

The next large jump

NANOTECHNOLOGY WILL PRESUMABLY BE GOOD FOR THE NEXT TECHNOLOGICAL REVOLUTION IN THE FOOD INDUSTRY

Nanotechnology comprises technological developments on the nanometer scale, usually 0.1 to 100 nm. (One nanometer equals one thousandth of a micrometer or one millionth of a millimeter.) The term has sometimes been applied to microscopic technology. The term nanotechnology is often used interchangeably with molecular nanotechnology (also known as "MNT"), a theoretical, advanced form of nanotechnology believed to be achievable at some point in the future, based on productive nanosystems. Molecular nanotechnology centers on the concept of fabricating precise structures using mechanosynthesis to perform molecular manufacturing. The term nanoscience is used to describe the interdisciplinary field of science devoted to the advancement of nanotechnology. This is the world of atoms.

From Wikipedia, the free encyclopedia.

+ Just image a bottle of ketchup whose contents become liquid when shaken and turn highly viscous again when the bottle sits still. Or do you like the idea of a frozen pizza which tastes like a Margherita when you heat it in the microwave oven at 400 watts. But when you put the oven to 800 watts, the pizza tastes like "Prosciutto e funghi" while at 1600 watts you have "Quattro stagioni" on your plate. You think we are joking? Not at all. Nanotechnology might make this possible. Nanotechnology offers enormous possibilities but also runs the risk of not being accepted by the consumers thus facing a similar fate as genetic engineering.

Nanotechnology is dealing with structures and processes in the nano range, which is one billionth of a meter. The exciting part of it is that everything is happening in the proximity of atomic and molecular magnitudes where very special physical, chemical and biological processes are happening. For example, surface and boundary layer properties are much more important compared to volume properties than in the world we see around us. But what is more decisive: modern science is capable of intervening in the processes and of manipulating them. New solutions might be found for different problems and palettes which up to now could not be fulfilled but which in future may promise large market shares, sales volumes and profits.

One example for that is the Nano-Zapp spray, which has been available on the Japanese market for some time now. This nanotechnology-based spray has a disinfecting action on Staphylococcus aureus, salmonella, tuberculosis and influenza bacteria, and on viruses and moulds. According to tests conducted in Japan, the effect should last weeks, even months, longer than comparable active agents can achieve. In Japan, this spray is used in the food industry as well as in hospitals, sports facilities, hotels and even consumers can buy this spray for household use.

Comprehensive and ongoing research and development activities in different countries show the significance nanotechnology has gained in the meantime. One step ahead are Germany, the USA and Japan, but China, South Korea and Russia have already jumped on the bandwagon. Image the wealth of possibilities for the food industry besides the already mentioned ketchup and pizza:

+ prolonged shelf-life by improved packaging materials

- +** improved traceability due to better indicators
- +** more safety due to indicators which might show that the cold chain has been interrupted
- +** enhancement of appearance, taste and texture
- +** improved analysis methods, for example to detect GMOs
- +** increased bioavailability of important ingredients, such as for functional food
- +** ingredients with precisely defined effectiveness in terms of time and location (this is already being practiced in the cosmetics industry with vitamins and UV filters).

Nanotechnology for the food industry has an enormous potential. According to estimates, the global market volume will increase to more than 20 billion USD within the next five years. However no new thing comes along without problems as was experienced with genetic engineering.

The drawbacks of nanotechnology have not been investigated yet. This is particularly valid for the environmental effects of the non-natural substances produced using nanotechnology. Their effects and in particular their long-term effects are not known. It could be that the consumers might fear respective foods as "manipulated on atomic level" while they still might appreciate all blessings nanotechnology brings along in the medical and hygiene field. +++

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