

New knowledge strengthens risk assessment of chemical cocktails in food

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Denmark's largest research project on chemical cocktail effects in food, spearheaded by the National Food Institute, Technical University of Denmark, has just been completed. It has established that even small doses of chemicals can have significant negative effects if they are present together. A reliable method for calculating the effects of chemical cocktails has been developed in the project. The project has also shown a need for limiting the Danish population's exposure to certain substances.

The fact that the traditional way of assessing potential harmful effects of



chemicals only takes the individual chemicals into account has long been of concern. Especially since this approach does not take into account the effects that can occur in humans when the chemicals are present at the same time in a cocktail. A serious concern is that substances can amplify each other's effects, so that their combined effect becomes greater than what can be predicted by looking at the individual chemicals.

A recently completed, four-year <u>research project</u> on cocktail effects in foods, led by the National Food Institute, has established that when two or more chemicals appear together, they often have an additive effect. This means that cocktail effects can be predicted based on information from single chemicals, but also that small amounts of chemicals when present together can have significant negative effects.

"Our research shows that indeed, little strokes fell great oaks also when it comes to <u>chemical</u> exposure. Going forward this insight has a profound impact on the way we should assess the risk posed by chemicals we are exposed to through the foods we eat," Professor Anne Marie Vinggaard from the National Food Institute says.

Danes' exposure to chemicals via foods

In order to assess the risk posed by various chemicals, it is essential to know what the typical human exposure to a particular chemical is. The cocktail project has created an overview of the amount of pesticides and other contaminants that humans are exposed to via foods.

This work has shown that Danes' intake of pesticides through foods is relatively limited. However, there is a need for reducing exposure to substances such as lead, cadmium, PCBs and dioxins.

The endocrine disrupting effects of chemicals have generally not been adequately studied. However, in cases where knowledge about the



effects is available, the results show a need to reduce the intake of endocrine disrupting chemicals from current levels, such as phthalates and fluorinated chemicals.

New model to calculate effects

In the project, a mathematical model was developed that can reliably calculate the cocktail effect of chemical mixtures in cases where the effect and dose of single chemicals are already known or can be estimated. Calculations using this method suggest that the chemical burden that Danes are subjected to may be harmful to the overall health for groups with the highest exposure.

"Chemical cocktail effects are a societal challenge, which challenges the way we assess and regulate the use of chemicals, both inside Denmark and within Europe," Anne Marie Vinggaard says.

Tools to assess risk

In the project, a toolbox for use in risk assessments when taking cocktail effects into account was developed. Among other things, this toolbox contains a computer program and a step-by-step procedure that can be used to assess and calculate the risk of cocktail effects. The more comprehensive and robust the available data is with regards to harmful effects of chemicals, the more reliable the calculation will become.

Several of the tools are specifically designed to generate more knowledge about the harmful effects of chemicals, since toxicological data on chemical contaminants is generally deficient.

Provided by Technical University of Denmark



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