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Title: A Computerized Procedure for Estimating Chemical Changes in Thermal Processing Systems

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**Abstract:** Chemical changes caused by heating in a continuous flow, helically coiled tube indirect UHT process system were evaluated and compared to a non-flow, vat process system. On the basis of known formulas for evaluating bacterial destruction, a computerized procedure was developed to estimate the rates (R) and accumulated values ( $L_d$ ) of chemical changes in the various stages of the UHT and vat thermal processes. Data were based on 149°C for 3.3 sec holding time in the continuous flow UHT process and compared to 82°C for 30 min holding time in the non-flow vat process system. The heat effect of the above heat treatments based on the 121°C reference temperature and a z-value of 7.2°C was approximately equal to 1.0 for the non-flow vat process and equal to 0.8 for the continuous UHT process. For UHT and vat processes that have  $L_d$  values equal to 1.0, the residence times in the holding sections were, 4.2 sec and 30 min, respectively,. Approximately 10% of the overall chemical changes occurred during the heating period for both processes, 86.1% approximately during the holding periods and 1.5 and 6%, respectively in the UHT and vat processes during cooling.

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