

SHORT COMMUNICATION

THE ANTHOCYANINS OF BULGARIAN AUBERGINE (*SOLANUM MELONGENA*)

S. S. TANCHEV, P. J. RUSKOV and C. F. TIMBERLAKE

Higher Institute for Food Industry, Plovdiv, Bulgaria, and Research Station, Long Ashton, Bristol

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Abstract—The skin of Bulgarian aubergine (*Solanum melongena*) contains delphinidin 3-rutinoside accompanied by a smaller amount of delphinidin 3-rutinoside-5-glucoside.

THE MAIN commercial aubergine (*Solanum melongena*—Solanaceae) cultivar in Bulgaria is known as Number 12. When methanolic-HCl extracts of skins (with or without purification via lead acetate) were streaked on Whatman No. 3 filter paper and chromatographed in butanol–conc. HCl–water (7:2:5, v/v), the anthocyanins separated into a trace component (I) of low R_f , in amount insufficient for further examination and minor (II) and major (III) components of increasing R_f s. The latter anthocyanins, after further separation in acid solvents (HOAc–conc. HCl–water; 15:3:82, v/v and 2% HOAc), were identified as follows: (a) spectral examination^{1,2} in the visible and u.v. region indicated that component (II) was a 3,5-diglycoside, that component (III) was a 3-glycoside and that neither component was acylated; (b) total acid hydrolysis and chromatographic examination by established methods³ showed that glucose and rhamnose were present in both components, quantitative assessment of the ratio glucose/rhamnose giving approximately 2:1 for component (II) and 1:1 for component (III), the aglycone being identified as delphinidin in both components; (c) H₂O₂ treatment⁴ showed that rutinose occurred in the 3-position of both components; (d) partial acid hydrolysis of component (III) gave only one intermediate anthocyanin (delphinidin 3-monoglucoside), but component (II) yielded two intermediate anthocyanins. Component (II) was therefore identified as delphinidin 5-glucoside-3-rutinoside and component (III) as delphinidin 3-rutinoside. The identity of (III) was confirmed by chromatography in five solvents with an authentic specimen of delphinidin 3-rutinoside obtained from black currants.⁵

The lack of acylation in (II) (and probably also in (I) because of its low R_f) indicates that this Bulgarian cultivar differs genetically from some Japanese aubergines which contain delphinidin 3-rutinoside-5-glucoside acylated with *p*-coumaric acid as their major component^{6,7} and in which both glycosidation and acylation of delphinidin 3-rutinoside are controlled

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² J. B. HARBORNE, *Phytochem.* **2**, 85 (1963).

³ J. B. HARBORNE, *Biochem. J.* **74**, 262 (1960).

⁴ B. V. CHANDLER and K. A. HARPER, *Australian J. Chem.* **14**, 586 (1961).

⁵ B. V. CHANDLER and K. A. HARPER, *Australian J. Chem.* **15**, 114 (1962).

⁶ S. SAKAMURA, S. WATANABE and Y. OBATA, *Agri. Biol. Chem.* **27**, 663 (1963).

⁷ S. WATANABE, S. SAKAMURA and Y. OBATA, *Agri. Biol. Chem.* **30**, 420 (1966).

by a single gene⁸ or a closely linked pair of genes.^{9,10} The anthocyanin pattern differs also from that of some other cultivars^{8,9,11} in which only delphinidin 3-rutinoside has been identified and from an unspecified Italian cultivar which contained delphinidin 3-glucoside, delphinidin 3-rutinoside acylated with *p*-coumaric acid and delphinidin 3-rutinoside-5-glucoside of uncertain acylation.¹²

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⁹ Y. ABE and K. GOTOH, *Botan. Mag. Tokyo* **72**, 432 (1959).

¹⁰ J. B. HARBORNE, *Comparative Biochemistry of the Flavonoids*, pp. 262, 264, Academic Press, London (1967).

¹¹ J. B. HARBORNE, personal communication.

¹² U. CASOLI and G. DALL'AGLIO, *Ind. Conserve Parma* **44**, 18 (1969).