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The possibilities of uses of biomarkers to the estimation of exposure of potato to herbicides

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Residues in foodstuffs active ingredients of herbicides for use in crop production, may be important risk factors for lipid metabolism (increased levels of triglycerides, total cholesterol, and the fraction of low-density lipoprotein (LDL) and lower blood lipoprotein, high density lipoprotein (HDL) which leads to an increase in atherosclerotic lesions of the aorta and the coronary arteries and the development of diseases of the cardiovascular system. Hence, the purpose was to demonstrate the possibility of biomarkers to evaluate of the exposure of potato on the herbicide. Analyzed samples of tubers very early potato variety Aster, from a field experiment conducted in the central-eastern part of Poland (51.639 °N, 22.900 °E). Field studies related to the cultivation of early potato variety under cover on the assumed on the flat with the use of chemical weed control using herbicides, whose active substances were: linuron, fluorochloridone and clomazone. Laboratory tests, the determination of residues of herbicides was carried out using gas chromatography, using a capillary column and a mass spectrometer ion trap, as a detector. During the analysis of potato samples, active substance of linuron was not detected, used for the care of pre-emergence preparation Afalon 50 WP is not left in the tubers, even trace amounts of the active substance that could be detected by this method. The quantity of active substance (fluorochloridone) Racer 25 EC in the preparation was more than 400 times smaller than the standard NDP in the EU, as in the case of an herbicide command for which the determined amount of clomazone was 250 times less than the NDP. All assayed samples were detected pesticide residues, or the amount they were so vanishingly small that it does not pose a threat to human and animal health. The technology used in the cultivation of potato on the flat with to soil bringing herbicides after planting potatoes turned out to be safe in case of very early potato variety Aster. So, the effect of chemical methods for protection of agricultural crops against weeds resistant to herbicides can be achieved by using properly selected remedy at the right time and under conditions conducive to their operation. Vegetative responses did not accurately predict yield and quality responses of tubers; therefore, reproductive responses should be considered in phytotoxicity test protocols for pesticide registration in the EU.

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