

## PRINCIPAL ANTHOCYANS FROM PETALS OF SEVEN *Tulipa* VARIETIES

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An HPLC investigation of anthocyanins found [1] that anthocyanins from red tulip petals (*Tulipa*) grown under conditions in Belgorod District contain mainly rutinoides of pelargonidin, cyanidin, and delphinidin. In contrast with previously reported data [2], glucosides were present in small quantities. In continuation of this research, several known tulip varieties were grown in 2003. The collected petals were dried without exposure to direct sunlight. Anthocyanins from the air-dried raw material were extracted with formic acid in water (10%). The solution was filtered, diluted, and analyzed by HPLC with elution by CH<sub>3</sub>CN:HCO<sub>2</sub>H:H<sub>2</sub>O (10:10:80 by vol.) and detection at 520 nm. If acylated anthocyanins were present, a different ratio of the same solvents was used (20:10:70 by vol.). Table 1 presents the results.

It can be seen that anthocyanins in all varieties consist mainly of rutinoides, as previously demonstrated [1], although the relative contents of delphinidin, cyanidin, and pelargonidin vary over wide ranges. Acylated anthocyanins, the compositions of which were not defined exactly, comprise a small fraction of the pigments (except for Gavota variety).

Blue (or purple) hues in the petal color are intensified upon increasing the fraction of delphinidin derivatives (Queen of Night, a dark lilac variety, and Passionale, a lilac variety). This agrees with the literature [3]. Red hues increase upon increasing the content of pelargonidin glycosides, as before [1].

TABLE 1. Relative Peak Areas for Anthocyanins Detected at  $\lambda = 520$  nm (%)  $\pm 0.1$ -0.3%

Tulip variety	Delphinidin	Cyanidin		Pelargonidin		
	3-Rut	3-Glu	3-Rut	3-Glu	3-Rut	AcAn
<i>Queen of Night</i>	78.9	<0.1	20.5	<0.1	<0.1	0.7
<i>Passionale</i>	75.4	2.1	17.6	<0.1	<0.1	4.9
<i>Gavota</i>	47.1	6.5	20.1	<0.1	<0.1	26.4
<i>Alexander Nevskii</i>	5.9	1.1	74.1	<0.1	18.0	0.9
<i>Akito</i>	10.0	1.4	71.2	<0.1	17.1	0.2
<i>Kiss Nellis</i>	4.0	5.6	68.2	2.8	15.6	3.9
<i>Crystal Beauty</i>	2.5	<0.1	8.1	<0.1	83.0	6.5

Glu = glucosides; Rut = rutinoides; AcAn = acylated derivatives. Content of delphinidin 3-Glu is <0.1.

### REFERENCES

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