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***Food Safety Management in the cold chain through "expiration dating"***

An open expiration date (eg use by XXXX) may be a useful means to ensure that a refrigerated food will not be consumed past a date at which it will become unsafe while in distribution in the cold chain. This assumes that the date is the management tool and such date can be calculated using various pathogen growth kinetics models using data for growth at constant temperature. This assumption is wrought with three problems that could result in an adulterated and unsafe food being consumed before the food reaches the expiration date: (1) it assumes growth models based on measurable lag and log phase kinetics, but we also need to know the initial level of the pathogen and knowledge of the growth rate at below detection levels, i.e. time to detect; (2) It assumes that distribution is at constant temperature while in the real world it will vary; (3) It assumes that if temperature changes, growth kinetics will immediately follow the predicted rate at the new temperature (no history effect). This presentation will give a very simple review of the principles of growth kinetics using examples for *Listeria*, as well as other pathogenic organisms. The use of both chemical and RFID (radio frequency identity) time temperature integrator tags (TTI) placed on food packages to essentially integrate the time-temperature history and indicate actual shelf life left will be evaluated with respect to cold chain management. Such a tag would be used to make a conservative estimate of time to detect a pathogen for cold chain management, thus integrating biology with chemistry and electronics. This will be contrasted with the growing area of nano-technology applications for detecting organisms. Thus the time to end of shelf life based on safety criteria would be solved by labeling with the expiration date along with a statement such as "use by the date indicated unless the tag turns red". Shipping based on least shelf life left will reduce loss of quality and any potential injury due to pathogens.