



Pakistan is an important Kinnow mandarin producing and exporting country across the globe. Waxing of Kinnow mandarin is a pre-requisite for its export and better shelf life. Unfortunately all the wax/ skin coating material that is currently used in Pakistan is being imported. This results in the expenditure of valuable foreign reserves of the country. Thus this was an important need of the time that this wax/ skin coating material should be prepared locally. Post Harvest Research Center, Faisalabad took this responsibility in a project funded by the **PARB UNDER PROJECT NO. 152.**

The research work for the preparation of a local skin coating material from indigenous based materials started on June 2009. During the research, more than 20 edible oils



were studied. From every oil, skin coating material was prepared and studied in detail for its properties. Finally two edible oils were selected namely castor and jojoba as base material. In 2011, two skin-coating material (SCM) formulations were prepared using these two oils along with some other ingredients. All the ingredients used in this SCM are indigenous based except for a few ones that are used just fractionally. This SCM was applied to different

fruits and vegetables on lab scale and the results were found encouraging.



Then this SCM was applied to Kinnow mandarins on commercial scale under the prevailing environment of the Citrus industry during the season 2011-12. Industrial application results were also found very encouraging. This locally developed SCM is cheaper than the imported wax but the results are comparable to the imported wax. Besides that, no ingredient hazardous to health is used in the locally developed SCM. Its use is also environment friendly.

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DEVELOPMENT OF INDIGENOUS BASED SKIN COATING MATERIAL FOR FRUITS AND VEGETABLES

UNDER PARB PROJECT NO. 152



Post Harvest Research Centre was established during the year 1989-90 with the assistance of ADB. This UNDP institute is meant for post harvest research on fresh fruits and vegetables in Pakistan. Post harvest technology deals with “produce management from harvesting to consumption with appropriate technology” to maintain quality and quantity to fetch the maximum market price.

Agro-climatic conditions of Pakistan ranging from tropical to temperate allow growing 40 different kinds of vegetables and 21 types of fruits. One of the major factors limiting availability of fruits and vegetables are post harvest losses in fruits and vegetables, which range from 25-40 %. Consumer's prices rise in addition to hidden quality losses. These losses bring low return to growers, processors and traders and country suffers in terms of foreign exchange earning. Keeping these problems in view, Post Harvest Research Centre is entrusted with the following objectives:

- To conduct R & D work on post harvest technology of fruits and vegetables
- To develop on-farm primary storage technology of vegetables
- To modernize cold stores
- To introduce grading & packing technology
- To conduct local trainings and demonstration programmes in respect of post harvest technology of fruits and vegetables
- To render advisory services to entrepreneurs & growers

Future Targets

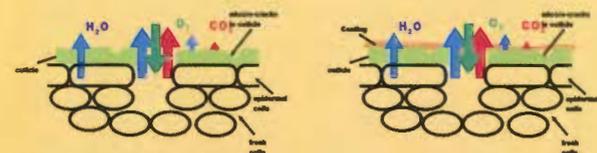
- To develop storage parameters according to variety
- To introduce the pre-cooling technology for better shelf life
- To assist the export of fresh fruits and vegetables
- To introduce disinfestation technology
- To disseminate on-farm low cost storage technology for potato & onion

We come across many items in our daily life that have very shiny appearance. These are actually coated or waxed items and include a wide variety of products from different fields like fruits and vegetables, pharmaceuticals, confectionary, food packages, cosmetics etc. Different industries take different advantages from coating or waxing.

Among fruits and vegetables, not all but many fruits and vegetables have a natural waxy coat on their epidermis. But that natural waxy coat is often damaged or removed during post harvest handling operations that decreases its ability to protect fruits and vegetables from water loss and high respiration rate thus leading to decreased shelf life. One of the preservation techniques for extending the shelf life of fresh or minimally processed fruits and vegetables is the use of edible coatings or wax coatings. Edible coatings are a thin layer of a material that can be eaten up by the consumer as a part of the whole food product. Waxing is recommended only for good quality products because it does not improve the quality of inferior ones. This is done to supplement or replace the natural waxy coat on the surface of a commodity.

The benefits obtained by the product from waxing include an improved appearance, less moisture loss, longer freshness, reduced shriveling, reduced post harvest decay, less susceptibility to chilling injury, less economic loss, inhibited mold growth etc.

How the wax or edible coating works? All fruits and vegetables are covered naturally in a cuticle that is a barrier to moisture loss. However, some water vapors can move through the pores, cuticle and micro-cracks in the cuticle. During the process of waxing, a tightly adhering thin firm of the coating substance is applied to the surface of the fruit. The wax coating blocks the pores in the cuticle, which significantly reduces the amount of water vapor loss.



Different types of raw materials (from animal or plant origin or synthetic) are used as a base for formulating food-grade waxes. The most commonly used materials are shellac, paraffin, carnauba and polyethylene. Less frequently used wax bases include bees wax, candelila wax and montan wax. Each of these raw materials has unique and different properties that determine its shine, firmness, gaseous exchange, and other physical characteristics.

The process of waxing is an under material is washed with fungicidal solution, sorted and dried before applying wax, and then wax is applied by a combination of spraying and slab waxing / roller brushing method. After waxing, the material is again dried with hot air. Then the fruit is graded and packed in corrugated cardboard cartons. The cartons are pre-cooled before storing in the cold store.

