J Food Process Technol 2012, 3:10
http://dx.doi.org/10.4172/2157-7110.S1.010

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Exhibition on
Food Processing & Technology

November 22-24, 2012 Hyderabad International Convention Centre, India

Applications of ultrasound in food industry

Gokulakrishnan Palanisamy
Indian Veterinary Research Institute, India

Ultrasound is well known to have a significant effect on the rate of various processes in the food industry. Using ultrasound, full reproducible food processes can now be completed in seconds or minutes with high reproducibility, reducing the processing cost, simplifying manipulation and work-up, giving higher purity of the final product, eliminating post-treatment of waste water and consuming only a fraction of the time and energy normally needed for conventional processes. The advantages of using ultrasound for food processing includes: more effective mixing and micro-mixing, faster energy and mass transfer, reduced thermal and concentration gradients, reduced temperature, selective extraction, reduced equipment size, faster response to process extraction control, faster start-up, increased production, and elimination of process steps. Food processes performed under the action of ultrasound are believed to be affected in part by cavitation phenomena and mass transfer enhancement. Ultrasonic is a rapidly growing field of research, which is finding increasing use in the food industry for both the analysis and modification of food products. The sound ranges employed can be divided into high frequency, low energy diagnostic ultrasound and low frequency, high energy power ultrasound. The former is usually used as a non-destructive analytical technique for quality assurance and process control with particular reference to physicochemical properties such as composition, structure and physical state of foods. Nowadays, power ultrasound is considered to be an emerging and promising technology for industrial food processing. The use of ultrasound in food processing creates novel and interesting methodologies which are often complementary to classical techniques. Various areas have been identified with great potential for future development: bleaching, crystallization, drying, degassing, filtration, extraction, freezing, homogenization, meat tenderization, sterilization, tempering, etc. There is a wide scope for further research into the use of ultrasound in food processing both from an academic and industrial viewpoint.

vetgokul@gmail.com

Numerical method for solving diffusion equation of dehydration process using DIC technique

Hafizah Farhah Saipan Saipol[1], Norma Alias[2], Nur Aminah Mahmud[3] and Asnida Che Abd. Ghani[1]
[1]Department of Mathematics
[2]Ibnu Sina Institute, Faculty of Science
[3]Jabatan Sains dan Perkhidmatan (Matematik), Program Sepenuh Masa UTMSpace, Universiti Teknologi Malaysia, Malaysia

Drying which involves heat and mass transfer phenomena is a suitable alternative for post-harvest tasks. However, there are many applicable methods of drying such as freeze, vacuum, osmotic, fluidized bed and other methods. Another alternative method of drying is DIC technique. The DIC (Détente Instantanée Contrôlée or instant controlled pressure drop) technology which was initially developed by Allaf *et al.* (since 1988) in the University of La Rochelle, France, applies instant pressure-drop to modify the texture of the material and intensify functional behavior. (Setyopratomo *et al.*, 2009). DIC technique has the following advantages compared to the conventional methods such as short time processing, low cost, low energy consumption and is an environmental friendly process. The dehydration process of DIC is available to predict using mathematical modeling. This paper focuses on the mathematical modeling based on PDE with parabolic type to govern the dehydration process using DIC technique in order to visualize the dehydration process. The mathematical modeling is derived from Allaf's formulation based on diffusion Fick's law (Allaf, 1982). The modeling will be discretized implicitly by using Finite Difference method based on Crank Nicolson method. The simulation of the dehydration process will be illustrated through some iterative methods; Jacobi, Gauss Seidel, Red Black Gauss Seidel and Successive Over Relaxation (SOR) method. The platform of simulation runs on Matlab 7.6.0 (R2008a) programming supported by Intel®Core™ based on Quadcore processor. The numerical analysis of some iterative methods in terms of number of iterations, time execution, maximum error and computational cost are compared. As a conclusion, the DIC process can be derived based on the numerical results which are obtained from the discretization of PDE.

Biography

Hafizah Farhah Saipan Saipol is a PhD student in Mathematics at the Universiti Teknologi Malaysia (UTM), Johor Bahru. She received her Bachelor of Science in Industrial Mathematics from Universiti Teknologi Malaysia (UTM) in 2009. Her main research interests include Numerical Computation and High Performance Computing on Distributed Parallel Computer Systems.

msc.hafizah@gmail.com