Title Head-space pressure generation in thermal processing of packaged foods: effect of food water activity

Author Sergio Almmonacid, Maite Jiménez and Ricardo Simpson

Citation Abstracts, 14th World Congress of Food Science & Technology, October 19-23 2008, Shanghai, China. 721 pages.

Keyword packaging; thermal processing

Abstract

Introduction: Retortable pouches are increasingly replacing the traditional cans because of number of advantages and represent an attractive opportunity to add value to food products. The world market has reaches about 20 billion units of retortable pouches and continue to grow. However, an important processing disadvantage, in comparison with traditional cans, is the need of closer and more accurate control during the thermal processing, specifically internal package pressure built up. Internal pressure may cause serious deformation and seam damage if not properly counterbalanced with external pressure. Modeling internal pressure profile is critical for food product/processing development and processing control. Very little published information is available describing the nature of pressure build up in retortable pouches containing food products. The most recent model that can be used to estimate internal pressure, in steady state conditions, when the food inside the package has reached processing temperature, is a relationship among dimensionless groups made up of product and container variables using. It was developed and validated for pure water (aw=1) as model food and tested against a 3% starch solution as model food, with good results, the model does not consider aw as input variable in the analysis, however. A 3% starch solution has aw of 0.995, and commercially sterilized foods have aw within the range [1-0.85]. **Materials and Methods:** Cylindrical cans were filled with solutions at different aw, and then subjected to 120°C until thermal/pressure equilibrium. Head space pressure and temperature were monitored over time. **Results and Discussion:** Results showed that aw has an important effect on head space pressure, 30% difference when comparing pressure at equilibrium over pure water and over a solution with aw of 0.85, at 120°C. A dimensional analysis mode, including a group accounting for aw is proposed to correct the model estimations.