



Estimating the Shelf Life of Whole Muscle Bison Jerky Using Accelerated Storage Conditions

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Objectives

The objective of this study was to determine the estimated shelf life of a whole muscle bison jerky using accelerated storage conditions.

Materials and Methods

Whole muscle bison jerky was packaged in a foil pouch with oxygen scavengers and sealed without a vacuum or gas flush. A total of 9 packages from 3 production runs were collected from a commercial processor. Identical product formulation and processing methods were followed for every production run. Packages were randomly assigned to three storage times (d 0, wk 6, and wk 12). Packages were stored in an accelerated storage cabinet and held at 33°C. It was estimated that 1 wk in accelerated storage at this temperature equated to 1 mo storage at ambient temperature. Instrumental L*, a*, and b*, pH, water activity, and thiobarbituric acid reactive substances (TBARS) were determined at the end of each storage period. Moisture and protein content was measured to calculate moisture:protein ratio (MPR). A trained sensory panel evaluated external color, off-aroma, flavor intensity, bite, tenderness, and off-flavor at the end of each storage period.

Results

Storage time did not ($P > 0.05$) affect L* values of the product so jerky did not become lighter or darker with storage. This observation was supported by the trained sensory panelists' external color scores. However, a*

value, or redness, increased ($P < 0.01$) from 8.41 at d 0 to 11.05 at wk 6. Additionally, b* values, or yellowness, increased ($P < 0.04$) from 7.15 at d 0 to 8.58 at wk 6. Jerky pH did not change ($P > 0.05$) during storage. Water activity decreased ($P < 0.01$) from 0.80 at d 0 to 0.75 at wk 6, but then increased ($P < 0.01$) to 0.81 at week 12. Oxidation, as measured by TBARS values, increased ($P < 0.01$) from 0.10 mg malonaldehyde/kg sample at d 0 to 0.15 mg malonaldehyde/kg sample at week 6. Although TBARS values increased during storage, the values remained under the 1 mg malonaldehyde/kg sample threshold for detectable off-flavors. This was further supported by the lack of off-flavors reported by the trained sensory panel. The MPR was stable ($P > 0.05$) from d 0 to week 6; however, MPR increased ($P < 0.01$) from 0.45:1 at week 6 to 0.59:1 at week 12. Despite this increase, MPR remained well below the standard required by the United States Department Agriculture Food Safety Inspection Service allowing a maximum MPR of 0.75:1. Storage time did not ($P > 0.05$) impact sensory characteristics including external color, off-aroma, flavor intensity, bite, tenderness, and off-flavor.

Conclusion

Throughout the storage period, minimal changes occurred in color stability, and oxidation did not increase at a rate detrimental to product quality. Additionally, the MPR did not surpass USDA FSIS compliance standards for jerky throughout the storage period. Therefore, it is reasonable to expect this whole muscle bison jerky to maintain compositional and quality characteristics throughout a 12 mo shelf life when stored at ambient temperature.