

SOP for Relating Product Yield to Water Activity and Moisture:Protein Ratio

The following procedure will be followed **FOR EACH FORMULATION OF PRODUCT**.

Yield, water activity, and Moisture:Protein Ratio (MPR) will be determined for at least **three lots**. The sample size for each batch will be **at least 6 pieces**.

The data for calculating yield will be determined in-house by weighing the pieces at the start and end of processing. The yield will be calculated by dividing the finished weight by the starting weight, and then multiplying the resulting value by 100.

A **testing laboratory** will determine water activity, % moisture, and % protein on the same strips used for yield calculation. The MPR will be determined by dividing % moisture by % protein. A list of Wisconsin testing laboratories is here:

www.meathaccp.wisc.edu/assets/EcoliTesting_Labs_Jan2011_2.pdf

The results of each lot will be recorded.

To legally call a product jerky, it must have an MPR of 0.75:1 or lower. To ensure safety, the water activity must either be 0.85 or lower (product packaged under air), or 0.88 or lower (product packaged under oxygen-free conditions).

For other products, the MPR must be either 1.9 or lower, or 3.1 or lower with a pH of 5.0 or lower. The water activity must be either 0.92 – 0.95 if pH is 5.1 – 5.2, or no higher than 0.91.

The highest % yield for any lot that meets the applicable MPR and water activity limits will be noted. This value will be the **targeted maximum % yield on future batches**.

From this time on, the % yield for six pieces will be determined on each lot to ensure that drying is sufficient.

A sample of six pieces will be sent to a testing laboratory for water activity, %moisture, and % protein testing at least semi-annually, with one sampling during warm weather and one sample during cold weather. The maximum % yield value will be decreased if the semi-annual sampling indicates that water activity and MPR standards were not met.

bhingham@wisc.edu



Correlation of Yield, Water Activity and Moisture : Protein Ratio (MPR)

Part 1. Initial Validation of Processes

Product Formulation	Lot	Start Wt.	End Wt.	Yield (see #1)	% Moisture (from lab)	% Protein (from lab)	MPR (see #2)	Meets Jerky identity standard? (see #3)			Water Activity (from lab)	Meets shelf-stability (safety) standard? (see #4)		
								Yes/No	Date	Initials		Or N/A	Yes/No	Date

#1 Yield = (End wt. / Start wt.) x 100

#2 MPR = % Moisture / % Protein

#3 Must be 0.75 or lower for jerky.

#4 To ensure safety, the water activity must either be 0.85 or lower (jerky packaged under air), or 0.88 or lower (jerky packaged under oxygen-free conditions), or for other products, the water activity must be either 0.91 or lower if the pH is 5.2 or 5.3; 0.92 or lower if the pH is 5.1; 0.93 or lower if the pH is 5.0; or 0.96 or lower if the pH is 4.9 or lower.

Part 2. Maximum allowable yield for each formulation (based on three validation lots per formulation in Part 1).

Product and Formulation	Maximum Allowable Yield	Notes

Part 3. Semi-Annual Verification of relationship between yield, MPR, and water activity.

Product Formulation	Lot	Start Wt.	End Wt.	Yield (see #1)	% Moisture (from lab)	% Protein (from lab)	MPR (see #2)	Meets Jerky identity standard? (see #3)			Water Activity (from lab)	Meets shelf-stability (safety) standard? (see #4)		
								Yes/No	Date	Initials		Yes/No	Date	Initials

#1 Yield = (End wt. / Start wt.) x 100

#2 MPR = % Moisture / % Protein

#3 Must be 0.75 or lower for jerky.

#4 To ensure safety, the water activity must either be 0.85 or lower (jerky packaged under air), or 0.88 or lower (jerky packaged under oxygen-free conditions), or for other products, the water activity must be either 0.91 or lower if the pH is 5.2 or 5.3; 0.92 or lower if the pH is 5.1; 0.93 or lower if the pH is 5.0; or 0.96 or lower if the pH is 4.9 or lower.