

## Drying technology as an application in post-harvest processing

■ ANWAR HUSSAIN, KUNZANG LAMO, P.I. AKBAR, M.S. MIR AND M.S. KANWAR

**SUMMARY :** Preservation of fruits and vegetables through drying based on sun and solar drying techniques is one of the oldest forms of food preservation technique known to man. Fruits and vegetables are dried to enhance storage stability, minimize packaging requirement and reduce transport weight. The residual moisture in the vegetables should not be more than 6-8 per cent and in fruits 10-20 per cent. There are two types of drying processes: sun and solar drying and atmospheric dehydration which include stationary or batch processes and continuous processes. The novel methods of drying are Osmotic Dehydration (OD), vacuum drying, Pulse Electric Field (PEF) drying, high hydrostatic pressure drying, superheated steam drying, heat pump drying, spray drying and freeze drying. Sulphuring or sulphiting are generally used as pretreatments in case of fruits and blanching in case of vegetables for better safety, quality control and retention of nutritive value of the final product.

**KEY WORDS :** Osmotic Dehydration (OD), Vacuum drying, Pulse Electric Field (PEF) drying, Fluidized bed drier, Blanching and sulphuring

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Many of the third world countries produce large quantities of fruits and vegetables for local consumption and export. According to the Food and Agricultural Organization, the estimates of world total production for 2011 were approximately 599300 thousand metric tons of fruits and 1012524 thousand metric tons of vegetables (FAO Database, 2012). In Asia, India produced 74878 thousand metric tons of fruits and 146554 thousand metric tons of vegetables or 12.5 per cent and 14 per cent, respectively of the total world production (Indian Horticulture Database, 2011). Many of these fruits and vegetables contain a large quantity of initial moisture content and are, therefore, highly susceptible to rapid quality degradation, even to the extent of spoilage, if not kept under controlled storage facilities. Therefore, it is imperative that, besides employing reliable storage systems, post-harvest methods such as drying can be implemented hand-in-hand to convert these perishable products into more

stabilized products that can be kept under a minimal controlled environment for an extended period of time.

Drying (dehydration) of fruits and vegetables is one of the oldest forms of food preservation technique known to man and consists primarily of establishments engaged in sun drying or artificially dehydrating fruits and vegetables. Although dehydration is the primary reason for food preservation, it also lowers the cost of packaging, storing and transportation when compared with fresh ones (Okos *et al.*, 1992) by reducing both weight and volume of the final product. In the process of drying or dehydration sufficient moisture is removed to protect the product from spoilage. The residual moisture in the vegetables should not be more than 6-8 per cent and in fruits 10-20 per cent (Rather and Parveen, 2010). Dried fruits can be used as such or after soaking while dried vegetables are usually soaked in water overnight and the cooked.

### Recent advances in drying of fruits and vegetables :

Drying of fruits and vegetables has been principally accomplished by convective drying (Nijhuis *et al.*, 1998). There are number of studies that have addressed the problems associated with the convective drying. Some important physical properties of the product have changed such as loss of colour (Chua *et al.*, 2000), change of texture, chemical changes affecting flavour and nutrients and shrinkage (Mayor and Sereno, 2004). Besides convective drying give

#### MEMBERS OF THE RESEARCH FORUM

Author for Correspondence :

ANWAR HUSSAIN, High Mountain Arid Agriculture Research Institute, SKUAST-K, LEH (J&K) INDIA

Email : yokcan63101@gmail.com

Coopted Authors:

KUNZANG LAMO, P.I. AKBAR, M.S. MIR AND M.S. KANWAR, High Mountain Arid Agriculture Research Institute, SKUAST-K, LEH (J&K) INDIA