



# Testing chemical mixtures: how to determine the effect concentrations?

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## Introduction & objectives

When the properties of a mixture cannot be estimated from the related properties of its components then testing on the mixture is required under most chemical regulations. However, the available standard methodologies to assess toxicity have been developed for single substances and guidance is missing in case of unstable compositions which are common<sup>[a,b]</sup>. The objective of this work is to highlight the issues faced when testing unstable mixtures and to propose some method adaptations.

## The analytical monitoring of mixtures is challenging

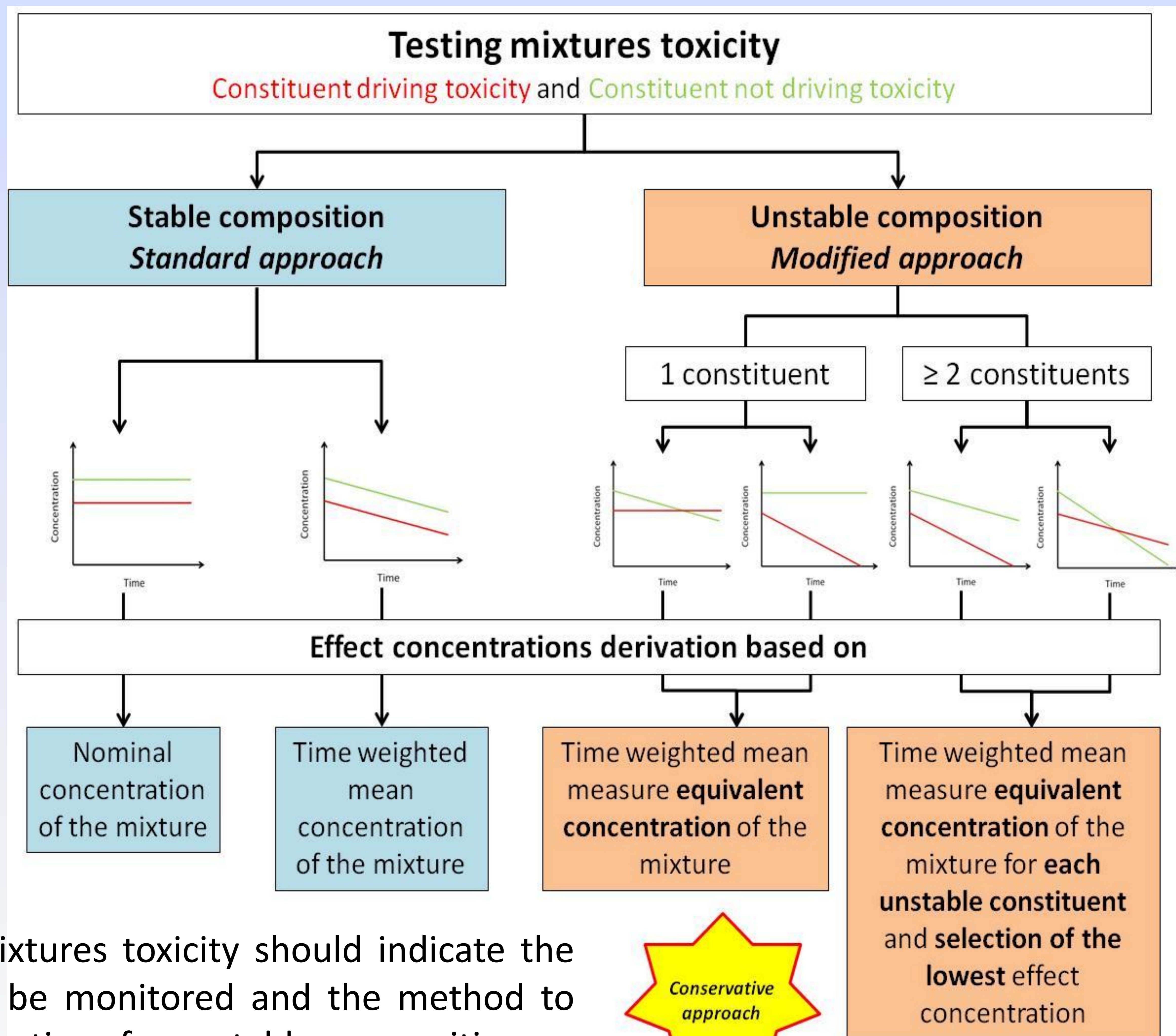
- Identification of relevant constituents to monitor may differ according to regulatory frames.
- Development of specific/quantitative analytical methods for each relevant constituent is limited by the availability of individual analytical standards and instrumental methods, that may be different (e.g. HPLC and NMR) and not be all available in the same testing laboratory.

## Derivation of effect concentrations

EC<sub>x</sub>, LOEC and NOEC are derived based on the time average concentration of the unstable constituent(s) which are converted in equivalent mixture concentration according to its initial composition. Mixture toxicity can only be overestimated if its effect concentration is not derived based on the constituent driving toxicity.

## Conclusions

- Guidance on testing mixtures toxicity should indicate the relevant constituents to be monitored and the method to derive the effect concentrations for unstable compositions.
- Effect concentrations based on time-weighted mean measure equivalent mixture concentrations is a proposed conservative approach.



### References

[a] OECD Series on testing and assessment Number 23, Guidance document on aquatic toxicity testing of difficult substances and mixtures, 2000; [b] EC, Toxicity and Assessment of Chemical Mixtures. Scientific Committees. 2012.

