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Evaluation of oxidative stress, cytotoxic and DNA damaging effects of terbuthylazine in human peripheral blood lymphocytes *in vitro*

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Terbuthylazine (TB) belongs to the chloro-triazine group of herbicides, and primarily acts as an inhibitor of photosynthesis. It is used as a substitute for atrazine that is banned in EU countries. Workers in industrial and residential settings could be exposed to TB, especially if pesticide is handled without appropriate safety precautions. Considering that its toxicity profile, especially genotoxic and carcinogenic potential is not fully described yet, this study focused on the evaluation of *in vitro* toxicity of TB on human peripheral blood lymphocyte model. Assessments were made using the biomarkers of lipid peroxidation and oxidative stress, quantitative fluorescent assay for simultaneous identification of apoptotic and necrotic cells, alkaline comet assay, and hOGG1-modified comet assay. Lymphocytes were treated for 4 h at doses of TB equal to its occupational exposure level, acceptable daily intake, and residential exposure level. Following TB treatment, we observed slight changes in the levels of thiobarbituric acid reactive substances, and total antioxidant capacity in lymphocytes. Cell viability decreased in a concentration-dependent manner. Apoptosis dominated over necrosis. The levels of primary DNA damage were concentration-dependent, both in terms of comet tail length and DNA % in comet tail. However, the results of hOGG1 comet assay did not indicate significant contribution of oxidative lesions to overall DNA damage. Taken together, our results suggest that TB has low cyto-/genotoxic potential to lymphocytes but to clarify the mechanisms involved in its toxicity further studies including more sensitive techniques to detect physiological and metabolic changes at the cell level should be undertaken.

Biography

Ana Lucic Vrdoljak is appointed as a Scientific Advisor at the Institute for Medical Research and Occupational Health, Zagreb and as a Lecturer at the Faculty of Pharmacy and Biochemistry, Chair of Toxicological Chemistry, University of Zagreb. Her research interests are focused on experiments dealing anticholinesterase poisoning and search for more effective therapy. She also possess extensive experience in human biomonitoring using the acetylcholinesterase assay and cytogenetic techniques to assess and control the risk of long-term outcomes associated with exposure to organophosphate and carbamate pesticides. Her work has been presented through 56 scientific papers.

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