# Anthocyanins from food by-products as alternative for syntethic additives? A big challenge for food and related industries

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*Anthocyanins are secondary plant metabolites responsable for the red, blue or purple colors in plants. Their role is not just to give color, but also they exhibit a protective effect against environmental stress factors like UV light or temperature changes. These compounds are one of the largest group of flavonoidic compounds, which are a subgroup of polyphenols. Nowadays, they present a great interest because of their possibility of use and their abundancy in fruits, vegetables, grains and flowers. Since food industry generates annually a large amount of food by-products rich in biologically active compounds, in the last years, the recovery of these compounds was attempted from pomaces, seeds, peels, pulps or husks. A food by-product that deserves attention is the eggplant peel that is rich in these compounds.*

*The aim of our present study is to probe the possibility to use the anthocyanins-rich extract from eggplant peels as functional ingredient in order to be used in food, nutraceutical or even in cosmeceutical applications.*

*In food industry, anthocyanins are used as natural enhancers for the organoleptic quality of foods, but also as antimicrobial and antioxidant agents, which gives them beneficial health effects. The health effects provided by the consumption of anthocyanins were analysed during multiple experiments* in vitro *and* in vivo*. These studies have showed inhibitory effects on some cancer cells. Also, an anthocyanins intake seems to be related with the reduction of the risk for cardiovascular events, neurodegenerative or diabetes disorder.*

*The antimicrobial activity of anthocyanins have multiple mechanisms of action, one of them consisting in the interaction between the -OH groups and the cell membranes of bacterias. That interaction produces a disruption of proteins and lipids structures, helping the binding of the active site of enzymes with the substrates, turning them unavailable for microorganisms. Beside some others, these compounds inhibit of the growth of Gram-positive and Gram-negative bacteria. Also, the anthocyanins show a great potential in regard the oxidation inhibiting in foods. They act as free radical scavengers, they are good reducing agents and excellent synergists with other antioxidants. The mechanism of free radicals scavenging consists either in a transfer of a hydrogen atom from a -OH group or of an unpaired electron. The presence of -OH groups in position 3 of the C-ring and in positions 3', 4' and 5' in ring B, gives them a significant antioxidant activity. Therefore, taking into acount their chemical structure, the delphinidin (major anthocyanin in eggplant peel) seems to be the most potent antioxidant in the group of anthocyanins.*

*Despite all the advantages that the anthocyanins provide, they are very sensitive to physical and chemical conditions. They can be degradated durring their extraction, food*

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*processing, storage, or digestion. That's why, for increasing their bioavailability, they should to be encapsulated before being used.*

***Acknowledgements***

*This work was supported by the project* Excellence, performance and competitiveness in the R&D&I activities at "Dunarea de Jos" University of Galati, *acronym "EXPERT", financed by the Romanian Ministry of Research and Innovation, Programme 1 – Development of the national research and development system, Sub-programme 1.2 – Institutional Performance – Projects for financing excellence in R&D&I, Contract no. 14PFE/17.10.2018.*

S0008_140519

*Received 14.05.2019*
*Accepted: xx.xx.2019*