

Should you take advantage of water activity monitoring?

Resources for food and pharmaceutical quality professionals

To help you identify how water activity could fit into your production and quality assurance processes, we've created a brief guide to help you understand common applications of water activity monitoring. We focus here on food and pharmaceutical applications, where production management teams have the greatest opportunity to improve product shelf life and integrity to benefit consumers and manufacturers.

Water Activity Basics

Water activity is a physical and chemical concept that describes the amount of free water in a substance. *Water activity* is separate from *water content*. For instance, a product that consists of a dry shell with moist filling may degrade as moisture moves from the shell to the filling because the shell has more water activity than the filling does. As a result, the shell becomes dryer while the filling takes on more water. Water activity is often applied in food sciences and pharmaceuticals to help preserve **product integrity**.

Advantages for Pharmaceutical Manufacturers

Water activity monitoring is a powerful tool but has historically been underused in the pharmaceutical industry compared to more laboratory-based approaches. Regulatory bodies provide soft guidelines for water activity monitoring as a way to strengthen product quality but do not enforce them. This presents an **opportunity for insightful pharmaceutical production teams**.

Production teams use water activity test results to inform decisions on temperature control, humidity, storage, and production processes. Teams that monitor water activity see benefits for their products that contain APIs (active pharmaceutical ingredients): increased stability, low microbial risk, optimized formulation, reduced caking and clumping, and low moisture migration. Manufacturers receive fewer consumer complaints, greater confidence, higher production output with higher quality products, and greater profits. Water activity monitoring can help pharmaceutical teams attain **massive advantages**.

Assuring Food Safety

Food safety is critical. Foods also tend to have an optimum water activity that maximizes their shelf life. Effective water activity monitoring helps to address both of those concerns.

For food safety, water activity monitoring is critical whereas water content is less so. Studies show that water *content* doesn't affect microbial growth much, but changes in water *activity* affect the direction of microbial growth in foods. In fact, microorganisms will not grow below a certain water activity level. This has clear implications for food safety, so **water activity testing helps assure that foods are produced and stored under the right conditions.**

Optimizing water activity will also help to extend food's shelf life. This has clear implications for foods that come in powders or specialized textures. Think: chocolate, powdered mixes, and cheese. This results in **gains for manufacturers, retailers, and consumers.**

Shopping for instruments and tools?

Look for reliability, speed, and intuitive menu navigation. Additional features of better products include expandable modular design, resistance to volatiles, and low calibration costs.

Current products on the market include instruments that work based on the equilibrium relative humidity (ERH) method, the capacitive measurement method, and the dew point measurement method. We **highly recommend the ERH method** because it is calculated based on changing properties of a test-specific membrane as it takes on moisture, does not require frequent cleaning or calibration like the dew point method, and takes very accurate measurements. Combined with its volatile filter system and reusable salts, the ERH method offers a great value.

Neutec partners with instrument makers with decades of experience. For water activity monitoring, we have partnered with Novasina's Swiss precision measuring devices and offer our well-regarded technical service level.

Questions?

Contact us for additional information and resources.