



L&R Agenda Item 260-3: Moisture Loss in Pasta

NCWM Annual Meeting July 2011

A close-up photograph of a silver fork holding a portion of spaghetti. The spaghetti is topped with a red tomato sauce, a small green basil leaf, and a slice of yellow pepper. In the background, there are other fresh vegetables like a red tomato and green basil leaves.

Overview

- **Proposal:** Handbook 133, Section 2.3, would be amended to incorporate a 3% (“gray area”) moisture allowance for pasta products, as with flour and dry pet food products.
- A majority of the Conference voted in support of the proposal at the July 2010 Annual Meeting. The proposal received favorable treatment by L&R Committee at January 2011 meeting.
- The National Pasta Association appreciates the opportunity to survey the merits of the proposed amendment and appreciates the Conference’s consideration of this item.



Legal Framework

- **Federal Food, Drug and Cosmetic Act:** Foods in package form must bear “an accurate statement of the quantity of the contents in terms of weights . . . except that . . . reasonable variations shall be permitted.” (21 U.S.C. 343(e))
- **FDA Regulations:** “Reasonable variations caused by loss or gain of moisture during the course of good distribution practice or by unavoidable deviations in good manufacturing practice will be recognized.” (21 C.F.R. 101.105(q))
- State laws parallel the federal requirement. A unified legal framework guides inspectors’ actions when checking pasta products.



Legal Framework

- U.S. Supreme Court in Jones v. Rath Packing Co. (1977):
 - **“The federal net-weight labeling standard permits variations from stated weight caused by this gain or loss of moisture.”**
 - **“Over 60 years ago, Congress concluded that variations must be allowed because of the nature of certain foods and the impossibility of developing completely accurate means of packing. Since 1914, regulations under the food and drug laws have permitted reasonable variations from stated net weight resulting from packing deviations or gain or loss of moisture occurring despite good commercial practice. ... We can only conclude that under the [Fair Packaging and Labeling Act], as under the [Federal Food, Drug, and Cosmetic Act], a manufacturer is not subject to enforcement action for violation of the net-weight labeling requirements if the label accurately states the net weight, with allowance for the specified reasonable variations.”**

A close-up photograph of a silver fork holding a portion of spaghetti, topped with a red tomato slice and a green basil leaf. In the background, there are other fresh vegetables like a red bell pepper and a yellow bell pepper.

Legal Framework

- Jones v. Rath Packing Co., continued:
 - **“The moisture content of flour does not remain constant after milling is completed.** If the relative humidity of the atmosphere in which it is stored is greater than 60%, flour will gain moisture, and if the humidity is less than 60%, it will lose moisture.”
 - “Weight fluctuations of 3% to 4% resulting from changes in moisture content are not uncommon during good distribution practice within the continental United States.”
 - **“If flour were packed in airtight packages in order to prevent weight fluctuations resulting from changes in moisture content, it would spoil.”**

A close-up photograph of a silver fork holding a portion of spaghetti. The spaghetti is topped with a red tomato slice and a green basil leaf. In the background, there are other fresh vegetables like a red bell pepper and a yellow pepper.

Historical Consideration

- **FDA Proposal – 1980:**
 - FDA proposed to quantitatively define permissible “reasonable variations” from stated net weights for several food categories, including food subject to moisture loss.
 - FDA encouraged industry to submit data on moisture loss so that reasonable variations could be established for more food categories.
 - FDA reviewed and accepted protocol for NPA moisture loss study.
- **FDA Proposal – 1997:** 3% “gray area” for pasta.
- **NIST Informal Guidance:** Recognize 3% for pasta, rice and like products not formally included in Handbook 133.
- **NCWM Working Group:** Teaching inspectors how to account for moisture loss has proven challenging. Call for industry to address the issue.

A close-up photograph of a silver fork holding a portion of spaghetti, topped with a red tomato slice and a green basil leaf. In the background, there are other fresh vegetables like a red bell pepper and a yellow bell pepper.

Agenda Item 260-3

- **Goal: A moisture loss gray area facilitates retail inspections but does not excuse or sanction unlawful short weight packages on store shelves.**
- An inspector cannot order product off-sale (nor can a jurisdiction issue a citation or impose a penalty) for pasta products unless adequate account is made for moisture loss.
- Adoption of a validated 3% “gray area” for moisture loss for pasta allows inspectors to effectively remove impermissibly short weight packages found on store shelves.
- This is not a “free pass.” Inspectors can elect to conduct further investigation to determine whether moisture loss is the basis for the product being short weight and whether 3% is the appropriate amount of moisture loss to apply.
- The pasta industry views retail inspections as important to equity in the marketplace for consumers and competitors.

