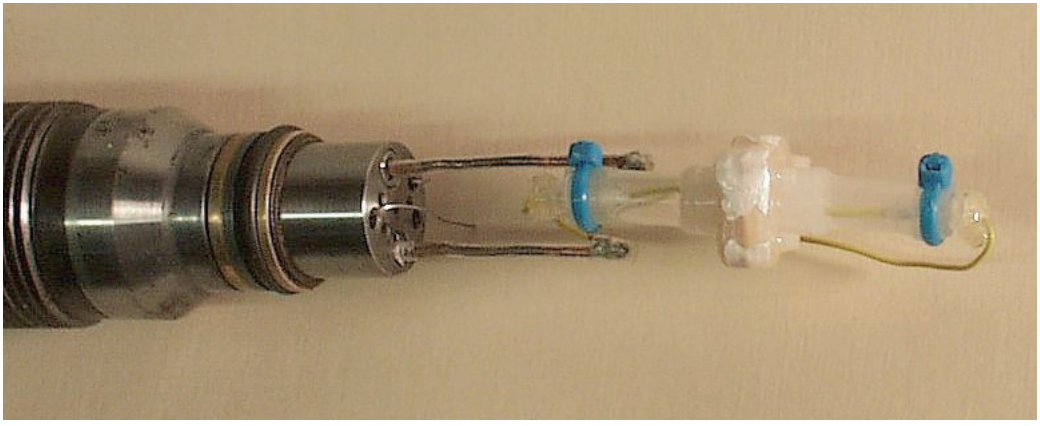
Center for Advanced Processing and Packaging Studies (CAPPS)

The Ohio State University, Steven Schwartz, Director, 614.292.2934, schwartz.177@osu.edu
North Carolina State University, Kandiyan Sandeep, 919.515.2444, kp_sandeep@ncsu.edu

Center website: http://www.fst.ohio-state.edu/CAPPS/index.html

High Pressure pH Probe



It has been thought for many years that the pH of various food systems may be reduced under pressure, yet to date there have been no means of studying this phenomenon. There has been a wealth of literature reporting the effect of pressure on inactivation of microorganisms in various buffer systems, yet it was known that the degree to which the pH lowering effect of high pressure is a factor in inactivation kinetics measured in different buffer systems. This High Pressure pH Measuring Device, or probe, developed at the Center for Advanced Processing and Packaging Studies (CAPPS), can determine the pH of fluids at extremely high pressures; on the order of 600 MPa (87,000 psi). No such device had been previously available to study acid / base equilibrium phenomena under extreme pressure conditions. High Pressure Processing is a technology that uses extreme pressures, instead of heat, to pasteurize foods. The probe is beginning to be employed commercially in the food industry for a number of high quality product applications such as processed meats, shellfish and the preservation of products containing heat-labile fruit and vegetables. The development of a high-pressure pH probe should finally enable a better understanding of the pressure / pH shift / microbiological effects.

Economic Impact: With this new probe as a research tool, it is becoming more possible to develop and select food acidulant systems that reach low pH levels under pressure (thus improving HPP antimicrobial effectiveness) yet allow for organoleptically acceptable products at 1 atm

when they are consumed. This is a development that could save many millions of dollars annually for the food processing and distribution industries.

For more information, contact Sudhir Sastry, 614.292.3508, sastry.2@osu.edu.

Continuous Microwave Sterilization of Fluid Foodstuffs

Equipment for pasteurization will benefit from continuous microwave sterilization technology.

Research at the Center for Advanced Processing and Packaging Studies (CAPPS) utilized technology that allows fluids to be continuously and very rapidly heated, in a tube, by a focused microwave source. Aseptic processing of fluid foods has been practiced by industry for a fairly long time, but the quality of foods produced conventionally, by indirect heat transfer through the walls of a tube, has been limited by the rate at which the food can be heated to pasteurization/ sterilization temperatures. To eliminate microorganisms, the food must be exposed to a certain target temperature for a defined period of time; slow heating will degrade the quality of food during heat-up. This is a particular problem with highly viscous fluids that tend to have poor heat transfer rates from a heated wall. By conducting heat with microwaves, heating rates can be substantially increased with dramatic improvement in quality, without the need for scraped surface heat exchangers and large surface area heat exchangers. Continuous microwave processing may be further extensible to food systems with particulates.

Economic Impact: This innovation makes possible a number of viscous food products to be prepared with a significant improvement in quality. It should result in substantial economies in the food processing industry.

For more information, contact Josip Simunovic, 919.513.3190, josip_simunovic@ncsu.edu or Ken Swartzel, 919.513.2063, ken_swartzel@ncsu.edu.