



## **NZFSSRC Webinar Potential Chemical Contamination in Food**

The webinar was hosted by the New Zealand Food Safety Science & Research Centre (NZFSSRC), consisted of four presentations by eminent food safety researchers on the topic of "Potential Chemical Contaminants in Food". These talks discussed the following:

- **Impact on human health of microplastics in the New Zealand diet**, presented by Jeane Nicholas, Senior Toxicologist at MPI.
- **Nitrates in food and water**, presented by Peter Cressey from the Institute of Environmental Science and Research.
- **MBIE research project on emerging contaminants – an update**, presented by Dr Louis Tremblay from the Cawthron Institute.
- **Potential food safety risks from substances unintentionally added to recycled materials**, presented by Professor Phil Bremer from University of Otago.

Recordings of the webinar can be found here: <https://www.nzfssrc.org.nz/node/209>.

### **Impact on human health of microplastics in the New Zealand diet**

Presented by Jeane Nicholas, Senior Toxicologist at MPI.

Microplastics refers to extremely small pieces of plastic debris that result from the disposal and breakdown of consumer products and industrial waste. They are considered to be a potential contaminant since there is potential for microplastics, once introduced into the human body, to be distributed throughout the whole body.

Data on the bioavailability of microplastics and their contaminants after oral exposure is limited. We do not know for certain whether one is/has been exposed to microplastics or other chemical contaminants.

There have been detections of microplastics in food (e.g., seafood, honey, sugar, beer, tea, milk, etc) and in water (e.g., bottled water, tap water and ground water). Current methods can only detect microplastics bigger than 10 microns in size, there is a lack of data on smaller microplastics.

Work is underway towards the development of the analytical method for microplastic detection. This involves subjecting a sample of food through four steps:

- Digestion, where the sample is broken down.
- Filtration, where components from the sample are separated.
- Detection, where we search for the presence of microplastics.
- Confirmation, where the presence of microplastics is confirmed and quantified.

There are multiple groups working on assessing the risks of exposure and the impacts on human health.

## **Nitrates in Food and Water**

Nitrates are used in a wide range of biological processes in the human body, as well as in the various ecosystems. Human exposure to nitrates come from either the environment or the food we eat.

The carcinogenicity of nitrates in humans is not well understood or supported, due to the inadequate evidence available. Nitrosamines, a compound derived from nitrates, are the suggested causal link to cancer. These compounds only become problematic once they are metabolically activated.

The acceptable daily intake of nitrates is 3.7mg/kg and exposure to these chemicals may come from food and/or beverage consumption. The means by which we are exposed to nitrates differs between children and adults.

Exposure in adults occurs mainly in lettuce, potato, and water (coffee, tea, etc.). In children exposure occurs mainly from consumption of potato, lettuce and other foods. Children's exposure to nitrates from water comes from the consumption of fruit drinks and water consumption during the meal.

The definitions of exposure in epidemiological studies are often very crude and do not consider the form or the timing of the drinking-water consumption.

## **MBIE research project on emerging contaminants – an update**

Emerging contaminants refer to any contaminants that enter the environment which are not monitored or regulated. Examples of these chemicals are:

- Cleaning products.
- Pharmaceuticals.
- Industrial chemicals.
- Agrichemicals.
- Plastics (all plastics contain chemical additives).

The main challenge of dealing with emerging chemicals is the sheer volume of chemicals being introduced into the environment.

To help detect such chemicals two types of analysis are undertaken.

- Targeted analysis – which searches for priority emerging chemicals.
- Non-targeted analysis – which uses mass spectrometry to look for emerging chemicals not in the priority list, metabolites or breakdown products derived from emerging chemicals.

Chemicals have enabled improvements in food production and in ensuring people are kept safe from contaminants. However, chemicals have the possibility of harming the environment.

## **Potential food safety risks from substances unintentionally added to recycled materials**

Packaging is under increased scrutiny due to the newfound concerns of consumers towards the environment. This increased scrutiny, highlighted the importance of working towards a circular economy, with the goals of:

- Focusing on closing loops in industrial/material systems.
- Minimizing waste, reducing raw material and energy inputs.
- Making food packaging more sustainable.

The New Zealand government implemented a plan about rethinking plastics, with the following being the main action points of relevance:

- Implement a national plastics action plan.
- Rethink plastics in the government agenda and drive uptake of best practice sustaining plastic use.
- Create and enable consistency in design, use and disposal.
- Mitigate environmental and health implications of plastic.

The use of packaging containing recycled components is perceived as an opportunity to reduce energy inputs, emissions and the environmental impacts. The term "Recycling" has become a political mean to initiate changes expected to bring economic and environmental benefits.

The challenge with introducing packaging with recycled components lies in ensuring product safety and quality within the context of the circular economy, meeting potential conflicting goals, such as protecting the environment, human health and ensuring product quality and the ability of some materials to be recycled.

Regulations overseas are requiring the same level of safety for chemicals migrating into food for recycled as for virgin materials. The recycling process for containers that come into direct contact with food, is considered on a case-by-case basis. In practice, a recycled plastic component is allowed if it does not come into direct contact with the food.