A close-up photograph of a silver fork holding a portion of spaghetti. The spaghetti is topped with a red tomato slice and a small green basil leaf. In the background, there are other fresh ingredients like a whole red tomato, a yellow bell pepper, and green basil leaves.

Benefits of Agenda Item 260-3

- Enhances the ability of inspectors to evaluate moisture loss for pasta products.
- Enables jurisdictions to meet their legal obligation to account for moisture loss.
- Prevents confusion about the need to consider moisture loss or how to account for moisture loss.
- Educates inspectors about the requirements for moisture loss consideration under Handbook 133.
- Encourages rigorous inspection of pasta products.
- Demonstrates the Conference's commitment to addressing issues of common concern in a timely and reasoned fashion.



Moisture Loss in Pasta

- **Manufacturing Overview:** Pasta is hygroscopic. Its moisture content does not remain constant after manufacture. Pasta eventually reaches a moisture equilibrium with its surrounding atmosphere. This balance does not occur until long after the packaging and distribution of product.

- **Data:** Studies indicate that pasta exhibits moisture loss in all environments and packaging types. Data shows 3% to be an appropriate gray area.

A close-up photograph of a silver fork holding a portion of spaghetti, topped with a red tomato slice and a green basil leaf. In the background, there are other fresh vegetables like a red bell pepper and a yellow bell pepper.

Pasta – Manufacturing Overview

- Pasta is a basic recipe of flour and water.
- Pasta is produced in accord with the moisture and quality requirements as defined by FDA regulations.
- Pasta is packed and documented at or above label weight in “breathable” film or paperboard cartons. Pasta must “breathe” to prevent substandard quality or mold issues.
- Pasta is hygroscopic; It will seek to equilibrate with the surrounding atmosphere.
 - Hot, dry, arid and air conditioned store environments that have less humidity will pull moisture from the pasta into the environment.
 - Tropical, wet, high humidity environments, seldom seen in U.S. stores, will pull moisture from the environment, into the pasta.
- Pasta is produced regionally, but distributed nationally, subject to various climatology and environmental conditions.

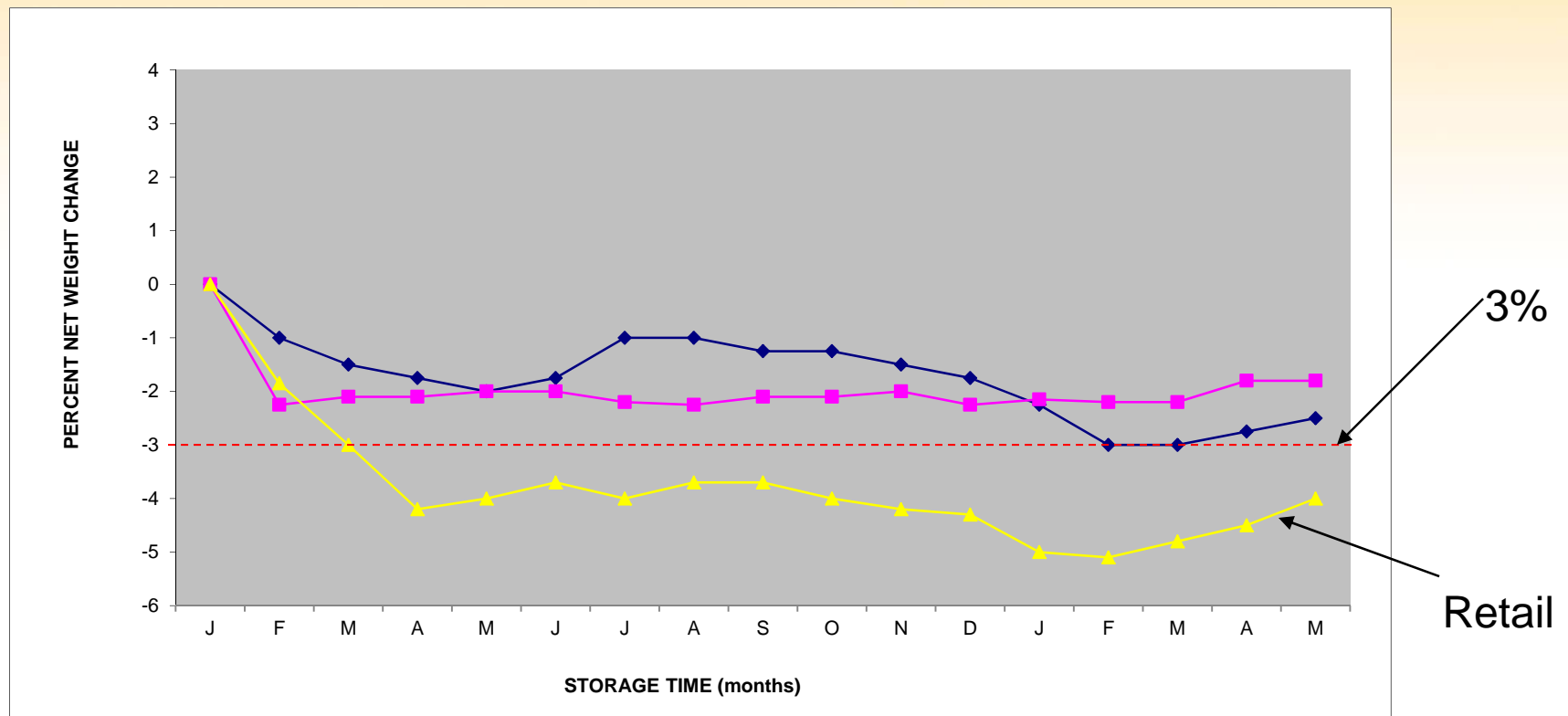
A close-up photograph of a silver fork holding a portion of spaghetti. The spaghetti is topped with a red tomato sauce, a fresh basil leaf, and a slice of yellow bell pepper. In the background, other fresh vegetables like a red tomato and a yellow bell pepper are visible.

