

## Influence of *E,Z*-isomerization and stability of acylated anthocyanins under the UV irradiation

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### Abstract

The *E,Z*-isomerization reaction and stability of acylated anthocyanins under the influence of UV irradiation was studied. Among monoacylated anthocyanins in flower petals the *E*-configured cinnamoyl derivative residues are predominant. However, these *E*-isomers are readily isomerized to *Z*-forms in acidic methanol solutions with UV irradiation to give a 1:1 mixture of the isomers. Under acidic aqueous conditions the equilibrium ratio of the *Z*-isomer of malonylawobanin to the *E*-isomer becomes lower (*Z/E*: 1:6) than in acidic methanol solutions. Furthermore, the pigment is stabilized, the extent depending on its concentration. In neutral aqueous solutions with 10 eq. of flavoccommelin, the ratio of the *Z*- to *E*-isomers of malonylawobanin was also 1:6 with UV light, but a significant stabilization effect was observed. In commelinin, a supramolecular metal-complex pigment, malonylawobanin was found to be stacked much more strongly than with a 1:1 mixture of malonylawobanin and flavoccommelin. Under such conditions malonylawobanin was more stabilized. With the diacylated anthocyanin, gentiodelphin, UV induced isomerization from *E*-isomer to *Z*-isomer was significantly suppressed. In acidic methanol solutions the content of *Z*-isomer was only a few percent, and in aqueous solutions gentiodelphin did not isomerize. Therefore, molecular associations prevent light induced *E,Z*-isomerization. Under UV irradiation conditions anthocyanins in neutral aqueous solutions were most stable. These phenomena are in line with biological function of anthocyanins in plant tissue blooming under solar radiation.

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