

Shelf-life Savers

Regulating moisture is essential in ensuring the shelf stability of packaged food products

Regulating moisture levels within the food package environment is an important element in packaged products as it limits moisture-mediated degradation such as microbial spoilage, and preserves the appearance and flavour characteristics of food products to extend shelf life and protect brand integrity. As its name suggests, moisture regulation technology maintains humidity 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's 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.

This technology also helps food manufacturers transporting or storing their products in challenging environmental conditions. 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, so too 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 these 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.

Because moisture regulation technology is 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 – it is able to regulate moisture to an optimal relative humidity (RH) level as required by different foods. Baked goods, for example, generally require an optimal RH of 80 to 90 per cent since they are fairly moist. On the other hand, dried products such as beef jerky have an optimal RH ranging from 65 to 75 per cent. In addition to optimal RH levels, packaging material and format must be considered to develop an appropriate moisture regulation solution. This 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, it's possible to achieve protection against both moisture- and oxygen-mediated degradation. This is an effective strategy for foods such as ready-to-eat meals, 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 odour.

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

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