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Nano-clays vacuum technology in the food industry

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Clays with molecular sizes from 3Å to 5 Å were implemented in the dehydration of food. The system allows the concentration of vitamins, augmentation of inulin content, improvement of probiotics' bacteria count and preservation of more than 1000 products for periods longer than one year without employing chemicals. The process consists of using clays as filters in a vacuum chamber and tuning the changes of temperature and pressure by trial and error until the maximization of desired characteristics is obtained. Results showed that vitamin content could increase at least 5 times more than the natural product for the same analyzed quantity, for inulin content 3 times more and probiotics' bacteria count up to 5 times more. Other advantages include: the system does not use any contaminant substances during the drying process, not abrupt temperature changes take place, therefore, color and smells are preserved and concentrated, the discharge is only limited to water vapor, as a result, it is consistent with the guidelines for green technology. The drying cycles could vary between 5 to 18 hours depending upon the water and sugar content of the product, the surface area, and thickness, as well as the final presentation: powder or pieces. In addition, sub products development could result from the recovery of wasted material such as pasta from banana peels, cosmetics from mangosteen and shrimp peels, bromelain from pineapple stems, leather from tilapia skins, among others. Whenever sub products development was not possible, the waste was used for soil improvement by means of composting. Polymer nanocomposites usually have much better polymer/filler interactions than conventional composites (Ludueña et al., 2007). A uniform dispersion of nanofillers into a polymer matrix results in a very large matrix/filler interfacial area, which restricts the mechanical mobility of the matrix, and improves its mechanical, thermal (especially glass transition temperature – Tg), and barrier properties. The ratio of the largest to the smallest dimension of a filler is an important property known as aspect ratio. Fillers with higher aspect ratios have higher specific surface area, providing better reinforcing effects (Azizi Samir et al, 2005; Dalmas et al, 2007). In addition to the effects of the nanoreinforcements themselves, an interphase region of decreased mobility surrounding each nanofiller results in a percolating interphase network in the composite which plays an important role in improving the nanocomposite properties (Qiao & Brinson, 2009). For a constant filler content, a reduction in particle size increases the number of filler particles, bringing them closer to one another; thus, the interface layers from adjacent particles overlap, altering the bulk properties more significantly (Jordan et al., 2005).

Biography

Carla Idely Palencia-Aguilar is an Engineer. She has completed 4 Masters Degrees and 4 specializations in various engineering and management fields worldwide. Currently, she is a PhD candidate at the University of Central Florida and Lund University in Sweden. She has participated in exhibitions and as speaker in various conferences around the world for many years. She has also published various papers on topics such as agriculture; remote sensing, modelling, and land used optimization. She has been a consultant for various companies in Colombia-South America and at international level. She has also been widely involved in social work and sustainable development.

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