Extended Abstract

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Food Chemistry 2018: Mathematical Modeling of Chemical and Sensory Changes within Almonds throughout storage- Ozan N Ciftci-University of Nebraska-Lincoln

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Additional investigations of almond degradation below typical industrial storage circumstances from a quantitative perspective are warranted. This education modelled the effects of packaging, temperature (TEMP), qualified humidity (RH), and boiling on chemical attributes of almonds kept according to common industry practices throughout 16 months. Almonds were assessed bimonthly for oxidation products, free fatty acids, moisture content, and water activity. Results indicated roasting almonds improved quality preservation. Models showed HBB (rather than PPB) to provide benefits to stability comparable to reductions in storage TEMP of ~15 to 30 °C. Roasted examples stayed stored in highÃ¢Â Â barrier bags (HBB) or polypropylene bags (PPB) at numerous mixtures of TEMP and RH. Raw samples were held in unlined cardboard cartons (UC) or PPB under the same conditions.

Due to their high percentage of unsaturated fatty acids, almonds are prone to oxidation (Sathe et al., 2008). Interior factors such as moisture happy (MC) of the nut, physical features of the nut, fatty acid arrangement, antioxidant content, and external area will also affect the rate of oxidation in almonds (Fennema, 1996; Shahidi & John, 2013). RH, O2 content, TEMP, light exposure, and packaging materials are all controllable factors that may affect the relative rates of oxidation in stored tree nuts. Almonds have been the largest specialty crop export in the United States (USDA, 2013). During storage, the physical and chemical quality of almonds will degrade and eventually result in consumer reject. Roasting of tree nuts is a common thermal process used to create specific flavor notes, darken color and add a more desirable crispy texture (Perren & Escher, 2013). Typically, the MC and a w are reduced while levels of CO2 and product brittleness are increased. Almond kernels have a compartmentalised microstructure that protects against oxidation, and evidence has shown this protective microstructure can be disrupted by roasting.

A large fraction of S. Typhimurium cells at stationary phase The effects of environmental storage conditions on raw and roasted almond quality characteristics were investigated with an incomplete factorial design. The combinations of factors were chosen in consultation with the Almond Board of California to be truly representative of storage strategies currently practiced by industry members. Different permutations of the possible factors produced 25 unique samples for assessment (Fig. 1). Raw almonds were divided into fourteen unique sample groups according to combinations of TEMP (n= 3), RH levels (n = 3), and packaging materials (n = 2).

Samples stored at the lowest assessed TEMP (4 °C) exhibited greater stability than those in higher TEMP. Samples stored at 50% RH exhibited greater stability than those stored at 65% RH. Our study found the roasting of almonds to improve product stability when packaged in PPB. Temperature and relative humidity are very important factors to the stability of almonds in storage, with higher TEMP and higher RH both consistently associated with more rapid physicochemical degradation. The choice of packaging will be dictated by economics and the storage conditions to which the almonds are subjected. The predictive models of degradation rates can be used to compare the expected quantitative effects of common industryÃ¢Â Âpractice storage factors. It is suggested these predictive models be reviewed when determining appropriate storage strategies for almonds. To the best of our knowledge, there is no report on the induction of the VBNC state in S.