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Influence of product-entrapped air and venting on lethal effect in model domestic pressure canner studies

P. WAMBURA¹, J. C. Anderson, and L. T. Walker¹. (1) Dept. of Food & Animal Sciences, Alabama A&M Univ., P.O. Box 1628, Normal, AL 35762-1628.

Claims of requirement of venting processes in domestic pressure canners have not been verified in the literature. This effort was to determine if recommendations were appropriate.

This study proposed to challenge venting needs in home-canned items to determine whether a range of venting periods could be identified to optimize the lethal effect. Accordingly, air was deliberately confined in the mason jars to bring air into the canner space for potential venting.

Effects of entrapped air during thermal processing on lethal effect were evaluated in three domestic canners with seven (7) quart mason jars. Entrapped air volumes in ceramic-bead products were established with various fillings of water into dry product matrix. Alternate periods of venting included none, 5, 10, and 15 min. Lethal effects were determined using thermocouples positioned near the bottom, middle, and top of model product and others outside the jars. Process pressure was monitored throughout each of the 96 runs.

Two canners (All American and Mirro models) were continuously vented during processes while the third (National Presto) was not – but was vented de facto until lid lock moved up under influence of escaping gases. Nevertheless, venting times and lack of continuous venting demonstrated little impact. The higher lethal effects were noted when least product-entrapped air was modeled. Differences were noted between pressure processes monitored by dial gauge versus calibrated weighted-devices with more variation of the dial gauge system and greater lethal effect due to manual control basis. Besides lethal effect differences with product-entrapped air, the three positions of thermocouples registered least thermal effect at top portions of the jars.

All manufacturers of domestic canning kettles emphasize periods of venting to eliminate air in the canners prior to the timed processing but this study only reflected suppressed lethal effects when containers manifested product-entrapped air.