

Investigation of thermal reaction products of betacyanins in betalain-rich extracts of Red Beet (*Beta vulgaris* L.)

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Abstract

Beetroot (*Beta vulgaris* L.) is one of the important vegetables and contains significant amounts of nutritious and bioactive compounds. One group of them are the natural pigments - betalains from which betanin is the most studied compound. In addition to the known and tested betacyanins from *B. vulgaris*, there is also a possibility of obtaining their unexplored derivatives by partial degradation - e.g. decarboxylated and dehydrogenated compounds. In the presented work, the possibility of obtaining new derivatives from betalain-rich extracts of red beet by thermal oxidation was tested. The process was carried out in selected acetate/phosphate buffers at pH 3–8 and at 85 °C. Also the possible directions of degradation routes of betalain compounds depending on the process parameters (buffer, pH, temperature, heating time) was investigated. Carrying out the process under such conditions leads to the formation of dehydrogenated and/or decarboxylated compounds. Monitoring of the reaction pathways was achieved by using LC-DAD-MS/MS system. This research led to detection of novel pigments such as 2,15-bidecarboxy-xanbetanin, 2,15-bidecarboxy-xanneobetanin and 2,15,17-tridecarboxy-neobetanin. The identification of new compounds provides the basis for their further research in terms of the possibility of using decarboxylated and dehydrogenated systems of thermal oxidation of *B. vulgaris* in food applications with new health-promoting actions and colorant properties.

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