

# PRESERVING FOOD STRUCTURE AND TASTE BY SUPERCRITICAL CO<sub>2</sub> DRYING

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## Abstract

The most common dehydration process for food products is air drying. Air drying is a fast dehydration method, but unfortunately leads to an inferior product quality. The obtained products are characterized by a collapsed structure, and the sensorial aspects (color, smell, taste) and the nutritional value are negatively affected due to the exposure to high temperatures (65-100°C) and oxygen. Currently, high quality drying is largely obtained through freeze drying, which does not lead to degradation of color and nutritional value. However, freeze drying is an energy intensive process and often leads to texture loss due to freeze damage.

Preliminary tests showed that the usage of supercritical carbon dioxide (scCO<sub>2</sub>) for drying of food products resulted in a comparable product quality as obtained using freeze drying. Products are dried using scCO<sub>2</sub> at mild temperatures (20-50°C) and at medium pressures (7-15 MPa) [1]. Due to the low interfacial tension of water and CO<sub>2</sub> at these conditions, the structure collapse of the food products during dehydration is limited. To regenerate the CO<sub>2</sub> used, CO<sub>2</sub> is dehydrated using water adsorbents. This CO<sub>2</sub> regeneration is performed at the same pressure and temperature as the drying step, thus limiting the energy and CO<sub>2</sub> usage of this process.

In this presentation, results will be shown comparing food products that were dried using scCO<sub>2</sub> and freeze drying. This comparison was done by analyzing the water content, microstructure (SEM), rehydration behavior and color analysis. Furthermore, the effect of process conditions on the drying rate was studied.

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## References

- [1] Patent: 'Dehydration method'  
EP1771074, CN100527965, CA2570799, WO2005122776