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Approach regarding the biosafety evaluation of black and red currant pomace extracts using *Allium cepa* test

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Abstract. In the present work, biosafety evaluation of black and red currant pomace extracts was conducted using *in vivo* plant test system, such as *Allium cepa*, a sustainable method which can provide valuable information on the cytotoxic and genotoxic effect of extracts from natural sources in relation with their phytochemical composition. In this view, different aqueous and hydroethanolic extractions from black and red currant pomaces were carried out. For revealing the differences in the phytochemical profile of the studied extracts, rapid, efficient and easy-to-operate analytical techniques such as colorimetry, UV-Vis spectrometry and electrometry were used. Cytogenetic analysis of pomace extracts was achieved using *Allium cepa* test by scoring the mitotic index, the limit value of cytotoxicity, the phase index of mitosis and presence of chromosomal aberrations for all samples and comparing to the control (tap water). The results have shown that the cytogenetic response depends both on the type of pomaces and on the experimental extraction conditions. Compared to the control sample (22.58 %), a decrease in mitotic index for each analyzed sample was observed. As well, an increase in the cells with chromosomal aberrations was detected in onion root tips exposed to the tested extracts compared to the control (0.69 %). The lowest value of mitotic index (12.44 %) and the highest value of chromosomal aberrations (1.91 %) were recorded from the root tip cells of onion bulbs exposed to the hydroalcoholic extract obtained from red currants pomace using water/ethanol (60:40 v/v). Even if the mitotic index decreased, the limit value of cytotoxicity was higher than 50 %, level considered as a sublethal condition for the organisms. At the same time, the increase of the frequency of chromosomal aberrations is not so significant, and in correlation with the cytotoxicity limit, it does not indicate a genotoxic effect on onion cells. Following these results, it can be concluded that black and red currant pomace extracts can be safely used for possible therapeutic benefits.

***Keywords*:** by-products; berry pomace extracts; mitotic index; chromosomal aberrations; *Allium cepa* assay.

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