

Document Title: <b>Description, AN, Water activity for jerky meat</b>		Part # and Rev. <b>13434-01</b>	
		Release Date:	
Rev.	Description	Revision By	Date

**Production Filename:** 13434 (In Product Library)

**Path to Working Files:** DecaDoc\Application Notes\Master

**Dimensions:** 8.5 inch wide, 11 inch tall

**Material:** Paper, 92 Bright White or better, 75g/m<sup>2</sup> or heavier

**Colors:** Color Print on White

**Printer:** HP Color LaserJet 8550-PS

**Finish:** None

**Adhesive:** None

**Special Notes:** Illustrations are Ref Only \*\* Not to Scale \*\* (Shown page 1 of 2)



Application Note

**Water Activity for Meat and Poultry Jerky**

Meat and poultry jerky, a popular snack, is a dried shelf-stable product. Preparation of jerky usually consists of 5 steps, namely: 1) strip preparation, 2) marination, 3) interventions such as acid drips, 4) lethality treatments, and 5) drying. The jerky process must eliminate potential hazards due to microbial contamination. The main pathogens of concern are *Salmonella* spp., *Listeria monocytogenes*, *Staphylococcus aureus*, and *Escherichia coli*. *Listeria* is of particular concern because of recent outbreaks from contaminated jerky. The primary control points for eliminating microbial hazards are during the lethality and drying steps. The lethality step destroys any existing pathogens and the drying step reduces the water activity of the jerky below the critical shelf stable value of 0.85.

**The Role of Water Activity**  
Water activity is a measure of the energy status of water in a system and predicts which microorganisms will grow in a food. Microorganisms require water of a specific energy level to grow and survive. Microorganisms do not require a specific amount of water to grow (moisture content), which is why water activity and not moisture content is used as a control point to prevent spoilage. The ancient practice of drying foods is based on reducing water activity through dehydration to prevent spoilage by microorganisms. The U.S. Code of Federal Regulations, in the definition of Non-Potentially Hazardous Food, has established a water activity of 0.85 as the critical value for shelf

stability. Products with water activities = 0.85 are considered shelf stable and do not need to be refrigerated. At water activity values of 0.85, none of the potentially hazardous pathogens listed in Table 1 can grow and the only remaining microbial issue is molds, which can be controlled with preservatives or packaging (Table 1).

Microorganism	Water Activity Growth Limit Value
<i>Escherichia coli</i>	0.95
<i>Salmonella</i> spp.	0.95
<i>Listeria monocytogenes</i>	0.92
<i>Staphylococcus aureus</i>	0.86

**Food Safety and Inspection Service**  
The USDA Food Safety and Inspection Service (FSIS) has outlined their requirements for jerky safety in "Compliance Guideline for Meat and Poultry Jerky." This directive states that jerky producers should not use moisture protein ratio (MPR) as a measure of proper drying for shelf stability and safety since the water activity can vary greatly at any given MPR, due to different amounts of solutes such as sugar and salt. Therefore, the product water activity is better correlated to inhibition of pathogen growth. The directive also outlines the importance of maintaining high humidity values during the lethality step to prevent pathogens from becoming heat resistant and surviving the kill step. In addition, FSIS Directive 10,240.4 "Verification Procedures for the *Listeria*