EXPOSURE ASSESSMENT TO MULTIPLE CHEMICALS AND FUTURE MIXTURE TESTING

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Every day, we are exposed to multiple chemicals by several routes of exposure: diet, inhalation and dermal contact. These chemicals may exert toxic effects and therefore risk assessment by evaluation of exposure and toxicity is necessary to monitor and control possible adverse effects on human health. Until recently, risk assessment is mostly performed separately for each chemical, considering only a single route of exposure. However, this simplified risk assessment does not take into account the effect that chemicals may have on each other and their effect on the same target organ. Therefore, there is a need to address combined exposure to mixtures of chemicals as set out in EU Regulation. According to EU Regulation, EFSA is responsible to establish the methodology for combined exposure to multiple chemicals. Recently, EFSA has published the outline of the methodology on the EFSA website, including four EFSA opinions on how based on their toxicological prof ile and EFSA guidance on how to perform the exposure assessment (1).

Within the ACROPOLIS project a model was developed to assess the dietary cumulative exposure to a group of seven triazoles following the EFSA guidance and the results are published in a special issue of Food Chemical Toxicology (2). EFSA started grouping pesticides into cumulative assessment groups based on their toxicological profile for all pesticides affecting the nervous system and all pesticides affecting the thyroid gland. EFSA noticed several gaps in the EU monitoring because some pesticides are difficult to analyze in and are therefore not included in the routine monitoring programs. Filling the identified data gaps might pose a challenge for analytical method development.

EFSA also noticed that relevant information on the toxicity of the chemical is not always available. Consequently, EFSA applied a precautionary principle in their grouping and it was noticed that refinements are possible when data on toxicity becomes available. To this end, the new European funded project EuroMix will apply several *in-silico* and *in-vitro* tools to mixtures of chemicals that can affect the liver, the endocrine system, and the development stage. A number of test systems, including omics technology and classic toxicological testing, will be explored. The most promising tests for mixtures will be verified against results from animal studies, which will be performed according to well-accepted OECD test guidance for single chemicals.

(1) Info Session on Applications - Pesticides – Technical meeting on Cumulative Risk Assessment. Parma 11-02-2014 http://www.efsa.europa.eu/en/events/event/140211.htm

(2) Scientific publications ACROPOLIS project: Food and Chemical Toxicology. Volume 79, Pages 1-80 (May 2015) Toxicity testing and model development for estimating cumulative and aggregate exposure to pesticide residues in Europe Edited by Susan M. Barlow and Polly E. Boon.
http://www.sciencedirect.com/science/journal/02786915/79

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