3	–
25-27; V. 1968, Samarkand oblast	Flowering	1.95	–
20. V, 1968, Bukhara oblast		1.86	–
15. VI, 1965, Samarkand oblast	Flowering and the beginning of fruit bearing	1.3	–
20. VII, 1969, Bukhara oblast	Massive fruit bearing	0.69	–
14. IX, 1967, Samarkand oblast	End of vegetation (dying off of the epigeal plant)	0.5	1.8

Note. m – young roots; o – old.

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as the plant develops. The quantitative ratios between the alkaloids vary according to the growth site. Thus, in the budding stage the plants collected in the Samarkand oblast yielded 31% of peganine on the total bases and those from the Bukhara oblast only 6%. Harmine predominates in the roots, regardless of the phase of development. The content of alkaloids in young roots is twice as great as in old ones. The seeds collected on September 14, 1967, after the withering of the epigeal part, contained 5% of combined alkaloids, 84% of these consisting of a mixture of harmine and harmaline. The fruit capsules yielded 1.08% of combined bases, from which harmine and vasicine were isolated.

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