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*Emerging Nanotechnology
Applications in the Field of oils
and fats*

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What is every industrial sectors desire ?

- *High-quality and smart products*
- *Low cost*
- *Safer*
- *Long lasting*

Nanotechnology

- ◎ *A new revolution in technology*
- ◎ *Affects most sectors of business such as food market.*

What is Nanotechnology?

- manipulation of biological and nonbiological structures with dimensions less than 100 nanometer

Nanotechnology Market

- By 2008:
- the total global demand for nanoscale materials, devices and tools will **cross \$28 billion.**
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Nanotechnology Market

- U.S. Nanotechnology market :
- \$3.3 billion by 2008
- cross \$19.8 billion by 2013

Nanotechnology Market

- ◎ United States has the largest share of global investment in Nanotechnology.
- ◎ Followed by **Japanese** market.

Nanotechnology Market

- ◎ The western European market :

A quarter of the market share in Germany, UK and France.

- ◎ The rest of the share in China, Russia, South Korea, Canada and Australia .

Nano food market

- The global nanotech food market will reach over \$20 billion by 2010. (The Helmut Kaiser Consultancy, 2004)

Nano food market

- More than 200 companies are active in research and development.
- US is the leader followed by Japan and China.
- By 2010, the market for nano food will be the biggest market for nano technology, led by China.

Food application

- 7 out of ten of the world's largest food companies are investing in nanotechnology research and development.

Food application

- Food packaging
- Disease treatment delivery methods
- New tools for molecular and cellular biology
- New materials for pathogen detection

Application in oils and fats

- A new delivery system for antioxidants produced by a company .
- Ready –to use clear solution
- Both Water and fat-soluble

Application in oils and fats

- ⦿ The product micelle is a nanoparticle with a 30 nm diameter
- ⦿ Can carry Vitamin C , Vitamin E , Q10 , Vitamin A
- ⦿ A good delivery system for both Vitamin C and Vitamin E

Application in oils and fats

- Frying oil refining catalytic device
- Inhibits thermal polymerization process of the frying oil

Application in oils and fats

- Reducing the surface particle size to the nano-level -- about 1/100,000th the width of a human hair,
- Exposes a huge surface area to the oil and diverts oxygen away from the oil

Application in oils and fats

- Unilever Company is developing low fat ice creams by decreasing the size of emulsion particles .

Application in oils and fats

- Micro-scale TiO_2 particles
- Clear plastic food wraps incorporating TiO_2 nanoparticles provide UV protection.