

Effects of fertilization and environmental conditions on anthocyanin content of red cabbage

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Anthocyanins are water soluble pigments widely used in the food industry to color soft drinks, jams, and dairy products and are classified as E-163 by the European Community and as 21 CFR 73 by the American Food and Drug Administration. They are also known for their benefits to human health showing antioxidant activity (Tamura and Yamagami, 1994), anticancer properties (Kamoi et al., 1995), visual acuity promotion (Muth, 2000), and a probable defense against coronary heart disease (Bettini, 1985). Up to now these pigments are mainly extracted from the pomace of grape but some problems related to vineyard cultivation, stress the need of more versatile crops as sources of natural red colorants. In our work, an experiment was conducted in North and Central Italy for two consecutive years to optimize the anthocyanin yield of red cabbage. Two hybrids ('Roxy' and 'Gradur') were grown under a factorial combination of increasing rates of potassium sulphate (0–50–100 kg K ha⁻¹) and superphosphate (0 - 39 - 78 kg P ha⁻¹) applied before planting. Cabbages were transplanted at the beginning of August and harvested in winter. Anthocyanins were extracted from cabbage heads with HCl in methanol (1% v/v solution) and quantified by spectrophotometry at 530 nm of absorbance. Results showed that red cabbage can give high yields of anthocyanins (more than 90 kg ha⁻¹) which are characterized by a strong acylation, therefore, presumably, by a good stability. However, differences over sites and years were marked. In the first year Ozzano yields were reduced by a heavy infection of soft rot disease. The choice of the variety, linked to a different anthocyanin content in the heads, appeared the major factor of success of the crop. P and K fertilization had a small influence. On clay soils in Central Italy the highest rates of both elements had a negative effect on anthocyanin concentration in cabbage heads.

References

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