



UNDERSTANDING NANOPARTICLES AND ENGINEERED NANOMATERIALS: USE AND LABELLING

What are nanoparticles and engineered nanomaterials?

Almost all solid food ingredients contain nanoparticles – tiny units of matter that cannot be seen with the naked eye or even with a conventional microscope. Nanoparticles in food generally dissolve in the body's digestive tract.

Most nanoparticles are created by Mother Nature. For example, cow's milk naturally contains casein micelles, which are nanocapsules created by nature to deliver nutrients such as calcium, phosphate and protein to new born calves. Others are created by standard technologies commonly used during the production of foods or food ingredients, such as drying, milling, grinding, etc.

Engineered nanomaterials, on the other hand, are intentionally created to fulfil a specific function. For example, iron hydroxide adipate tartrate¹ is an engineered nanomaterial developed for use in food supplements as a source of bioavailable iron. It is different to other types of iron because it has unique properties that make it easier for the body to absorb and use.

Using nanomaterials in food

Before being allowed on the market, all food ingredients have to be checked and authorised as safe by the European Food Safety Authority (EFSA). This is the case, whether or not a food ingredient contains nanoparticles or engineered nanomaterials.

Some ingredients also go through a specific nano-risk assessment such as nanoparticles which do not dissolve in the gastro-intestinal tract.² If a food additive that has already been approved for use in the EU undergoes a significant change in its particle size, it must be resubmitted to EFSA and go through a new authorisation process.³

In addition, engineered nanomaterials that were not used for human consumption to a significant degree within the EU before 15 May 1997 are said to be "novel": therefore, their safety must be evaluated by EFSA before they are permitted for use in the EU.⁴

1. Safety of iron hydroxide adipate tartrate as a novel food pursuant to Regulation (EU) 2015/2283 and as a source of iron in the context of Directive 2002/46/EC
2. Guidance on technical requirements for regulated food and feed product applications to establish the presence of small particles including nanoparticles
3. Regulation (EC) 1333/2008 on food additives, article 12
4. Regulation (EU) 2015/2283 on Novel Foods

Misleading labelling and consumer confusion

Food labelling serves the key purpose of informing consumers about products, without misleading them. That is why all ingredients are listed on food packaging. Currently, engineered nanomaterials have to be indicated by the word "nano" in brackets after their name, but there is no similar requirement for "macro" or "micro" ingredients.

"Nano" labelling does not relate to consumer safety, as is the case for allergens. It simply relates to a particle's size, and *"neither implies a specific risk nor does it necessarily mean that this material actually has new hazard properties compared to its constituent parts."*⁵

Food ingredients must also be labelled as "nano" if they have developed new nanoparticle properties during production. However, these new properties are unlikely to exist in the food ingredient if the nanoparticles do not make up at least 50 per cent of its solid particles. Similarly, if the content of nanoparticles in an engineered nanomaterial is below 50 per cent, "nano" labelling could mislead consumers, who might expect it to have taken on new properties.

European Commission recommendation: a positive step

In June 2022, the European Commission adopted a recommendation on the definition of nanomaterial for use across various sectors, including the food, cosmetics and chemicals industries. Amongst other criteria, this states that for a material to qualify as a nanomaterial, it must contain a minimum of 50 per cent nanoparticles.

This definition is a robust legal basis for developing a clear and non-ambiguous definition of engineered nanomaterial for use in food legislation. To avoid misleading information for consumers, additional characteristics such as dissolution properties, novelty of the ingredient or natural occurrence should be taken into consideration.



Clearer labels for EU food ingredients

There is no doubt that current "nano" labelling is not meaningful. It is potentially confusing for consumers and should not be required for foods or ingredients that contain natural nanoparticles such as milk proteins or those created during the production process such as ground coffee. Likewise, there is no need to label engineered nanomaterial ingredients that dissolve when they are combined with other ingredients in a recipe, during food production or in the digestive tract.

Nor should food additives that have been permitted in the EU and used in food products since before 1997 be labelled as "nano" retrospectively. They are already well known to consumers and relabelling them as "nano" would lead to confusion because consumers would expect them to be new ingredients, which they are definitely not.



5. https://ec.europa.eu/health/scientific_committees/emerging/docs/scenihr_o_032.pdf