Using fuzzy set theory for determining toxicity thresholds of product

Nouara Ouazraoui
Laboratory of Research in Industrial Prevention (LRIP), Health and Occupational Safety Institute
University of Batna, Road Med El-Hadi Boukhlouf, Batna 05000, Algeria.
ouazraoui@yahoo.fr

Rachid Nait Said
Laboratory of Research in Industrial Prevention (LRIP), Health and Occupational Safety Institute
University of Batna, Road Med El-Hadi Boukhlouf, Batna 05000, Algeria.
r_nait_said@hotmail.com

Mouloud Bourareche
Laboratory of Research in Industrial Prevention (LRIP), Health and Occupational Safety Institute
University of Batna, Road Med El-Hadi Boukhlouf, Batna 05000, Algeria.
mouloud.bourareche@hotmail.fr

Abstract

The quality control of a product is a major and permanent preoccupation of productive enterprise in particular an agribusiness industry. Indeed, the products no conform to the requirements for quality imposed by the standards and the regulations, present risks for the producers and the consumers. Among these products and which is of important nutritional interest, the milk whose composition, the physicochemical properties, make of it a medium very favorable to the multiplication of the pathogenic micro-organisms. The quality of this product thus depends, amongst other things, of the heat treatment aiming at destroying the pathogenic bacteria lasting the phase of pasteurization. Values thresholds establishment of variation parameters of the thermo-resistance of pathogenic micro-organisms is presented as intervals. Consequently, it is often difficult to fix exact values of these parameters to have a good pasteurization. To overcome this difficulty, the objective of this paper consists in proposing the application of fuzzy logic like alternative for values establishment for more precise thresholds. The fuzzy model using fuzzy rule-based system in order to generate adequate temperature and time for a complete deterioration of the pathogenic bacteria in milk. The fuzzy model suggested will be validated by applying it to a process of pasteurization on the Aurès-Batna dairy.

Keywords
Thresholds of toxicity, Pasteurization, Fuzzy rule-based system

Acknowledgements

We thank the leaders of the dairy Aures Batna for help to accomplish this work

Biography

Ouazraoui Nouara, is an Assistant Professor, Head of licence in "Risk Assessment" and supervisor of Master thesis’s at Health and Safety Institute, Batna university, Algeria. Member of Laboratory of Research in Industrial Prevention (LRIP) at the same Institute (Batna University). Member of research project "Quantitative Risk Assessment and Safety Systems Performances: Contribution of Artificial Intelligence Techniques". Her research
interests include quantitative risk analysis and application of fuzzy sets and possibility theories in risk assessment. She got the best Track Paper for the 2015 IEOM Conference: Artificial Intelligence Track.

**Nait-Said Rachid**, Professor, Head of Master in “Risk Assessment” and supervisor of Master and Ph.D thesis’s at Health and Safety Institute, Batna University, Algeria. Member of the scientific council of Health and Safety Institute. Member of Laboratory of Research in Industrial Prevention (LRIP) at the same Institute (Batna university). Chief of research project "Quantitative Risk Assessment and Safety Systems Performances: Contribution of Artificial Intelligence Techniques". His research interests include application of fuzzy logic to fault diagnosis and risk assessment.

**Bourareche Mouloud**, is an Assistant Professor and supervisor of master thesis’s at Health and Occupational Safety Institute, Batna University, Algeria. Member of Laboratory of Research in Industrial Prevention (LRIP) at the same Institute (Batna university). Member of research project "Quantitative Risk Assessment and Safety Systems Performances: Contribution of Artificial Intelligence Techniques". His current research interests include application of fuzzy set and possibility theories to the assessment of safety barrier performance.