Development of Nanoencapsulates for Nutritional Use

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Fundación CARTIF is a leading Applied Research Centre created in 1994 as a non-for-profit association focused on applied research in Boecillo, Valladolid, Spain. In October 2005, it was established as a Foundation. In 2009 CARTIF carried out 127 R&D and innovation projects and served 124 customers, enjoying a total income up to 13,74 m€. Nowadays, CARTIF is formed up by 200 people, mainly engineers, scientists and senior researchers and has an international dimension with 21 international projects out of the 2009 projects, with partners in almost all the EU-25 countries, the non-EU Mediterranean ones and Latin America.

Fundación CARTIF coordinates and participates in **DINAMO Project (Development of nanoencapsulates for Nutritional Use**) in cooperation with other four Spanish Technological Centres: Centro Nacional de Tecnología y Seguridad Alimentaria (CNTA), Navarra, Asociación de Investigación de la Industria Agroalimentaria (AINIA), Valencia, AZTI Tecnalia, País Vasco and the Instituto de Biotecnología, (INBIOTEC), León.

The main project objective is the implementation of techniques and procedures, which should allow applying nanotechnology in the food sector. It is expected the development of nanoencapsules containing active compounds to be used as additive.

Specially, protection to active compounds such as beta-carotene, docosahexaenoic acid and casein phosphopeptides is searched using covering materials as milky proteins (β-lactoglobulin, casein) or cyclodextrins, which allow to reach nanometric size without jeopardizing safety in human food.

The Project development steps are:

- Development of encapsulating technology. Evaluation of encapsulating bottom-up strategies mainly in order to obtain nanoencapsulates with possible nutritional use.

- Characterisation of the obtained encapsulates. During the Project development characterisation methods as Dynamic Light Scattering (DLS), Environmental Scanning Electron Microscopy (ESEM) and Size Exclusion Chromatography (SEC) were set to measure nanoparticles size and weight. Laser Doppler Velocitimetry (LDV) technology was used to foresee suspended nanoparticles stability by means of the Zeta potential.

- Nanoencapsulates industrial feasibility was studied. An economical assessment of the selected techniques from the food process point of view will be carried out.

- Evaluation of nutritional safety and health aspects. Concerning nanoparticles safety in food uses, the (CE) 1333/2008 and (CE) 258/97 regulations of European normative state that every new food has to proof harmlessness before its commercialization. In the project, particularly, *in vivo* toxicity tests are being carried out with embryos of zebra fish to assess the toxicity of the nanoparticles.

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