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Deactivation of allergens in some foods using ultrasound

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Allergenic foods include foods from both plants and animals such as peanuts, tree nuts, wheat, soy, cow's milk, eggs, fish, and shellfish. Typically proteins known as allergens or antigens, in their presence immunological mechanisms can elicit acute response in sensitized/allergic individuals. Food allergy and sensitivity to immunoglobulin E (IgE)-mediated reactions are becoming more serious health issue in recent years with the number of novel food products and ingredients launched on the market by the industry.

During processing, interactions between proteins and other ingredients can lead to structure and conformation modifications and induce allergenicity. Otherwise, some allergens show a resistance to process and in this point, effective process parameters or deactivation techniques to reduce their allergenicity are needed.

A number of thermal and nonthermal food processing technology for reducing allergenicity have been studied on various allergenic foods. Ultrasound is an emerging technique in food industries, frequently used for homogenization, emulsification, meat tenderization (meat), and fruits and vegetables dehydration processes.

Ultrasound uses high energy mechanical waves, cavitation bubbles are formed which induces cyclic generation and collapse of cavities followed by formation of localized region of high pressure and temperature surrounding these collapsed cavities which can bring about conformational changes to food proteins and thereby influence their allergic reactivity by such as altering allergen epitopes.

Understanding of the mechanisms of deactivating food allergens in foods by ultrasound treatment may be a good approach for food allergy/sensitization for food industry.

In this presentation the application of ultrasound for potential reduction of food allergenicity and some results of our project titled "effect of Maillard reaction on the allergenicity of proteins in chicken and shrimp, their protein isolates and hydrolyzates" will be highlighted.