

Production of elemental selenium nanospheres

The invention of the researchers of the University of Debrecen makes it possible to produce high-purity red and grey elemental selenium nanospheres with the help of microorganisms used in the food industry.

Background

Selenium is an essential microelement with an antioxidant effect, and is a constituent of numerous enzymes. In Hungary it would be especially important to increase the selenium content of food and feed, since the soil in most parts of the country has a deficient level of selenium. A diet rich in selenium decreases the occurrence of oncological diseases by 30-50%.

Selenium forms various chemical compounds with different degrees of effectiveness, it can even be toxic in bigger quantities. It is known that elemental selenium has the lowest toxicity.

Invention and technology

The researchers examined how probiotic yoghurt bacteria transform inorganic selenium compounds into organic compounds. They also investigated the effect an overdose of inorganic selenium compounds has on bacteria. They found that certain bacteria protect themselves against the effects of a toxic quantity of selenium salts in a way that they produce elemental selenium within the cell. The elemental selenium thus produced is stored in the form of small, nano-sized globules. The nanoparticles produced by the bacteria can be retrieved and used as a basic component of comestibles, fodder and

medicine. The size of globules produced was between 100 and 500 nanometres, depending on the breed of bacteria; as regards the shape and size of the globules, a homogenous grain-size distribution is characteristic of the given breed of bacteria.

Commercial opportunity

The uniform size and shape and the spherical form are advantageous for microelectronic and pharmaceutical technologies, and promise a unique behavior as a constituent of comestibles and fodder as well.

The technology opens the way to the industrial production of nanoparticles, owing to its low cost and simplicity.

University of Debrecen and Dr. Alimment Ltd. with the inventors have established Bionanoferm Ltd., a spin-off enterprise for producing nanoselenium and researching its utilization possibilities.

The invention is protected by an issued US patent No. 8,003,071 and a pending Hungarian and European patent application.

Further steps

The University is currently seeking partners for the further development of the invention and for researching its utilization possibilities.



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