

# IMPACT OF CYANIDIN-BASED ANTHOCYANINS ON ROS LEVELS IN HUMAN COLON CARCINOMA CELLS

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Anthocyanins are able to scavenge ROS and thus protect against free radicals and cell oxidation. The nuclear factor erythroid 2 (NFE2)-related factor 2 (Nrf2) is considered as a key sensor for cellular ROS. In its active form Nrf2 translocates into the nucleus, binds to the antioxidant responsive element (ARE) triggering the transcription of a wide variety of genes that are capable to protect the organism against xenobiotics and/or oxidative stress. Whether the pattern of different sugar moieties at the cyanidin (Cy) molecule affects the antioxidant properties differently in human colon cells was assessed with the dichlorofluorescein (DCF) assay. The bioactivity of naturally occurring anthocyanins such as cyanidin-3*O*-glucoside (Cy-3-glc), cyanidin-3*O*-sambubioside (Cy-3-sam), cyanidin-3*O*-sambubioside-5-glucoside (Cy-3-sam-5-glc) and cyanidin-3*O*-rutinoside (Cy-3-rut) were tested in colon carcinoma cells C2BBE1 at a concentration range of 0.01 - 200 µM. Cellular ROS levels were measured for 1h. The protective effect of anthocyanins against hydrogen peroxide induced oxidative stress was determined with a modified DCF assay, where cells were incubated with test compounds for 24h prior the addition of stressor.

All anthocyanins including the aglycon Cy caused a concentration-dependent reduction of ROS levels. Cy-3-glc and Cy-3-sam appeared to be the most potent antioxidants. Both anthocyanins were also able to protect colon cells from H<sub>2</sub>O<sub>2</sub> -induced stress at 200 µM, indicating a potential activation of cellular defense systems such as the Nrf2 signaling pathway. All other test compounds were not protective. The position and number of glycosyl moieties as well as the type of glycoside, as most obvious for Cy-3-sam and Cy-3-rut, significantly impact the antioxidant activity of cyanidin derivatives in C2BBE1 cells.

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