

ABSTRACT

Abiad, Mohamad Ghassan. PhD, Purdue University, August, 2009. Thermal properties of food and pharmaceutical powders. Major Professor: Osvaldo Campanella.

Foods and pharmaceuticals are complex systems usually exposed to various environmental conditions during processing and thus storage, stability, functionality and quality are key attributes that deserve careful attention. The quality and stability of foods and pharmaceuticals are mainly affected by environmental conditions such as temperature, humidity, time, and processing conditions (e.g. shear, pressure) under which they may undergo physical and/or chemical transformations. Glass transition as well as other thermal properties is a key to understand how external conditions affect physical changes of such materials. Development of new materials and understanding the physico-chemical behavior of existing ones require a scientific foundation that translates into safe and high quality foods, improved quality of pharmaceuticals and nutraceuticals with lower risk to patients and functional efficacy of polymers used in food and medicinal products. This research provides an overview of the glass transition and other thermal properties and introduces novel methods developed to characterize such properties.