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Pressure BioSciences, Inc. Comments On Using Improved Sample Preparation to Detect Food Contaminants

SOUTH EASTON, Mass., July 16, 2009 (GLOBE NEWSWIRE) -- Food contamination continues to dominate the headlines. Whether it's a widespread pistachio recall, dangerous ground beef products, or cookie dough contaminations, these shocking incidents have sent federal microbiologists out into the field to perform the detective work necessary to uncover the sources of disease-causing strains of food-borne bacteria.

"The key here is the phrase 'detective work,'" says leading expert in high pressure bioscience and biotechnology, Dr. Edmund Ting, Senior VP of South Easton, MA-based Pressure BioSciences, Inc., (Nasdaq:PBIO) who has spent years researching the effects of high hydrostatic pressure on pathogens that contaminate the food supply, such as E. coli, Listeria, and Salmonella. Dr. Ting believes that improvements in food safety depend on the rapid and accurate detection of food-borne pathogens, both in pre-release quality control testing and in post-outbreak investigations. Such detection depends to a great extent on the quality of the extraction of the DNA, RNA, and proteins ("biomolecules") from the pathogens contaminating the food.

"Current extraction methods rely principally on heat, electrical charge, sonication, homogenation, bead beating, and chemical partitioning, all of which can alter and sometimes even destroy sensitive, important biomolecules (such as proteins), or fail to liberate them from complex biological structures," explains Dr. Ting. "Consequently, it may be difficult to find the contaminating pathogen if the sample preparation method cannot reproducibly and effectively extract the pathogen's biomolecules from the food sample prior to testing."

New sample preparation technologies continue to be developed, enabling scientists to extract biomolecules related to food-borne and other pathogens more quickly, accurately, and efficiently than ever before. One example cited by Dr. Ting, pressure cycling technology (PCT), employs cycles of hydrostatic pressure between ambient and ultra-high levels (up to 35,000 psi and greater) to safely, reproducibly, and efficiently release DNA, RNA, and proteins from food, plant, and biological samples within minutes, allowing for more rapid and accurate downstream testing.

At present, PCT technology is being used by approximately seventy-five laboratories around the world, mostly in the areas of biomarker discovery (to detect markers for cancer, stroke, neurological disease, etc.), soil and plant biology (to detect pathogens harmful to food crops, such as wheat and strawberries), forensics (mostly in the detection of DNA), human disease (to detect microbes that live on or in the human body), and counter-bioterror applications. Currently, several USDA laboratories are employing the technology, as is at least one laboratory of the Food and Drug Administration (FDA).

Dr. Ting believes that the issues affecting the quality of sample preparation in the food safety industry are fundamentally the same as those facing the biotech drug discovery and development laboratory. Traditional sample preparation methods are difficult to reproduce due to user variability, sample collection contamination, and the fundamental process limitations of the basic extraction technology. Conversely, PCT uses pressure, a bio-physical force that is instantaneously and uniformly transmitted to all points within the disposable sample container, thus offering the potential to standardize the sample preparation process, a significant advantage to any method.

"Current sample preparation methods used in the food industry may fail to preserve sensitive and important biomolecules, especially proteins, or fail to liberate them from complex biological structures," explains Dr. Ting. "It may be difficult to effectively find the contaminating pathogen if the sample preparation method cannot reproducibly and effectively provide proper preparation of the sample, in order to efficiently release pathogen DNA, RNA, or proteins from the food sample prior to testing and analysis."

The food safety spectrum involves not only bacteria pathogens but also allergens and genetically modified organism (GMO) issues. Explains Dr. Ting, "all of these areas will depend on effective sample preparation methods. Having speed, increased reproducibility, the opportunity for greater accuracy, and the ability to standardize the preparation of the samples to be tested, will better allow for 'hold and release' strategies, which should further enhance food safety."

Dr. Ting concluded, "higher levels of quality are now being expected from the food industry, and the scientific community is being asked to develop better ways to increase the safety of the world's food supply. To that end, we believe that new sample preparation methods, such as PCT, will begin to play more important roles in the identification of food-borne pathogens going forward."

For more information, log in to www.irgnews.com/coi/PBIO.

CONTACT: Investor Relations Group
Janet Vasquez
212-825-3210
jvasquez@investorrelationsgroup.com