SUPERCRITICAL CARBON DIOXIDE INACTIVATION OF MICROORGANISMS IN SOLID MATERIALS

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Supercritical carbon dioxide (SC-CO_2) treatment has been largely shown to be a promising preservation method for liquids, as it induces microbial inactivation avoiding undesirable alterations of quality attributes of the sample. Due to the high potentials of the process, the research has been recently turned into the applications of SC-CO_2 treatment to solid materials.

Some examples of SC-CO_2 treatment will be presented and discussed concerning the inactivation of microorganisms commonly present on the surface of different solid matrices, in particular foodstuffs and medical devices.

As about foods, fresh cut carrot has been taken as test sample, and inactivation kinetic of both microflora naturally present and *Escherichia coli* spiked on its surface have been obtained as a function of different treatment conditions. With respect to biomaterials, cardiac interventional catheters have been investigated, and inactivation of bacteria and yeast inoculated on these samples has been studied as a function of operational conditions used.

The results obtained show the efficacy of supercritical CO_2 to inactivate the microorganisms present on the surfaces of both types of samples, at mild temperature (not higher than 40°C). In addition, SC-CO_2 allows to preserve quality (color and texture) and organoleptic attributes (taste, aroma, smell and appearance) of foodstuff and surface structure and composition of medical device, respectively. The obtained data clearly demonstrate the effectiveness of the process, suggesting that SC-CO_2 is a powerful innovative technology for the pasteurization/sterilization of solid food products as well as of thermo-sensitive biomaterials.