NDSU Published Study

- North Dakota State University designed a controlled study in 1989 in accordance with previous FDA study on moisture loss in flour.
- Packaged pasta loses or gains moisture dependent upon environmental temperature and humidity during storage and distribution.
- At retail, pasta packaged in paperboard lost up to 5.02% of its weight. Pasta packaged in flexible polyethylene bags lost up to 3.18% of its weight.
- Neither product size, shape, composition or source of manufacture showed a significant effect on weight gain or loss. All products met the FDA regulations for pasta moisture at time of pack.

NDSU Published Study

- Study considered moisture loss at retail and in warehouses (a transient point in the distribution chain—after which additional moisture loss occurs).



Net weight change in spaghetti in paperboard cartons during storage under ambient conditions.

A close-up photograph of a silver fork holding a portion of spaghetti. The spaghetti is topped with a red tomato sauce, a fresh basil leaf, and a slice of yellow pepper. In the background, there are other fresh vegetables like a red tomato and a yellow pepper.

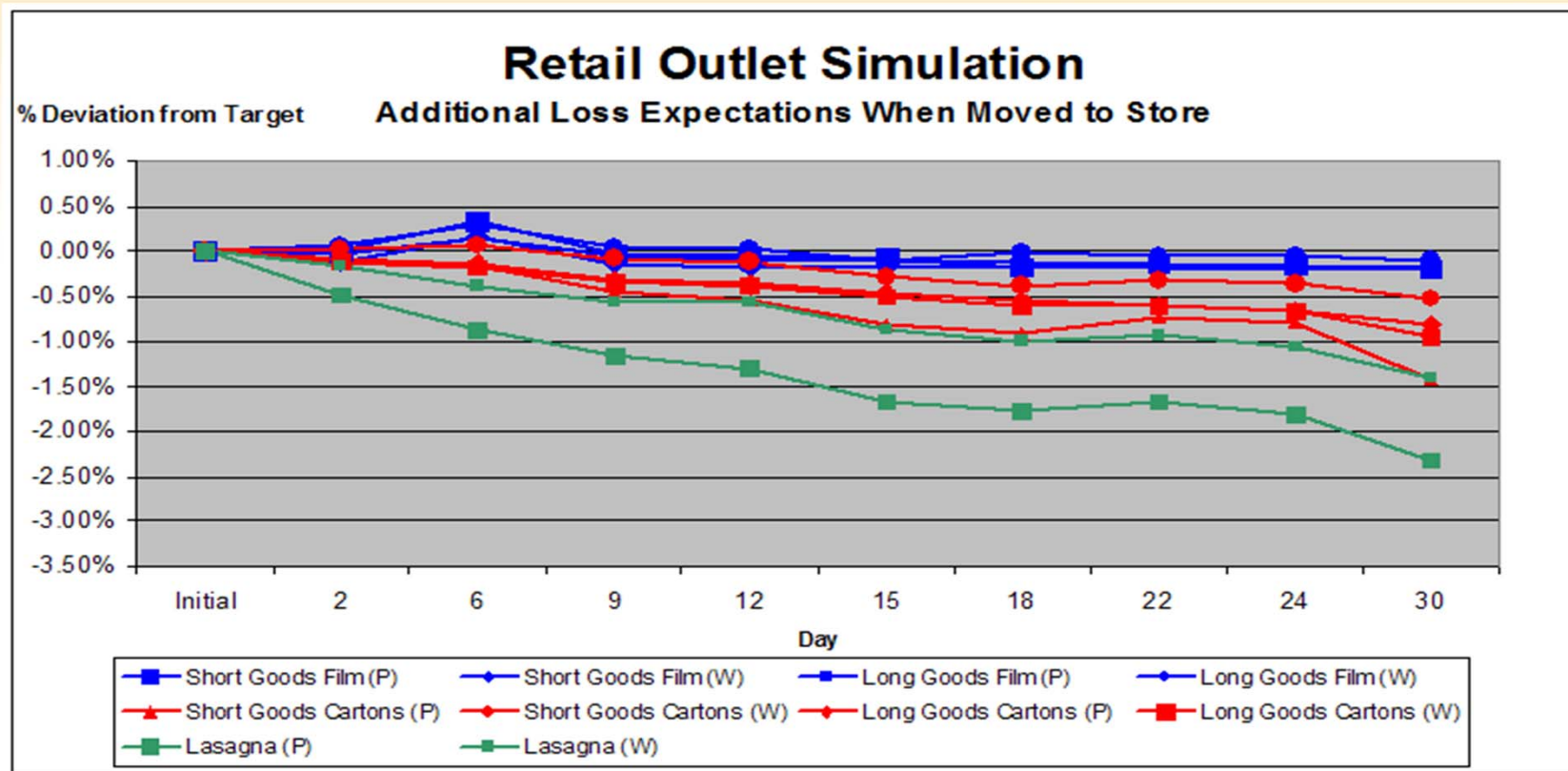
Industry Study 2006 – 2007

- Using a similar design as 1989 Study,
 - >700 samples were pulled
 - 10 major geographic locations
 - 5 manufacturers
 - Throughout summer and winter months
 - Over a one year time period.

- Outcome:
 - 75% of the samples lost moisture between 2.5% - 5.5%.
 - Samples from hot, dry or high altitude locations, and from winter vs. summer weather were significantly more variable.

