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## Fundamentals and consequences of water-solid interactions: Investigating vitamin C stability in powder blends

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A lthough known to affect product performance, the interactions of water with food components are not well-understood at a fundamental level, particularly in complex systems. There are five major mechanisms of water-solid interaction. These are: adsorption onto the surface of the solid particle, capillary condensation, deliquescence, crystal hydrate formation, and vapor absorption into the bulk of amorphous solids. Of these, absorption into amorphous materials and deliquescence are likely to have the greatest impact on food products and can lead to significant changes in physical and chemical properties, including phase transformations, changes in powder flow and caking, and degradation of bioactive and other ingredients. There are numerous reports of water absorption into amorphous materials and resulting effects in the food science literature. More recent studies by the author have increased awareness of the fundamentals and consequences of deliquescence and deliquescence lowering in crystalline ingredients and blends thereof. However, many powder food products and effects of moisture-mediated interactions in blends containing crystalline and amorphous solids is also important. This presentation will address the chemical and physical stability of vitamin C in a variety of formulations. Vitamin C is a deliquescent crystalline solid and is acknowledged as one of the most unstable vitamins added to foods. The declaration of the percent of the reference daily intake of vitamin C is mandatory on food labels, and therefore understanding its stability is important.

## Biography

Lisa Mauer is a professor in the Department of Food Science and the Whistler Center for Carbohydrate Research at Purdue University. Currently at Purdue, Dr. Mauer teaches food chemistry, food ingredient functionality, and food packaging courses. She is a Fellow of the Purdue University Teaching Academy. Her major research areas include water-solid interactions, shelf-life, and FT-IR spectroscopy method development, for which she has received the Purdue Agriculture Research Award and Faculty Scholar recognitions. Dr. Mauer is currently the interim director for the Center for Food Safety Engineering.

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