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"Nano-Food and Nano-Packaging: Consumer boycott without communication"

Nanotechnology in packaging and food - what exactly does this mean? According to nano expert, university lecturer and CEO of the Innovation Society Dr. Christoph Meili the food industry needs to communicate this topic more openly. Otherwise he worries that a "debacle like in the case of gene technology" could take place.

- **Mr. Meili, what does food packaging of the future look like?**

CHRISTOPH MEILI: *(laughs)* This is a good question. Nanotechnology will certainly be a central topic in this area. If you look at packaging purely as a marketing tool, many things are thinkable: from anti-fingerprint-coatings through to smell-active packaging. But nanotechnology is also an important topic when it comes to aspects of product protection and durability. For retailers and manufacturers, increasing the shelf life of products is of great importance. In the future, there will for instance be active systems with antimicrobial properties. Needless to say that exactly in this area the potentials are enormous.

- **What precisely does this mean?**

The potential of nanotechnological packaging can be derived from the example of semi-finished bakery products: The total market volume in Europe is about 480 million Swiss francs. However, today around 6 to 15 percent of these products perish because they exceed maximum storage time. This causes an annual loss of between 30 and 70 million Swiss francs. On the one hand, it is an economical problem: the loss is in the end paid by the consumers. But on the other hand there is also an ecological and ethical question involved: To throw away edible food products has – when looking at the current food situation worldwide – a negative touch.

- **"Nanotechnological" packaging also raise the question of health risks.**

We have to make a distinction: For consumers it is of central relevance, whether it is a "nano inside" or a "nano outside" product. "Nano inside" means, that nanotechnology directly comes into the stomach of the consumer via food products. We know that consumers are critical about this – except if they can recognize a direct benefit, for example in the case of nano vitamins, the benefit of which prevail for them. "Nano ouside" – including most packaging – however is less problematic, because the nanoparticles are not eaten in this case.

- **Is it possible to guarantee that nanoparticles really stay "outside"?**

For most packaging solutions it is possible to guarantee it, because nanoparticles are integrated into a matrix and therefore are immobile. But there are also exceptions – for instance in the case of so called "active packaging" -, where paricles can migrate into the food products. There needs to be a case-by-case assessment of the nature and concentration of the substance.

- **There are a lot of spooky stories: that nanoparticles could cause inflammations or genetic damages in cells. Is all of this fear-mongering in your eyes or is there any truth in it?**

Among the nano-scaled substances there are many that have been known for a long time. An example is silicon dioxide that has been used as a flowing agent or is known as E 551 in food products. Those are really unproblematic substances, because they are egested again. More difficult is the case in which particles interact with cell structures. The available knowledge in this field comes from *in-vitro* experiments. And they have shown that some substances on the nano scale – such as zinc oxide – can have toxic effects. But it needs to be said that especially in the food area the testing methods are very strict.

- **Anyhow: Are there substances that you would regard as problematic in the food area?**

One topic for me is nano silver. Silver is a long-known, relatively potent anti-microbial substance. If silver – for instance in plastic packaging – is firmly integrated and immobilized I do not see it as problematic under a health point of view: Sterling cutlery is also such a case. More difficult is the case where silver gets into the environment; there are many open questions in the area of disposal. But this is not the only problematic point: In the meantime there have been first bacteria that are resistant to nano silver – a reminiscence that is unpleasant when remembering problems like those with the insecticide DDT. So, nano silver is relatively easy to incorporate, highly effective – but the threshold values need to be observed and the area of usage must be well considerate.

- **Speaking of threshold values: How do you judge the current legal situation – is it sufficient?**

Currently there is no nano-specific regulation in Europe – and in Switzerland neither: Legislators do not differentiate whether a certain substance is available on the macro, micro or nano scale. However, it is known that the properties of a substances can vary according to its size. Therefore it is necessary to have a risk raster that allows to assess the risk potential of every use of any substance. Switzerland – with the action plan "risk assessment and risk management of engineered nanoparticles" – is quite advanced in this area: Authorities understand that it is not possible to simply ban nanotechnology. Rather, the right sense of proportion is needed: Potentially problematic substances must be looked at individually. And there must be information: Authorities and retailers are reliant on information from industry.

- **The Innovation Society together with the Swiss Retailers' Association (IG DHS) has developed a Code of Conduct for nanotechnology. Is this the right way for you?**

Yes, since there is a lack of nano-specific laws voluntary measures are important. It has been the case in the past already that manufacturers are accountable in their own responsibility for the products they bring to the market. Switzerland has a somewhat special position in this area, that is not so deeply rooted in the laws of other countries. And today we stand to benefit from this situation, also with the Code of Conduct of the IG DHS.

