



The Sweet Spot:

Moisture and Texture in Candy and Confectionery

If the moisture isn't right, the circus peanut—a soft orange candy that tastes like bananas—is a confectionery failure. Too high, and the candies all stick together in the bag and turn mealy. Too low, and they become a rock-hard adhesive that welds jaws together.

Getting the moisture measurement right is critical for nearly every confectionery product. Water activity is the most powerful way to measure and monitor moisture. This guide will show you how to use it.

Texture & Taste

Many candies have a distinctive texture - chewy, crunchy, smooth, grainy, sticky, or soft—and this texture is a key ingredient in the customer experience. Water activity is closely tied to texture properties. Typically, there is an ideal range of water activity—a sweet spot—that defines this perfect texture.

That means you can set a water activity spec that helps produce consistently high quality product and avoid ruined batches.

Moisture and Water Activity

Water activity may also be a more precise moisture measurement.

Most candy tends to have relatively low moisture. Our circus peanut, for example, has only about 5% by weight. According to the Spangler Candy Company, circus peanut moisture must be between 4.4 and 6.3% to be acceptable. That's a range of just 1.9%—pretty tough to measure accurately with a moisture meter.

Fortunately, when moisture changes in products that don't have much to start with, the water activity reading changes a lot. In our circus peanut, 4.4% moisture is a water activity of 0.450, and 6.3% is 0.600, a total range of 150 water activity units.

Comparing the precision of these two methods, water activity is about 15 times more precise than moisture content.

(Note: if you still want a % moisture reading, check out the AquaLab Duo Moisture Analyzer which measures both moisture content and water activity.)



TABLE 1

Average water activity and moisture content readings for common candies.

Candy Type	Average Dew - A _w	Average % MC
Translucent Bears	0.70	14.25
Super Mario Assorted Fruit Flavored Snacks	0.70	16.28
Strawberry Twists	0.69	13.89
Evil Twins (half sweet - half sour)	0.60	11.36
Mott's Original Fruit Flavored Snacks	0.67	10.59
Watermelon Rings	0.66	10.03
Original Red Twists	0.64	12.89
Licorice Pieces Strawberry	0.59	8.49
Opaque Bears	0.58	8.01
Laffy Taffy	0.56	5.20
Starburst Fruit Chews	0.55	2.34
Airhead Chewy Fruity Candy	0.54	2.34
Nordic Fish Mini	0.53	5.12
Tootsie Roll	0.51	2.85
Bit-O-Honey	0.45	2.50
Chewy Caramels	0.45	1.87
Salt Water Taffy	0.44	2.07
Original Long-Lasting Chews	0.36	3.93
Lifesavers Butter Rum	0.30	0.28



PHOTO

Laffy Taffy Slab

Shelf Life

Moisture migration isn't the only factor that affects shelf life. Case in point: single serving packages of Laffy Taffy, which seem to have been born with a wrapper on. As the Laffy Taffy ages, it loses moisture through the wrapper, eventually becoming rock solid. We can understand and predict what will happen over this product's shelf life by measuring the Laffy Taffy's water activity and the wrapper's vapor transmission rates. In fact, because water activity is tied to many of the factors that end shelf life, it is an excellent predictor of shelf life. It can also be used in formulation and packaging studies. If you want to hit your shelf life target, water activity can help.

Easy Accuracy

Once you've solved all these problems in your candy, the next challenge is making sure they stay solved. Many quality control instruments are only useful in the lab - they're either too complicated or delicate to use anywhere else. AquaLab is different. It gives you +/-0.003 aw accuracy no matter where you are. The instrument is solid and easy to use, and doesn't require any special training or sample preparation. Water activity is as easy to measure on the factory floor as it is in the lab.

