

Uniform European concept for the health assessment of multiple residues in pesticides

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When more than one pesticide is detected at the same time on a food, the expression used to describe this is “multiple residues”. They may arise when plants are treated with several pesticides to protect them from various pests. The active substances in pesticides differ depending on their use. Herbicides are used against weeds, fungicides against fungi, insecticides against insects. In this context the question is raised about the health assessment of these multiple residues. Animal experiments involving mixtures of various chemical substances have shown that toxic effects can only be detected from combined effects from doses in the range of or above the NOAEL of the individual substances. The NOAEL (No Observed Adverse Effect Level) describes the amount of an individual substance which no longer manifests any harmful effects in animal experiments. When the doses of the individual substances are far lower than the NOAEL, then no toxic effects are to be expected from additive or synergistic effects. This also applies in principle to active substances that have been classified as “dangerous” because of specific toxic properties. As a rule maximum levels have been established so far for individual substances and not for substance groups. When the admissible maximum levels for the individual substances are not exceeded, it can practically be ruled out that additive or synergistic effects of pesticide residues in food will harm the health of consumers.

However, as the above-mentioned animal experiments were only conducted for a comparatively low number of chemical substances and mixtures, it is necessary from the scientific angle to develop concepts for a targeted test and assessment strategy which takes into account both the toxicological properties and the combinations of active substances anticipated from the envisaged use. This is currently being done on the European level by the European Food Safety Authority (EFSA). It evaluates the available conceptual approaches with a view to basing the assessment of the cumulative risk of pesticide residues on a uniform concept on the European level.

Three forms of combined toxicity of multiple active substances are possible: the addition of the individual doses, the addition of effects and interaction. As dose addition is of importance in particular for risk assessment, the competent EFSA panel initially considered only this effect. The Panel proposes classifying the active substances of pesticides in “cumulative assessment groups” which are based on properties like the chemical structure of the active substance and the mode of action of a pesticide. This approach is currently being tested.

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