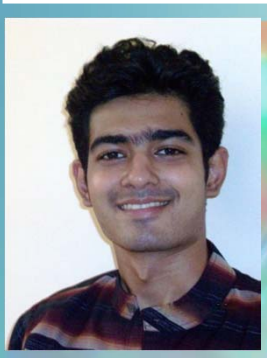
FST Lunchtime Seminars

Host: Dr. Liu Mei Hui **Date:** 14th March 2014, Friday
Time: 12 to 1 pm **Venue:** Seminar Room S14-06-19



Effect of Different Factors on the Antibacterial Effect of Light Emitting Diodes on Foodborne Pathogens

By Mr. Vinayak S. Ghate
FST PhD student; B. Tech. in Food Engineering & Technology from the Institute of Chemical Technology, India

Abstract

Pathogenic contamination of fresh produce is a global problem. In order to overcome this problem, scientists have been trying to shift from traditional thermal technologies or the use of chemicals to more novel technologies over the years. One such novel technology which looks promising is the use of light-emitting diodes (LEDs).

LEDs have been shown to have an antibacterial effect as a result of their photodynamic action. In this study, the effect of LEDs on four foodborne pathogens – Escherichia coli O157:H7, Salmonella Typhimurium , Listeria monocytogenes and Staphylococcus aureus was investigated. The parameters which are likely to affect the inactivation of these pathogens in a food matrix were also studied. The wavelength of the LEDs, the illumination temperature, the pH of the medium and the predominant acid in the medium were all determined to have a significant influence on the inactivation of the pathogens. LEDs with a peak wavelength in the blue region of the electromagnetic spectrum were observed to be the most effective in producing an antibacterial effect. A lower illumination temperature (10°C or 15°C) was found to be much more effective in aiding the LED inactivation than a higher temperature (20°C). An acidic pH was found to aid more the inactivation of Gram positive pathogens, while an alkaline pH was found to aid more the LED inactivation of Gram negative pathogens. Of the weak acids studied, lactic acid was observed to be more effective in facilitating the LED inactivation of the pathogens.

This study has demonstrated the potential of the use of LEDs as a novel food preservation technology. Future efforts need to be directed towards elucidating the mechanism of the LED inactivation and increasing the spectrum for the technology's application.

Characterization of Aged Infant Formula and the Changes in Its Physicochemical Properties

By Ms. Tham Wei Yi Tammie
FST PhD student; B. Sc. In Food Science and Technology from University of New South Wales, Australia

Abstract

Infant formulas are products that contain specific compositions of essential ingredients, bioactive and functional compounds. Due to the complexity of the matrix, it may result in instability of certain ingredients which can affect the overall functionality of the product. An example of such instability is caking, whereby free-flowing powder form lumps or cakes during prolonged storage.

This research was aimed to establish the understanding of caking mechanism and aid the industry in preventing undesirable changes. Experimental ageing tests were conducted at 25°C, 45°C and 60°C incubators over a period of 1 – 8 weeks. Various physicochemical properties were measured.

Infant formulas containing different types of proteins were characterized and stepwise regression was conducted on glass transition (obtained via TMCT) to determine the various parameters which may contribute to the caking process. Apart from lactose crystallization analysis via X-ray diffraction analysis, confocal laser scanning imaging revealed that surface fat on the various formulations could have also contributed to the caking process.