

Regulating Moisture to Ensure Shelf Stability of Packaged Food Products

Food Marketing & Technology recently talked to Robert Sabdo, Business Development Leader - Food & Beverage Packaging at Multisorb Technologies (Buffalo, NY) to discuss how moisture regulation can help maintain the shelf stability and product quality of packaged food products.



Robert Sabdo, Business Development Leader - Food & Beverage Packaging at Multisorb Technologies

FMT: Why is moisture regulation important in packaged foods?

RS: Regulating moisture levels within the food package environment limits moisture-mediated degradation such as microbial spoilage, and preserves the appearance and flavor characteristics of food products to extend shelf life and protect brand integrity.

FMT: How does moisture regulation technology work?

RS: Moisture regulation technology, as its name suggests, maintains humid-



ity at a desired level by releasing or absorbing moisture as needed to establish equilibrium relative humidity (ERH). Maintaining a state of ERH prevents moisture transfer between the product and the packaged environment, preventing moisture levels from becoming too high or low, which can adversely affect product quality.

For some food products, it is ideal to maintain ERH at some intermediate level, allowing the product to absorb limited amounts of moisture. With baked goods such as cakes or cookies, a certain level of moisture is desirable to maintain texture and "mouthfeel." In this case, moisture regulation technology equips a package with a pre-determined amount of moisture, which is customized to suit the specific needs of the packaged food product. The moisture is released and reabsorbed over time, in response to conditions affecting the packaged environment.

FMT: What benefits does moisture regulation technology offer food manufacturers transporting or storing their products in challenging environmental conditions?

RS: Throughout long distribution chains, for example, packages may be stored and shipped in climates with varying temperatures and humidity levels. As the temperature increases or decreases, likewise does the capacity -

and propensity - of the air within the package to store moisture. A packaged environment that is too moist or too dry can be damaging to a product's integrity, causing it to become stale or soggy.

Moisture regulation technology accounts for temperature fluctuations by absorbing or desorbing moisture to stabilize the total amount of moisture in the package to pre-specified levels. In essence, it acts as a buffer, supplying or removing moisture within prescribed limits to maintain product stability irrespective of temperature change and other shifting environmental variables.

FMT: In what types of food products is moisture regulation technology commonly used?

RS: Moisture regulation technology is commonly used in a wide range of food products, including baked goods, dried meats and fruits, and certain types of confections such as nougats and caramels. This technology regulates moisture to an optimal relative humidity (RH) level as required by different food products. Take for example, baked goods, which generally require an optimal RH of 80-90% since they are fairly moist. On the other hand, dried products such as beef jerky have an optimal RH ranging from 65-75%. In addition to optimal RH levels, packaging material and format must be considered to develop an appropriate moisture regulation solution. This





Photos: Multisorb Technologies

solution can vary significantly from product to product as each food has a unique set of characteristics that must be maintained while considering the protective qualities of each packaging format.

Another important factor to note is that, depending on the application, moisture regulation technology can be configured to address other environmental concerns. When combined with oxygen scavengers, for example, protection against both moisture- and oxygen-mediated degradation is achieved. We recommend this strategy for foods such as Meals Ready to Eat (MREs) used by the American military, which degrade through exposure to both moisture and oxygen. In certain applications, moisture regulation technology may also be used in conjunction with activated carbon to manage volatiles, which can cause odor.

FMT: How is moisture regulation technology delivered in packaging applications?

RS: Moisture regulation technology is delivered through a range of customized product formats. Depending on the type of food product and package design, a sachet, canister, compressed tablet, large format bag, or self-adhesive label is recommended. They are dry to the touch and maintain their structure regardless of the amount of moisture they hold. A versatile portfolio of designs offers further benefits: easy insertion into a new packaging line and straightforward integration into pre-existing packaging systems.

FMT: Mr. Sabdo, thanks for your time and all the best for the future.

Multisorb Technologies has been an innovator in sorbent technology for over 45 years. Founded in 1961 by John S. Cullen to protect products against the damaging effects of moisture, today Multisorb is the world leader in the development and production of active packaging components. Robert J. Sabdo, Jr. serves as Business Development Leader, Food and Beverage Packaging where he is responsible for sales and market development of active packaging solutions for the food and beverage industry. Sabdo is a member of the Institute of Packaging Professionals (IOPP) and is an AmeriStar Judge for the IOPP.

Moisture Regulation in Packaged Organic Food Products

Organic food is one of the fastest growing food sectors in the US. According to the Organic Trade Association, increasing consumer demand for healthier food choices has driven the industry's growth by at least 15 percent each year over the past 10 years. However, domestic organic food producers will be unable to meet such a strong demand alone and will likely need to rely on imports, which will lengthen distribution chains and cause food to spoil en route. As many conventional preservation methods are prohibited in foods certified as organic, organic food manufacturers are challenged with longer transportation demands without the use of artificial preservatives, chemical additives or flavor enhancers.

The primary cause of organic food spoilage is microbiological degradation through oxidation, one of the key threats to flavor and color preservation. When both oxygen and moisture are trapped in the packaged environment, oxidation will occur. Moisture-mediated oxidation degrades food products over time, limiting the timeframe within which a product stays fresh. For example, the increased use of citrus and spice oleoresins presents unique challenges to organic food manufacturers as oxidation can adversely affect the taste of foods that include natural flavors.

As color is a primary influence on first-purchase decisions, and flavor drives repeat purchase, a strategy that targets oxidative degradation is indispensable. With this in mind, a holistic moisture regulation approach, including oxygen absorption capabilities, is the most promising solution for organic foods to meet extended distribution chain demands while maintaining product freshness, color, taste, texture and aroma.

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