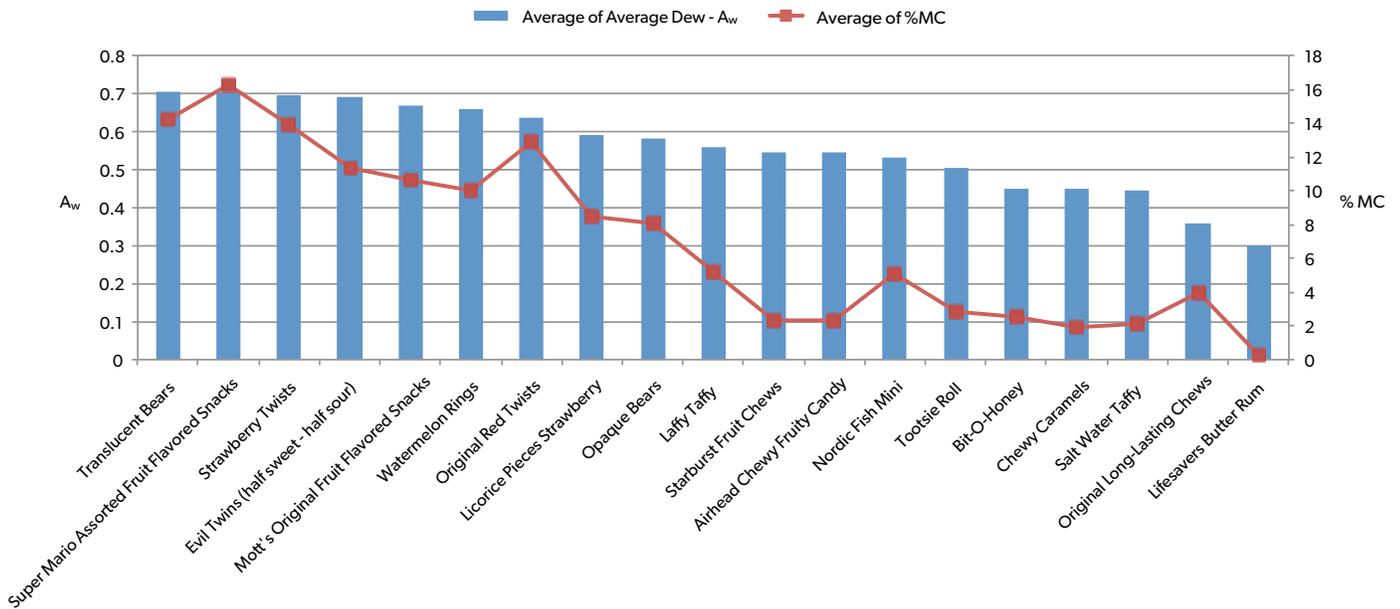
What Next?

Talk to us about your specific application. We can suggest resources that will help you meet your moisture challenges and maximize quality and profit. For more information and info about free online courses, call 509-332-5587 or e-mail wateractivity@aqualab.com.



FIGURE 1

Graphical representation of the relationship between moisture content and the average water activity in confection.



Moisture Migration

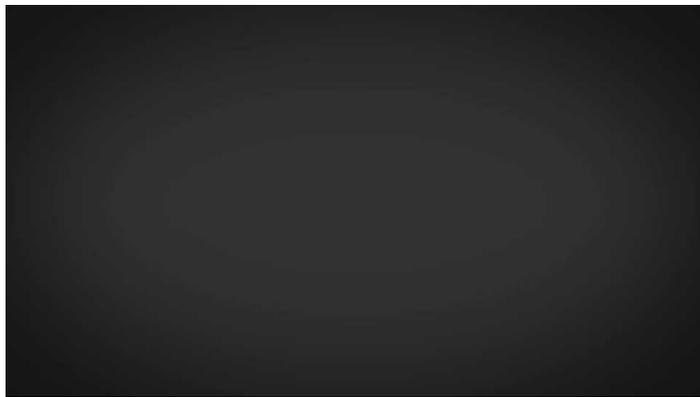
Just because your product has the right taste and texture when you box it up doesn't mean it will stay that way.

Even in a product at rest, water will keep moving from high to low energy. Picture a pot of boiling water. The high energy molecules are constantly escaping in a cloud of steam.

Energy differences between the components in your product are less extreme, but over time, water will move from your filling into your coating (or vice versa), and your originally perfect product may become gummy, hard, cracked, stale, or otherwise unacceptable.

Water activity is the best way to predict how water will move. In fact, if you rely on moisture measurements, you will end up frustrated, because ingredients with similar moisture contents can have very different water activities.

To avoid this surprise, adjust and equalize the water activity of different components during formulation to make a product that will keep its character as it waits to be purchased.





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