

There is little to fear from nanoparticles in food

June 8 2016, by Ian Rae



Credit: Beyzaa Yurtkuran from Pexels

Nanomaterials, and especially nanoparticles, have been on some people's worry list for at least a decade.

The definition of a nanomaterial is rather loose, just specifying that it must have at least one dimension of 100 nanometres or less. This means that the material could be a sheet, fibre, wire or a particle.

For nanoparticles in particular, all three dimensions are likely to be tiny. This means they will often be about 100 times smaller than the particles in air pollution, which range in size from 10 micrometres (PM10) down to 2.5 micrometres (PM2.5).

The substances that make up the nanoparticles – most often the oxides of zinc, silicon and titanium – and are generally not regarded as toxic. But the particles are so small that their behaviour can be quite different from what we see on a large scale.

We know that nanoparticles in sunscreens and cosmetics can penetrate the skin, and this raises questions about what they can do in the body. Nanosilver is also used as a disinfectant, such as when it is included in clothing items like socks.

In terms of [food](#), nanoparticles can be present at levels of a few percent, often mixed with larger particles. Some foods have silicon dioxide (silica) as an anti-clumping agent to keep mixtures free-flowing, while others have [titanium dioxide](#) to confer extra whiteness.

You may recall the news item from March last year about the use of titanium dioxide in the frosting of donuts. The application was withdrawn in the face of consumer resistance.

The use of nanosilver in food is restricted but there may be residues on fruit and vegetables that have been disinfected by washing with suspensions of nanosilver.

While there is no sign that nanomaterials are used in [food packaging](#) in

Australia or New Zealand, they are being used overseas. Some applications are adding nanoparticles of clay to make packaging more robust, or adding nanosilver as a disinfectant.

Some future developments could involve nanoparticles that act as indicators, by changing colour for instance, if the contents deteriorate in quality over time.

Small risks

Keeping an eye on our food is the bi-national government agency Food Standards Australia and New Zealand ([FSANZ](#)), which has just released two long-awaited reports on the safety of nanoparticles in food, one on [additives](#) and one on [packaging](#).

The reports were commissioned in 2015 and were written by one of Australia's leading toxicologists, [Dr Roger Drew](#), and his colleague [Tarah Hagen](#).

Both reports were based on comprehensive surveys of the scientific literature and relevant patents.

The upshot of both reports is that the most common nanoscale materials likely to be present in food or food packaging – [silicon dioxide](#), titanium dioxide and metallic silver – do not pose significant health risks.

In terms of food, many common foods already contain [natural nanoparticles](#), but FSANZ was specifically interested in "engineered" or manufactured nanoparticles and their effects.

In terms of packaging, studies where nanomaterials are used in packaging have shown that nanomaterials can migrate from the packaging into the food therein.

Ingested nanoparticles can, and do, get into the body in places where bulk materials cannot, but there is no evidence that mere size is responsible for the effects observed in laboratory studies.

Any impact is caused by soluble materials or colloids, such as gels, that are formed by interaction of the nanomaterials with aggressive components, such as food acids or body fluids.

Soluble materials bring the elements – silicon, titanium and silver – into contact with vital systems. The case of silver is especially interesting since silver is not bioactive until the metal is converted to silver ions, which is when it becomes harmful.

However, the authors noted that there have been few studies of the effects of nanoparticles on large populations of people. That said, nanomaterials have been used for many years, and there has been no evidence of harm.

Also, in order to make an accurate risk assessment, you need to look at both hazard (in this case, toxicity) and exposure. So a substance that is highly toxic might still be low risk if exposure is typically very low.

There have been few regulatory studies on nanoparticles in which hazard and exposure have been considered together, so it's difficult to provide a comprehensive risk assessment.

What it means for us

It's understandable that many people are wary of a new technology that has unknown effects on health.

However, these reports should reassure us that the scientific and empirical evidence to date suggests nanoparticles in food or food

packaging pose low risk.

That doesn't mean there isn't more work to be done to learn more about [nanoparticles](#) and their biological effects. However, given the expense of mounting large-scale studies, and the likelihood that they will also find no significant health effects, the cost may not be justified.

Nonetheless, we should expect FSANZ to follow developments in the science and, most importantly, to learn more about just which [nanomaterials](#) are used in food and packaging applications in Australia. It would be good if this were also to lead to improved food labelling standards.

This article was originally published on [The Conversation](#). Read the [original article](#).

Source: The Conversation

Citation: There is little to fear from nanoparticles in food (2016, June 8) retrieved 21 June 2024 from <https://phys.org/news/2016-06-nanoparticles-food.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--