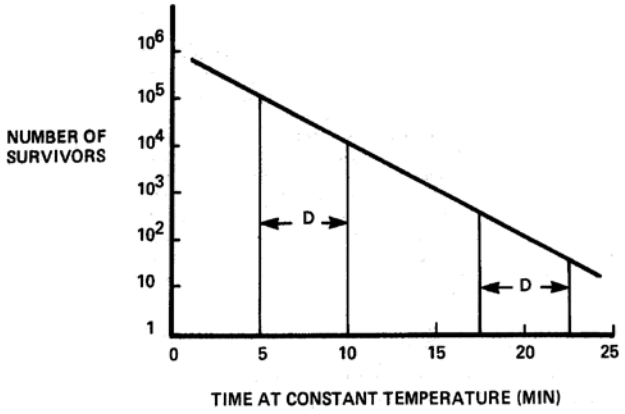
Worthwhile Operational Guidelines & Suggestions

BROILER PROCESSING TIMELY INFORMATION – AUGUST 2010

Establishing a Thermal Process to Eliminate Pathogens

It is well known that heat is an important and effective step to kill/eliminate bacteria from foods. Cooking temperatures must be adequate to ensure the safety of ready-to-eat meat and poultry products. While designing thermal processes, thermal resistance of the bacteria as well as heating characteristics of the foods being manufactured must be taken into account. The thermal death time (TDT) basically refers to the amount of heat necessary to kill microorganisms in a food matrix. We all know that heat cannot be an independent factor; hence, it is critical to know "how much heat for how long" in order to design an effective kill step within a process. So, while determining the TDT of a given bacteria, the most common term used is a D-value. The term "D-value" (aka: Decimal reduction time) means the time for which a product needs to be held at a known temperature to obtain 90% (1-log) reduction in the bacterial populations. As most of us know that if we cook a product to a higher temperature the chances of killing bacteria increase, therefore "higher the temperature - lower the D-value". Decimal reduction time (D-value) is calculated as the negative reciprocal of the slope of the survivor curve. The temperature at which a D-value applies is indicated by a subscript, e.g. D_{55}. A D-value can be obtained from a plot of log survivors of bacteria *versus* time. The figure above illustrates the time it takes to reduce bacterial populations by 1-log cycle (i.e., 5 minutes to reduce populations from 10^5 to 10^4). Knowledge of the D-values for food-borne pathogens is crucial in designing and/or validating thermal intervention step(s) in your fully-cooked products/processes.



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