Nano-particles in organic production? Issues and opinions

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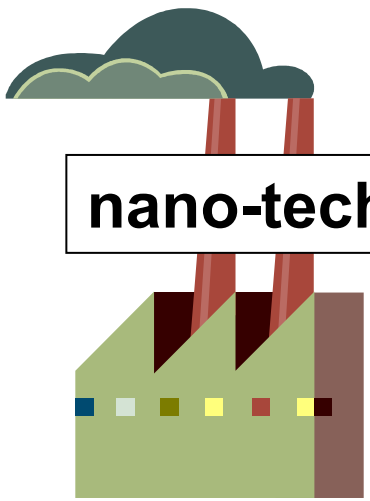
Overview

1. What are nano-particles?
2. Major issues (technical questions)
3. Some opinions in the organic sector

nano-technologies / nano-particles

nano-structures → industrial goods



nano-technologies

nano-particles

various uses,
including agriculture

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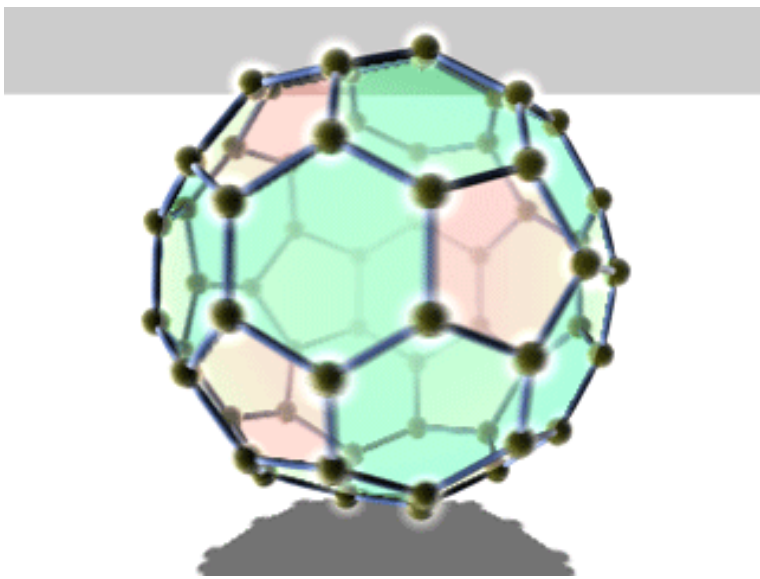
What are nano-particles?

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

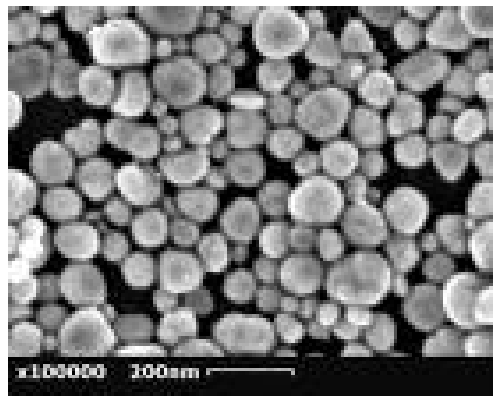
Nano-particle = Particle smaller than 100 nm. Size range of molecules.

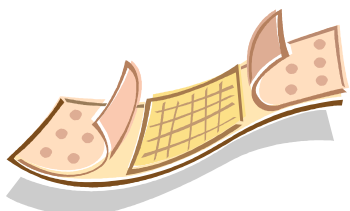
Note: physical & chemical properties may change in this range of particle size.

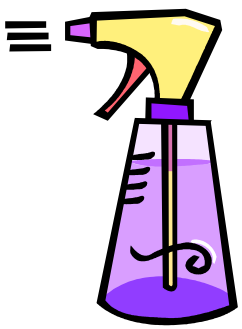


Most frequent nano-particles (1)

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







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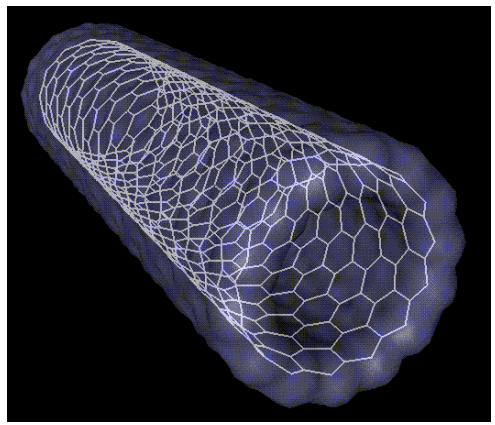
Most frequent nano-particles (2)

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

Most frequent nano-particles (3)

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



Major issues

- Heterogeneity: are all nano-particles the same?
- Are nano-particles natural?
- What are the potential benefits of nano-particles?
- What are the potential risks of nano-particles?

