

Abstract

Heating Foods
Integrating quality and safety in thermal processes

Mafalda Quintas, Teresa Brandão^(*) & Cristina L.M. Silva

*CBQF – Centro de Biotecnologia e Química Fina
School of Biotechnology, Regional Center of Porto
Catholic University of Portugal*

The main objective of the food industry is to produce safe products, a criteria requested by consumers as well as governmental entities. However, product's quality is also another important aspect that can never be questioned.

It is well known that thermal processes are the most efficient in terms of inactivating non desirable microorganisms and enzymes, and therefore continue to be used intensely to prolong products shelf life. Although initially processes were mainly designed to ensure the required safety level, along the last few decades a lot of research investment has been made to search for conditions minimizing the negative effect of thermal treatments on quality (e.g. sensory and nutritional). Tools such as mathematical modelling of transport phenomena (heat, mass and momentum) and kinetics of inactivation and degradation of microorganisms/enzymes and quality factors, respectively, can and should be more and more used to optimize food processing conditions. Quality and safety studies have to be well integrated in order to develop products most suited for the consumer and the global market.

Recently, thermal processes have been also combined with other non-thermal technologies (e.g. ultrasound, high pressure, ozone or ultraviolet radiation). The goal is to extend shelf life with minimum impact on food quality.

This work presents the main achievements of the research group LOPA, (<http://www.esb.ucp.pt/lopa/>) from CBQF, on this field.

Keywords: modelling; kinetics; safety; quality factors

(*) Author presenting the work

Authors Short Biography

Mafalda Quintas got her PhD degree in Food Science and Technology from Universidade Católica Portuguesa (2007). Currently she is developing work on modeling the chemical and physical phenomena in foods during processing. Her main research focus is on proposing modelling approaches that provide information not only of the observed response but also on the underlying phenomena giving origin to the observed responses.

Teresa Brandão got her B.Sc. degree in Chemical Engineering from University of Porto, Portugal, in 1990, her Master (curricular part) in Food Science and Technology in 1992 and her Ph.D. degree in Biotechnology from College of Biotechnology, Portuguese Catholic University, in 2004. In 2004 she became a researcher in Centre of Biotechnology and Fine Chemistry of College of Biotechnology, Portuguese Catholic University. She authored 5 book chapters, she published 26 articles in referred international journals and co-authored more than 60 communications in scientific meetings. Her research interests have been focused on food processing (thermal and non-thermal), modelling quality and safety attributes of food products (e.g. kinetics of quality changes and predictive microbiology) with emphasis in statistical experimental design procedures.

Cristina L.M. Silva is an Associate Prof. at Portuguese Catholic University – College of Biotechnology and is a member of the Direction Board of the research Center of Biotechnology and Fine Chemistry – INTERFACE A⁴ at ESB. Cristina L.M. Silva is a Chem. Eng., and PhD in Biotechnology and Food Engineering. She is involved in research on quality and safety of foods and the leader of the laboratory LOPA (www.esb.ucp.pt/lopa/). She has been involved as a responsible partner or coordinator of national and international projects. Recently, she has been involved in the coordination of LLP, Erasmus Mundus and FP7 projects. Her research interests are focused on: (i) design and optimization of food process conditions; (ii) predictive microbiology as a tool to optimize food processes; (iii) evaluation of food quality changes due to conventional and novel processing; (iv) evaluation of food quality and safety changes during storage; (v) formulations of new food products and (vi) design and optimization of ethylene oxide sterilization of medical devices. Cristina L.M. Silva is also coordinator of the networks ISEKI_Food 3 and ISEKI_Mundus 2 (<https://www.iseki-food.net>), and president of IFA Association (<https://www.iseki-food.eu>). She is a member of: Executive Committee of EFFoST (www.fffost.org/), responsible for the TG (task group) on European Cooperation; and International Division of IFT (<http://www.ift.org/divisions/international/>).