- **Honestly: Is this Code just a paper tiger?**

Caution. It should not be neglected that retailers have an extremely strong position in Switzerland. One example: We have found that in the food sector, big companies like Nestlé, Kraft or Unilever – who are actively engaged in nano research – simply do not communicate about nanotechnology, be it for reasons of competitive disadvantage or image. In the light of critical media coverage this is unsettling for consumers – which is a certain risk for retailers. Retailers have to inform consumers at the point of sale what these products and packages do contain. The IG DHS Code of Conduct will have a significant impact in this area – a fact that has obviously not been understood by industry so far. Retailers certainly have more pull in this question: if products do not come on the shelf, industry has a problem.

- **However, Switzerland is a small market: Is this really going to impress global corporations like Nestlé?**

For global companies Switzerland certainly is a small market and negligible in terms of volume. But it is not insignificant in terms of its signalling role. Additionally, reatailers all over the world have the problem that they need to give information on their products. The Code of Conduct therefore is a great step in the direction of transparency, product safety and trust. And especially the aspect of trust will become – the closer we come to the "nano inside" area – ever more important: It is the key to success for nanotechnology.

- **At the moment, all involved seem to aim at keeping a low profile in order not to raise panic with consumers. Is this impression deceptive?**

If we look at the Swiss authorities – for instance the Federal Offices of Public Health or the Environment – I think that they try hard to openly communicate the opportunities and risks. There is a true will to highlight both sides and to create optimal conditions for success. Concerning industry, especially in the food sector, I have the impression that they really try to keep a low profile. However, this could well go awry: If industry does not recognize soon the importance of open communication I fear a debacle like in the case of gene technology. Because we know from experiences with topics like genetic or nuclear technology: If there is no open communication, there will emerge mistrust, fear and in the worst case: boycott.

- **Is the reluctance of industry also associated with the great economic potential it sees in nanotechnology – and that it does not want to put at stake?**

We estimate the potential of nanotechnology worldwide at 1000 to 1500 billion Swiss francs until 2015. And we act on the assumption that by 2015 25% of today's 100 billion packaging market volume will be nanotechnologically modified. But it would be a gross misconsideration not to communicate openly with customers on this account.

- **Why?**

In the matter of nanotechnology there are, especially for industry, three different kinds of risks: Firstly, very real risks like the case that a certain nano-scaled substance might have an unwanted effect on the environment or health. Secondly the risk of changing legislation. If a company invested into a technology that will be banned tomorrow this was a misdirected investment. And thirdly the risk of negative perception. If a new technology is perceived as dangerous by the public and the media it will be rejected – no matter how dangerous it really is. And take three guesses which one of these risks is the most threatening for companies: It is perception.

- **So what is your advice for industry?**

I advice them to communicate proactively and to establish a 360 degree risk monitoring. Because if the food industry does not do this, it will be rolled over by the nanotechnology topic sooner or later. Additionally we suggest that they join forces in a working group: The food industry should have a dialog platform in order to work on this topic in a broader framework and to develop and implement measures.

- **Last question: How much nano do you accept in your food?**

(laughs) Many food components are "nano" by nature, because they simply are in this size range. However, engineered nanomaterials (nano-encapsulated vitamins or colorants) will increase because they also have advantages: Important aspects are solubility or bio-availability. And as long as I as a consumer know what kind of benefit I can expect, this is not critical for me. But I want to know exactly what is in my food and in its packaging, so that I can decide on my own whether I will buy the product or not. – And this is exactly the point where communication by industry has to set in.

Box 1:

Christoph Meili (44) is a business economist and biotechnologist with a focus on nano and emerging technologies. He is CEO of the Innovation Society Ltd. and lecturer for Business Administration at the University of St.Gallen (HSG) and the University of Applied Sciences in St.Gallen.

The Innovation Society Ltd. was founded in 2005 as a spin-off from the HSG. The company offers consulting services for industry, bancs, retailers and authorities in the area of technology, risk and safety management and communication and has developed different tools in these areas.

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Box 2:

The Code of Conduct of Swiss Retailers

The Swiss Retailers' Organisation, IG DHS, in collaboration with the Innovation Society Ltd. has developed a Code of Conduct for nanotechnology: This Code of Conduct for nanotechnology in consumer products comprises among other statements, that the retailers Charles Vögele, Coop, Denner, Manor and Migros have to demand from their suppliers all nano-related information necessary for the assessment of a product. This comprises for example the technical specifications, data on risk potential for humans, animals and the environment as well as details on the added value of the nano-product as compared with a conventional product.

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