Are all nano-particles the same?

No. Nano-particles are a very heterogeneous group. Small size is their only common property.

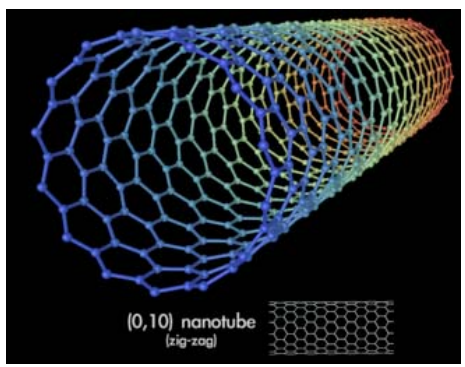
- **Manufacture: physical or chemical processes.**
- **Materials of origin: Natural or synthetic.**
- **Chemical structure: highly variable.**
- **Physical & chemical properties: highly variable.**
- **Uses: highly variable.**

Can we have a single opinion on such a diverse group?

Are nano-particles natural?

Nano-particles can be:

- **natural**
- **unintentionally produced, or**
- **engineered.**



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Potential benefits

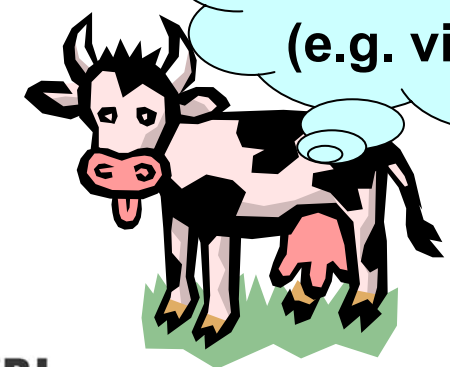
Nano-particles have numerous potential applications in the agriculture, food and non-food sector.

pesticides, fertilizers

food additives

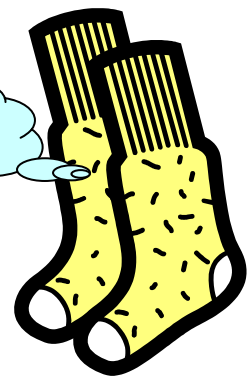
cosmetics

veterinary medicine, feed (e.g. vitamins)



packaging

textiles



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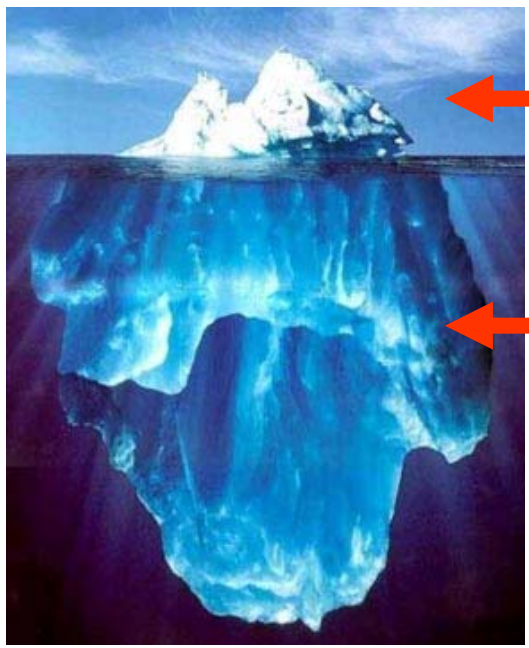
… and future potential benefits ?

Nano-technologies are key technologies of the 21st century, and huge research efforts are made in this field.

> New applications may become available in the future.



Uses today

Future uses (some relevant for organic farming ?)

Uncertainties concerning human health

- Routes for uptake (oral, dermal, lungs) ?
- Transport across cell membranes?
- Transport across the blood-brain barrier?
- Pathways & speed of excretion?
- Physiological / toxicological effects?

Many uncertainties …

Uncertainties concerning environmental impact

- Dispersal in the air?
- Dispersal in water?
- Mobility within plants?
- Mobility / accumulation along the food chain?
- Absorption in the environment (e.g. soil)?
- Aggregation (= particles are no longer nano-size)?
- Toxicity for various organisms?

Many uncertainties …

Level of regulation

Human health & environmental risks will have to be addressed by general legislation in the mid term.

> **Is it necessary for organic farming to make its own restrictions?**

Opinions

- **Soil Association: all uses of nano-particles currently excluded.**
- **Austria Bio-Garantie: nano-particles excluded from organic cosmetics.**
- **Discussion of stakeholders at BioFach 2008: more information needed, many still undecided. Need for another workshop at IFOAM World Congress 2008.**

The discussion continues …

Workshop this afternoon:

- **14.30 – 18.00 h**
- **Faculty of Law / Giurisprudenza**
- **Aula II**
- **In English**
- **I hope to see you there!**

Thank you for your attention !