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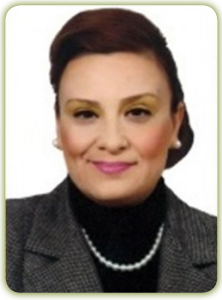

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Improved food preservation and shelf life stability by ultrasound processing technologies: Case studies

Ultrasound is one of the emerging technologies that were developed to minimize processing, maximize quality and improve the food product preservation and the quality. Ultrasound (US) is applied to impart positive effects in food processing such as improvement in microbial inactivation, mass transfer, inactivation or acceleration of enzymatic activity to enhance shelf life, assistance of thermal treatments and texture manipulation, facilitating the extraction of various foods/plants and enhancing of bioactive components of foods. US generally uses intensities higher than 1Wcm-2 at frequencies between 20 and 1000 kHz, that are disruptive and induce effects on the chemical-biochemical, physical, or mechanical properties of foods and can be used in preservation and safety and are applying to food enzymes, in microbial inactivation, in ultrasound assisted extraction. Also, US can be used for improved sensory, texture and color quality and microbial stability of plant food resources including fruit and vegetables, fruit juices, peels, oils and fat-based products, cereals products as bread dough, batters and biscuits, food pastes.

US can be used for stimulation of living cell activity (algal activity etc.) or sonochemical destruction, stimulation of ezymatical activity or controlled denaturing of unwanted enzymes, improved extraction, improved impregnation, improved homogenization (for milk, for whey etc.), prevented oxidation of foods, improved texture (for cheese making, for chocolate manufacturing), for meat tenderness, for emulsion stability of foods, for crystallization and freezing, for filtration and drying. The monitoring the attenuation of an ultrasound pulse has been proved possible to determine the degree effects. Besides, the measurement of ultrasound velocity in conjunction with attenuation can be used to estimate the degree of emulsification in such foods. The use of an ultrasound process during the mixing step of foam production in foods may lead to better quality products.

We deal with the determination of the improved qualities of chocolate manufacturing, cheese making technology by ultrasound processing as case studies. Chocolate quality is highly dependent on tempering stage of the manufacturing process owing to tempering is critical for reducing processing failures and ensuring a quality end product. 150 kHz of application for cocoa mix gave the pleasant texture, good mold stability, stable shelf-life and good resistance to fat bloom. The effects of US treatment on the lipid oxidation stability in whey for gravyer cheese, lor cheese making and for cheese-based sweet manufacturing were determined at 400-600 kHz of frequencies. Fatty acids, major phospholipids and texture quality were good and US can be utilized in whey processing applications with no negative impact.

It was concluded that the approach of ultrasound applying to assist food preparation could be of great interest to food manufacturers for the innovative and safe food products.

Biography

Ozlem Tokusoglu has completed her PhD at Ege University Engineering Faculty, Department of Food Engineering at 2001. She worked as a research fellow/ doctor assistant/ assistant professor/associate professor at Ege University and Celal Bayar University during 1993 to now. She is currently working as Associate Professor faculty member in Celal Bayar University Engineering Faculty Department of Food Engineering. She performed a visiting scholar at the Food Science and Nutrition Department /University of Florida, Gainesville-Florida-USA during 1999-2000 and as visiting Professor at the School of Food Science, Washington State University, and Pullman, Washington, USA during April-May 2010. She organized and directed as Conference Chair the International Congress entitled ANPFT2012 (Advanced Non-thermal Processing in Food Technology: Effects on Quality and Shelf-Life of Food and Beverages in May, 2012 at Turkey. She served as organizing committee member at 2nd International Conference and Exhibition on Nutritional Science & Therapy Conference in July 2013 at Philadelphia, USA. She has published many papers in peer reviewed journals and serving as an editorial board member of International Journal of Food Science and Technology (IJFST) by Wiley Publisher, USA and Polish Journal of Food and Nutrition Sciences (PJFNS) in Thomson Reuters. She published the scientific edited two book entitled Fruit and Cereal Bio-actives: Chemistry, Sources and Applications by CRC Press, Taylor & Francis, USA Publisher and entitled Improved Food Quality with Novel Food Processing by CRC Press, third book Food By-Product Based Functional Food Powders is also in progress.

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