

Assessing the combined effects of chemicals using non-animal methods

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Novel, non-animal tools and scientific methodologies show high potential for the assessment of combined effects of chemicals on humans and the environment. They allow meaningful information on individual mixture components or whole [mixtures](#) to be derived, enabling a better understanding of the underlying mechanisms of their effects, according to a report by JRC's EU Reference Laboratory for Alternatives to Animal Testing (EURL ECVAM).

Humans and wildlife can be exposed to an infinite number of different combinations of chemicals in mixtures via food and consumer products which might impact health. It is practically impossible to test all these possible mixtures experimentally. Therefore smart strategies are needed to assess the potential hazards using new tools that rely less on in vivo testing and incorporate instead alternative experimental and computational tools.

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needed to facilitate a more widespread application.

The authors have conducted a review of recent literature and have surveyed the experience of experts on the different approaches. The report reviews the current state of the art for the application of these alternative tools. It touches upon the adverse outcome pathway (AOP) concept, in vitro methods, omics techniques, in silico approaches such as quantitative structure activity relationships (QSARs) and read-across, toxicokinetic and dynamic energy budget (DEB) modelling, and on integrated approaches to testing and assessment (IATA). These can help achieve a more effective regulatory assessment and at the same time reduce the reliance on [animal testing](#).

Background

Risk assessment of chemicals for regulatory purposes does not generally take into account the "real life" exposure to multiple substances, but mainly relies on the assessment of individual substances. A JRC report on regulatory requirements for the assessment of mixtures published in 2014 shows that combined exposure is nowadays taken up in several pieces of legislation, however a harmonised consistent approach on performing mixture assessments across different regulatory sectors is still lacking.

More information: "Scientific methodologies for the assessment of combined effects of chemicals - a survey and literature review." [DOI: 10.2788/093511](https://doi.org/10.2788/093511)

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