The pilot demonstrator ATOMIZER - new technology of Carbon Dioxide-Assisted Spray Nebulization Drying

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The ATOMIZER demonstrator combines the spray drying technology, when the liquid to be dried is atomized by a rotary atomizer, with carbon dioxide assisted nebulization process in an original way. The atomization process takes place in two steps. In the first step, primary droplets are produced at the outlet of the rotary atomizer of special construction. In the second step, the primary droplets are divided in secondary droplets by the carbon dioxide expansion from the inside of primary droplets. The secondary droplets, usually in the form of microbubbles and nanobubbles, are rapidly dried by warm air stream at temperatures up to 60°C. A wide range of application forms - low density particles, composite particles, sterically stabilized liposomes, phytocepsules, microencapsulated particles or microbial cells, solid dispersions, dried single and multiple emulsions, nano- and microfibers and other - can be produced by this process. Wide range of new unique particles has already been prepared, including microparticulated proteins of canola, hemp, or sunflower seed. Microparticulated proteins exhibit a number of special properties relative to the proteins dried by a conventional spray drying process, such as improved solubility, dispersibility, foaming and emulsifying properties. Milk and whey, or egg white and melange gentle drying, or instant coffee production are just examples of many potential industrial applications of the unique and universal technology. The operating cost of the CASND technology does not exceed the cost of the conventional spray drying technology.

Publications AND Application Outlets

Papers:

Poster and Lectures:

IP and Application Outlets:
Czech Utility Model 30343: Multifunctional magnetic nanoparticles and nanomaterials.
Czech Utility Model 30344: Glutathione phospholipid complexes.
Czech Utility Model 23541: A superspaped native protein for use in the food industry.
Czech Utility Model Application PUV 2017-34347: A carrier for production of powders of fatty acids, oils, and hydrophilic compounds.
Czech Utility Model Application PUV 2017-34348: A carrier for enhancement of bioavailability of monacolin K and other bioactive compounds of filamentous and bacterium biomass extracts.

Awards:
Award of the Minister of Agriculture of the Czech Republic for the best applied result of research and experimental development in 2017. "Pilot plant technology of encapsulation of probiotic microorganisms in biopolymeric microparticles by spray nebulisation drying.
Award of the Minister of Agriculture of the Czech Republic for the best applied result of research and experimental development in 2017 (1st price). Technology of production of dried extract of hemp seeds, fortified by curcumin and encapsulated probiotic microorganisms.
IAAB Best Poster Presentation Award of your 2017 for research presentation, entitled "Preparation of Phospholipid Delivery System by CS-Assisted Spray Nebulisation" in the International Conference on Materials Science,Technology on 25th March 2017, Bhubaneshwar, India.