

A cut and dried solution

Dinesh Gupta provides an option for controlling humidity during storage in order to reduce food contamination



Food safety has emerged as one of the most important issues for food companies, driving them to establish norms not only for food handling but also for plant and process design. Manufacturers must combat the root causes of food spoilage at every stage of the food supply chain. Food spoilage occurs due to various reasons, depending on the nature of the food, the processing or packaging and the conditions in which it is stored and transported. One of the main causes of potential food contamination is the growth of microorganisms on food. As microorganisms thrive in moist conditions, preventing excessive humidity is of prime importance while storing or packaging.

In food handling, the efficiency of transporting powdered, granulated or flaked materials by high velocity air streams is significantly improved by drying the air. Highly hygroscopic materials make humidity control crucial. The moisture in the air may interfere with the operation of the processing machines and obstruct the free and easy movement of the foodstuff. As moisture affects food and machinery, the solution lies in surrounding the processing and manufacturing area with dry air.

Ambient conditions vary with changes in the absolute humidity levels. These influence the packaging areas leading to different levels of relative humidity (RH) at controlled temperatures. Some products release moisture during manufacturing/packaging, leading to a variance in RH conditions. Also, a food package that is not appropriately sealed after use can lead to infestation due to unwanted humidity.

During storage, low RH has to be maintained so as to prevent moisture regain. Almost 30% to 40% of fresh fruits and vegetables produced are wasted due to decaying

or fungal growth. This happens when proper storage facilities are not provided. There have been instances when worms were found in chocolates and in other food items. If the insects are external to the food product, they can multiply if proper storage conditions are not provided. There can be a possibility of insects or pests growing from within, due to wet surface areas. For food grains, a correct level of moisture should be maintained, in order to avoid fungus or pests. In India, grains are stored at the Central Warehousing Corporation (CWC) or in the open with a plastic covering, causing 3% to 5% of the grains to get spoilt. Worldwide, grains are stored in silos, which have dehumidifiers.

Dehumidifiers lower the moisture content of the area, maintaining RH as low as 1% constantly, regardless of the ambient conditions. During storage and transportation of fresh vegetables and fruits, mechanical cooling through coolers or refrigeration type dehumidifiers is used to maintain RH of 60% or above. However, for maintaining RH below 50%, they become uneconomical. In food processing, for drying and packaging applications desiccant-based dehumidifiers are the preferred choice. During this process, the moisture-laden air is passed through a rotary fluted desiccant rotor/bed where the moisture is absorbed by the desiccant bed and dry air is released to the areas requiring it. It is a continuous process in which moisture is expelled in the atmosphere in the form of vapour through regeneration of the desiccants.

Dehumidification technologies are also essential to avoid food contamination by microbial agents or pests, ensuring food safety. 🍓

The author is President, Bry-Air (Asia)