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Extended shelf life, storage and maintenance of seed quality and viability through vacuum packaging

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Vacuum packaging is the simplest and the most common means of modifying the internal gaseous atmosphere in a pack. The product is placed in a pack made from film of low oxygen permeability, air is evacuated and the package is sealed. An evacuated pack collapse around the product so that the pressure inside is seldom much less than atmosphere (Kothari and Jadhav, 1998). Vacuum packaging and gas flushing are techniques adopted for the purpose of prevention of food spoilage by oxidation. Elimination of oxygen from the pack therefore helps in extending the shelf life of the products. These methods are effectively utilized for packaging processed food products such as tea, coffee, cheese, snack foods, nuts, etc. (Narayanan and Dordi, 1998).

The average family throws away approximately US\$1200 worth of spoiled food each year. Vacuum packaging can eliminate most of this cost when used properly. Vacuum packed foods maintain their freshness three to five times longer than food stored by conventional methods. There are other secondary benefits of vacuum packaging. Many products shift violently during the shipment process and cause the products to be damaged. Vacuum packaging hugs the product in place, thwarting this violent movement and thus having the following advantages. In addition to this, vacuum packaging technology can also be extended for seed storage of agricultural and horticultural crop seeds. The applied vacuum inside the package protects from oxidation, insect infestation and microbial spoilage. Consequently, the initial quality of the seed is preserved for a longer period. Seed deterioration is a major problem during storage the losses are even grater in the geographical regions where high temperature and high humidity prevent during seed maturation and storage. Considering the importance of preservation both for maintaining the quality of products and viability of seeds, investigation were carried out to study the influence of vacuum packaging on various bioactive compound in chilli and also it influence on seed viability during long term storage.

Investigation over a period of 24 months revealed that total extractable colour; oleoresin extractable colour and capsaicin contents were very high in vacuum packaging treatments. Among various treatments, vacuum packed whole chilli powder under cold storage were found to have the least percent to decline in all the quality parameters compared to controlled treatments where the deterioration was more than 70 percent. Carotenoids estimation data revealed that there is treatments, while β -cryptoxanthin and lutein contents fully disappeared in these treatments.

The respiratory rates of whole chillies greatly reduced in the vacuum packed bags may be due to lack of oxygen. the data of seed viability studies indicated that the viability can be maintained even after 24 months with 90 percent germination in the vacuum packed bags with very high seedling vigor index compared to traditional storage methods. The maintenance of viability under vacuum packaging could again be due lack of oxygen, since temperature and oxygen are the most deterrents for seed deterioration.

This technology is in the process of commercialization for chilli and for the storage of different kinds of seeds. The university produces huge quantity of seeds every year to be distributed to the farmers. If proper storage conditions are provided, the produce can fetch high value crops like cardamom, nutmeg, vanilla, basmati rice etc. the research was carried with the financial assistance of enterprise in Brussels & Belgium. The process of commercialization of this technology for the vacuum packaging of seeds is also on the cards.

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