Adrian L Kerrihard et al., J Exp Food Chem 2018, Volume: 4
DOI: 10.4172/2472-0542-C1-011

3rd International Conference on
FOOD CHEMISTRY & NUTRITION
May 16-18, 2018 | Montreal, Canada

Mathematical modeling of the chemical and sensory changes within almonds throughout storage

Adrian L Kerrihard[1], Daniel R Parrish[2], Anna N Cheely[2], Ronald B Pegg[2], William L Kerr[2], Ruthann B Swanson[2] and **Guangwei Huang[3]**
[1]Montclair State University, USA
[2]University of Georgia, USA
[3]Almond Board of California, USA

Statement of the Problem: In the industry, almonds are exposed to a variety of storage conditions that can greatly influence the rate of quality degradation. To date, little work has quantitatively modeled these effects on quality over time.

Methodology & Theoretical Orientation: Roasted almonds were stored in either high-barrier bags (HBB; n=4) or polypropylene bags (PPB; n=7) at 15, 25, or 35°C and 50 or 65% RH, and at 4°C with no RH control. Raw samples were held in either unlined cardboard cartons (UC; n=7) or PPB (n=7) under identical conditions. Almond quality was assessed bimonthly by measures of oxidation products, free fatty acids, moisture content, water activity, and sensory evaluation. Rates of change over time for each attribute were modeled with univariate analyses, and the slopes from these models were then predicted by multivariable analyses according to storage conditions.

Findings: The models showed higher temperatures predicted greater rates of quality degradation for all measures. Storage in HBB (rather than PPB) mitigated decline in consumer acceptability at a magnitude comparable to that of a decrease in storage temperature of 15–25°C. Use of HBB (rather than PPB) was also associated with a reduction in expected peroxide formation by a magnitude comparable to a reduction in storage temperature of 25°C. Storage in PPB (rather than UC) was associated with a reduction in expected peroxide formation by a magnitude comparable to a reduction in storage temperature of 20°C.

Conclusion & Significance: The models quantitate the deleterious effects of higher storage temperatures and suboptimal packaging conditions. The benefit of HBB packaging is substantial, but there is an associated cost with employing this packaging. Industry members can use these models to make highly informed decisions about storage and packaging strategies.

Biography

Adrian L Kerrihard is an Assistant Professor of Food Science at Montclair State University in New Jersey. His research background is in food stability, chemical analysis, sensory evaluation, and mathematical modeling. His more recent work has focused on food processing variables and how these relate to flavor chemistry outcomes and nutritional attributes.

kerriharda@montclair.edu

Notes: