

## What is nano-technology?

### Definitions and examples of potential applications

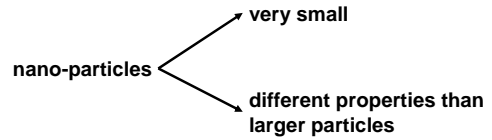
> Bernhard Speiser, FiBL

> IFOAM Organic World Congress, 20 June 2008

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## What are nano-particles?



A good definition should include **both** aspects.

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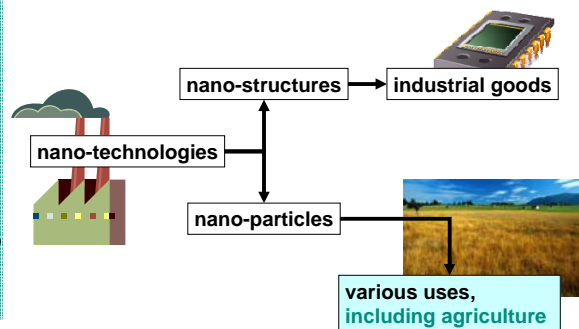
## Definitions

- > 1 Nanometer =  $10^{-9}$  m = 1 billionth of a meter.
- > Frequently used definition: particle smaller than 100 nm.
- > Alternative definition: smaller than 500 nm AND altered properties.
- > Note: there is no agreed definition of nano-particles.

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## nano-technologies / nano-particles

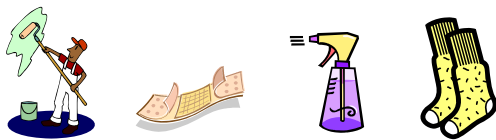
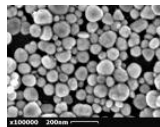


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## Most frequent nano-particles (1)

- > **Nano-silver** (anti-microbial): paints, cosmetics, disinfectants, textiles etc.



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## Most frequent nano-particles (2)

- > **Nano-titanium** (UV absorbant): sunscreens, paints.

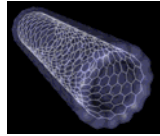


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### Most frequent nano-particles (3)

- > **Carbon nanotubes** (hollow fibers): plastics & sporting equipment, electronics & batteries.



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### How nano-particles are made

- > **Materials of origin:** often metals or metal oxides (e.g. silver, titanium-dioxide), or carbon structures (e.g. carbon nanotubes)
- > **Manufacture:** various physical or chemical processes
- > Often followed by company-specific **treatment to prevent aggregation** (confidential)

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### Examples for natural occurrence



Nano-particles



Nano-structures



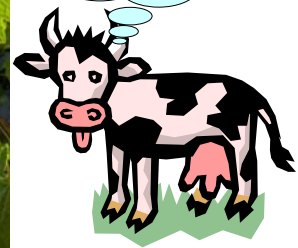
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### Potential applications in agriculture

pesticides,  
fertilizers

veterinary  
medicine, feed  
(e.g. vitamins)



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### Potential applications in the food sector

food  
additives

processing  
equipment



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### Potential applications in the food sector

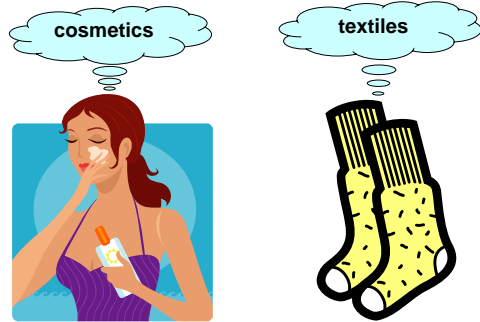
packaging  
materials



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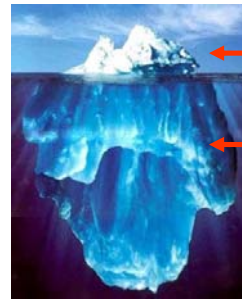
## Applications in the non-food sector



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## ... and other applications in the future?



Uses today

Future uses  
(some relevant for  
organic farming ?)

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## How to evaluate technologies / inputs

### General guidance: IFOAM basic principles

- > health, ecology, fairness & care

### IFOAM criteria for inputs evaluation (Appendix 1)

- > Necessity & alternatives
- > Source & manufacturing process
- > Environment
- > Human health
- > Quality
- > Social, economic & ethical considerations

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