Impact of Retail Environment 2006-2007 Study

- There is an additional and immediate weight loss when product is moved from a storage warehouse environment to a retail shelf environment.
- Weight Loss through the Total Distribution Life Cycle (Storage + Retail Outlet) measured from 2.5% to 5.5% across the USA.



A close-up photograph of a silver fork holding a portion of spaghetti topped with a red tomato sauce and a fresh basil leaf. In the background, there are other fresh ingredients like a red tomato, yellow corn, and green basil.

Moisture Loss in Distribution - All Studies

- Total Loss in Distribution Environment; (up to 5.5%)
 - Climatology – Temperature, Seasons and Humidity
 - Humid vs. Dry or High Altitude Areas of Country
 - Air Conditioned Store Environments
 - Length of Time in Distribution
 - Regional Production Locations with National Distribution
- Warehousing of Closed Palletized Cases of Product; (up to 2.5%)
 - Slowest Rate of Decline
 - Individual Packages are Not Exposed
- Cased to Uncased, Displayed Product; (Additional 1.0 – 3.0%)
 - Quickest Rate of Decline
 - Exposure of Individual Packages to Direct Environmental Conditions



In Summary

- Federal and state law require consideration of moisture loss.
- Pasta is a hygroscopic product whereby moisture loss or gain occurs.
- Substantial data, including a peer-reviewed published article (and other data submitted by NPA to the Conference), demonstrates the known amounts of moisture loss.
- Regulatory officials have recognized 3% as a validated and reasonable "gray area."
- NPA appreciates the Conference's interest in and support of Agenda Item 260-3.