

Challenges Faced by Food Industry in India wrt. Loss/Damage due to uncontrolled Humidity

by Sonali Dutta

VP, Corporate Affairs, BRY-AIR

The Food industry, especially the processed food segment in India is facing many challenges. Currently, increased pressure on raw material costs, food safety, quality and hygiene, excessive wastages, poor product shelf life, shortage of skilled manpower are some of the most frequent problems faced by the industry.

India, as we know, is the world's second largest producer of food next to China, and has the potential of becoming the biggest. As per industry reports, the total food production in India is likely to double in the next ten years and there is a growing opportunity for very large investments in food and food processing technologies, skills and equipment, especially in areas of Canning, Dairy and Food Processing, Specialty Processing, Packaging, Frozen Food/Refrigeration and Thermo Processing. Fruits & Vegetables, Fisheries, Milk & Milk Products, Meat & Poultry, Packaged/Convenience Foods, Alcoholic Beverages & Soft Drinks and Grains are important sub-sectors of the food processing industry. Health food is another segment which is rapidly growing.

The Indian food industry is estimated at over US\$ 182 billion, and which is predicted to grow to US\$ 400 billion by 2025.

The food processing industry is said to be growing at 14 per cent against 6-7 per cent growth in 2003-04. The industry received foreign direct investments (FDI) totaling US\$ 143.80 million in 2007-08 against US\$ 5.70 million in the previous fiscal. The cumulative FDI received by the industry from April 2000-January 2009 stood at US\$ 760.32 million.

With the growth comes the technology challenges! As the food industry incorporates more sophisticated technologies to maintain the growth fuelled by changing consumer tastes and lifestyles, every processor is endeavoring to ensure that the food product reaches the consumer with the right flavour, perfect shape as well as has a long shelf life.

Food safety is, probably, one of the most important issues that food companies face day-in and day-out. Concern for public health in the case of potentially devastating consequences of contaminated food have driven industry associations, safety experts and watchdog organizations to establish guidelines not only for food handling, but for plant and process line design. Following these recommendations can reduce the possibility of a catastrophe. Microorganism growth is one of the main causes of potential food contamination. Moisture results in increased microorganism growth. Microbial growth and dispersal can be controlled if the food processing facility is kept dry. But keeping a plant dry is not easy as water is an essential part of product and process of food processing. Ensuring the correct moisture and condensation levels for food production is crucial.

Water or moisture greatly affects the keeping qualities of food. Excessive moisture pickup can result in product spoilage and spoilage by:

- * Microorganisms — microorganisms need water to dissolve the food they use. Water allows the food to get into bacterial, yeast and mold cells where it is used for energy and growth.
- * Chemical Reactions — the moisture in the food also causes chemical reactions to occur between components in the product.

Food spoilage and spoilage can occur when there are slight changes in relative humidity. Moisture can condense on the surface of a product and this can result in many common food defects. The molding of grain, soggy cereals, and the caking and lumping of dry products like powders and cake mixes can result from excessive moisture. Other defects such as mottling, crystallization and stickiness have also been observed. Moisture condensing on the surface of a food can also provide an environment for bacteria and molds to grow and multiply. Physical defects such as cracking, splitting and crumbling occur when excessive moisture is lost from foods.

Moisture can make a Meal of Food Industry's profits

Moisture or rather uncontrolled humidity during processing, packaging, storage, often, play party spoiler. Moisture control is essential in every segment of the food industry in the spheres of:

- Storage
- Production
- Processing
- Low temperature drying.

Some examples of how **Moisture Menace** can affect the quality in various segments of food.

In Confectionery

Chocolates, hard candies, chewing gums, bubble gums, etc contain large ingredients which are hygroscopic. When the humidity is high, these products regain moisture and become sticky and prone to mould formation. This inhibits the natural flow as it sticks to the high speed processing and packaging machinery and also to the wrapping material. The processing thus slows down and also creates a problem of hygiene, resulting in loss of production as well as loss in the final product quality.

Uncontrolled Humidity/Moisture during the manufacturing and Coating process of Confectionery causes.

- Change in the structure/dimension of the film core interface
- Grainy and irregular coating
- Increase in residual moisture content and improper adhesion i.e. degradation of coating quality presence of moisture
- Sugar bloom and change in flavour.

Humidity: A threat to Confectionery Quality

The solution to the problem lies in maintaining required stringent conditions of temperature and humidity and in surrounding the processing, packaging and storage areas with dry air.

Chocolates need to be stored at $35 \pm 5\%$ RH at 25°C for safe storage in order to retain its original flavour and aroma..

In Powdery Food processingDrying

In processing powdery foods such as milk powders, the presence of moisture in the air can cause lumping or caking. This effects the free and easy movement of the food and beverage powders in the processing machine and pneumatic conveyors. Due to high humidity, powdery material tends to stick to the hopper conveyors and packing machine, leading to

Beverage & Food World

Challenges Faced by Food Industry in India wrt. Loss/Damage due to uncontrolled Humidity

Date: 24-03-2010 | Edition: National | Page: 55 | Source: Bureau | Clip size (cm): W: 20 H: 24

Clip: 2 of 2

frequent breakdowns in the conveyor drive mechanism. To ensure free flow of powder and avoid sticking of powder on chain conveyor and other machine parts, Relative Humidity (RH) in the packing hall has to be maintained at $40 \pm 5\%$ and temperature at $22-25^{\circ}\text{C}$. The solution to the problem lies in the introduction of a dehumidifier. The dehumidifier by controlling the relative humidity in the environment provides the most simple and economic solution to overcome lumping and caking. It also avoids the sticking of powder on packing machines, hoppers, and other parts. Moreover, it ensures an easy, free flow of powder through the packing machine into containers.

Spray / Fluidized bed dryers require large quantities of hot air for drying. The quality of the final product is affected by the quality of air entering the dryer. It should be dry, free from contamination, foreign particles and odourless. With the growing emphasis on limiting production losses and downtime, which impacts final product quality and thus profits, the importance of using dehumidifiers, in conjunction with Spray Dryer / Fluidized Bed Dryer for quality drying, has become almost mandatory.

Moisture hinders the free flow of powders/ granules making many downstream operations (e.g. packaging, filtering, handling) difficult and expensive.

In Meat Processing. Condensation can "seep" into your profits

Water vapours released during slaughtering and processing, cooking processes and temperature differentials contribute to moisture buildup inside a plant. Preventing fog and condensation build-up by controlling the room temperature and humidity retards microbial growth. Controlling condensation by ensuring management of moisture levels is now an accepted engineered solution as Air conditioning usually is not sufficient to eliminate condensation. Compared to the typical refrigeration system, desiccants are effective in removing moisture from the air without condensing or at extremely low temperatures.

Food safety scares in the Western world, specially the US and Europe has drawn food processors' attention to desiccant dehumidification systems, which ensure the right levels of humidity within food production facilities.