

## Discussion: Attitude of organic farming towards nanotechnology

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## Goals of the meeting

- > Basic understanding of nanotechnology and its implications for organic farming.
- > Overview of different view points within the organic sector.
- > Proceed towards a common view (discussion).
- > Discuss next steps.

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## Structure of the meeting

- 15 min. Introduction to nanotechnology
- 30 min. Different view points (9x 3 min)
- 15 min. Comments & questions from audience
- 30 min. Structured discussion:
  - >General rejection or case-by-case approach?
  - >Main concerns? How to deal with knowledge gaps?
  - >How to proceed?
- 5 min. Concluding remarks

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## After the meeting

- If you agree, I will distribute
- > all presentations
  - > links to standards etc. on your Websites
  - > all E-Mail addresses

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## What does «nano» mean?

1 nanometer =  $10^{-9}$  m = 1 billionth of a meter

(German: 1 Nanometer = 1 Milliardstel Meter;  
nicht 1 Billionstel !)

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## What does «nano» mean?

**Nanoparticle: Particle smaller than 100 nm**

For comparison:

- > Water molecule: 0.3 nm
- > Virus: 20 – 300 nm
- > Smallest transistors: 350 nm
- > Red blood cell: 6000 – 8000 nm
- > Hair, diameter: 17'000 – 100'000 nm

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## What does «nano» mean?

Nano-technology: includes the manufacture and the use of nano-particles.

Note 1: there is no agreed definition of nano-technology.

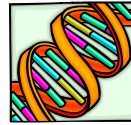
Note 2: regulation of nano-technology / nano-particles is still rudimentary.

Note 3: nano-particles need not be declared.

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## Nano-particles have always been there ...



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## ... but now, they have many additional, technical applications



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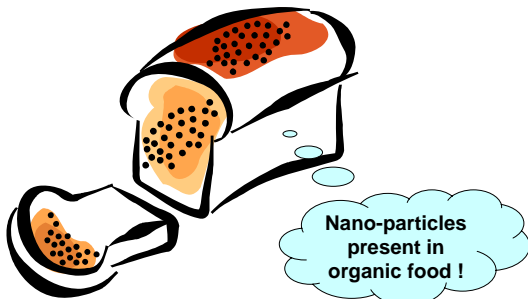
## Potential applications in organic farming

- > In several areas, organic farming uses non-organic «inputs». In the future, many of them will be available with nano-particle size.
- > Some hypothetic examples ...

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## «Nano-baking powder», «nano-vitamins» etc.



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## «Nano-coating» of chocolate



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### Fungicide with «nano-copper»

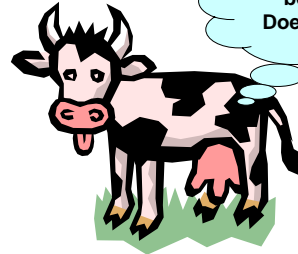


Substance allowed.  
How about nano-particle  
size?

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### Veterinary «nano-drug»



Lower dose and/or  
better health?  
Does it go into the  
milk?

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### Packaging with «nano-material»



Might save material,  
retain odour,  
anti-microbial effect,  
etc.

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### Processing equipment with «nano-surfaces»



Anti-microbial =  
more hygienic?

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### Characteristics of nanoparticles

Nanoparticles are highly diverse. Some common characteristics are:

- > Often highly reactive.
- > Often highly mobile in environment / crops.
- > Often highly mobile in human body.
- > Sometimes different properties than with normal particle size.

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### Criteria for inputs evaluation

- > The EU-funded project «Organic inputs evaluation» has developed criteria for evaluation of inputs.
- > These criteria could provide the **right questions** for our discussion (but **not the answers!**).



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## Questions for evaluation of nano-particles (1)

**Authorization for general use:** How are nano-particles regulated (plant protection, fertilizers, veterinary medicine, food additives, packaging, worker protection ...)?

**Origin:** How are nano-particles made? Are nano-particles «natural»? Is the manufacturing process more similar to mechanical-physical or to chemical-synthetic?

**Necessity:** Are nano-particles necessary for their intended use?

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## Questions for evaluation of nano-particles (2)

**Environment:** Do nano-particles harm the environment? How do we deal with knowledge gaps?

**Human health:** Do nano-particles harm human health? How do we deal with knowledge gaps?

**Organic farming principles & traditions:** consumer expectations (naturalness, food authenticity); food quality; ethical aspects; animal welfare ...

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### Acknowledgements:

- > Karin Nowack compiled much of the information.
- > FiBL has sponsored the room rent.

**Now, let us start the discussions !**

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