

Post harvest losses of tomato in markets of district Lahore

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Abstract

The quality of tomatoes (*Solanum lycopersicum* L. syn name *Lycopersicon esculentum*) mainly depends on proper handling during post harvest processes like harvest, grading, packing and transportation. The present study was focused on shelf life of tomato based on the systematic survey of the distribution of tomato crop in markets of the district Lahore. During the survey it was evaluated that the deterioration of the produce due to packing material was 25%, transportation system was 10%, means of distribution was 5 %, exceeding post harvest losses up to 30% and sometimes the whole lot is lost. Time lag in transportation, bulky packing in the traditional wooden crates wrapped with papers cause high humidity making the microclimate favorable for mycoflora. The dominating fungi associated in decay process were *Aspergillus niger*, *Aspergillus flavus*, *Fusarium oxysporum*, *Rhizopus stolonifer*, *Aspergillus fumigatus*.

Key words: *Lycopersicon esculentum* mill, Post harvest, fungal deterioration, fruit quality.

Introduction

Tomato (*Lycopersicon esculentum* Mill.) a member of the family Solanaceae is a fruit used as vegetable in Pakistan. Total area of production of tomatoes in Pakistan is 0.03 million hectares (MINFAL, 2005) and the production is more than 0.3 million metric tones. Tomatoes are cultivated in Punjab, Sindh and Khyber Pakhtunkhwa provinces, whereas total production is 0.6 million metric tones from total covered area of 0.051 million hectares in Punjab during the year 2004-05 (MINFAL, 2005). Tomatoes are of great importance in human nutrition as they supply essential vitamins and minerals (which are necessary to maintain good health) to the diet, provide variety to the food and make food appetizing. It is highly perishable crop and it has been shown that as high as 50% of these produce are lost between rural production and town consumption in the tropical areas (Oyeniran, 1988).

Principle causes for post harvest losses are decay, external damages incurred during harvest and handling, and harvest at an improper maturity stage (Thorne and Alvarez., 1982). The effect of storage conditions on physiochemical quality and quantity changes in tomatoes varies with cultivar, exposition time and harvesting conditions (Hobson, 1981). The aim of the present study was to evaluate the post harvest losses in the markets of Lahore i.e., the hub of business in the Punjab Province. Many factors especially fungal

contamination was found as important factor of losses in the markets of Lahore district.

Materials and Methods

Markets located at Badami Bagh (Market 1), Kot Lakhpat (Market 2) and Allama Iqbal Town (Market 3) in Lahore were surveyed for collection of data regarding post harvest losses. Structured questionnaire was used to interview the stakeholders. Information about packing, transport, storage, grading and distribution was recorded.

Infected tomatoes were collected in 8 X 10 cm cellulose envelopes which were sterilized by keeping them under UV radiation for about 24 hours. The surface sterilized 1-3 mm pieces of the tissue were placed on PDA or MEA plate and incubated for 3-5 days. Fungi isolated from the samples were cultured on MEA or PDA at $28 \pm 2^\circ\text{C}$ in 90 mm Petri dish for further studies. These plates were kept at 25 Centigrade for growth of the mycelium. Then these isolates were identified using various keys. The data was recorded in percent deterioration

Results and Discussion

The results of the present studies indicate (Fig.1) that packing is the most important factor damaging the perishable commodity at quite early phase of post harvest processing. These losses reaches up to 27% in market 1 which is the main

business point in the Lahore district, where tomatoes are brought from all over the country.

Transport is another cause of post harvest losses and it 12%, 10% and 8% in Market 1, Market 2 and Market 3 respectively. However losses due to storage, grading and distribution up to the consumers does not show much differences in occurrence and remain 3%,1% and 1% only.

Although a large number of growers are concerned with the cultivation of tomatoes but due to lack of proper training, cold storages, poor means of transportation, time lag, Lack of post harvest awareness, improper harvest techniques result post harvest losses of tomato fruits. Post-harvest life depends on the rate at which they use up its stored food reserves and its rate of water loss. When food and water reserves are exhausted, the tomato dies and decays (Akhtar *et al.*, 1994, Abou-Aziz *et al.*, 1976, Ait-Oubahou, 1990). In most of the cases growers do not keep the fruits at proper temperature and the rapid rate of respiration by the commodity reduces the shelf life and causing the post harvest losses. Holding it at its lowest safe temperature (0°C or 32 °F for temperate tomato crop or 10-12°C or 50-54°F for chilling sensitive crop) and relative humidity (60-90%) enhance storage life by lowering respiration rate, decreasing sensitivity to ethylene and reducing water loss. Water loss results in shriveling and wilting, causing severe post harvest losses (Krochta and De Mulder-Johnston, 1997).

About 30% tomatoes are wasted daily in the markets of Lahore district due to transportation. There are no arrangements to avoid the ethylene effects on the fruit and it provides basis for rapid ripening of them. The management of ethylene is post harvest consideration for quality maintenance

during storage and transportation of tomato. Ethylene is a natural hormone produced by plants and involved in many natural functions during development, including ripening (Trevor Suslow, 2000).

Grading is imperative during marketing of vegetables. Untrained labor damage the skin of the tomato during grading that invites the fungal contamination like *Aspergillus niger* and *Aspergillus fumigatus* that were isolated from the infected tomatoes obtained during the market surveys. Fungi associated with fruit rot of tomato including *Fusarium equiseti*, *F. chlamyosporum*, *Alternaria solani*, *Geotrichum candidum*, *Acremonium recifei*, *Aspergillus flavus* and *A. niger*. Most pathogenic on tomato fruits, most pathogenic being *Geotrichum candidum* followed by *A. niger*. Least rot was caused by *Alternaria solani*. The optimum temperature for maximum rotting caused by *G. candidum*, *A. niger* and *A. flavus* was 30°C. The relative humidity for maximum rot ranged from 70–90%. Tomato fruits stored at low as well as optimal temperatures remain healthy. Fruits stored at 35°C showed blemishes. The best Relative Humidity for storage ranged between 60 and 90% (Oladiran and Iwu, 1992).

These preliminary studies provides basis for the determination of post harvest losses of tomatoes which is one of the most demanded vegetable in Pakistan. A detailed and investigative survey is required to establish the post harvest strategies to reduce the losses both in terms of economic and food supply especially caused by fungi.

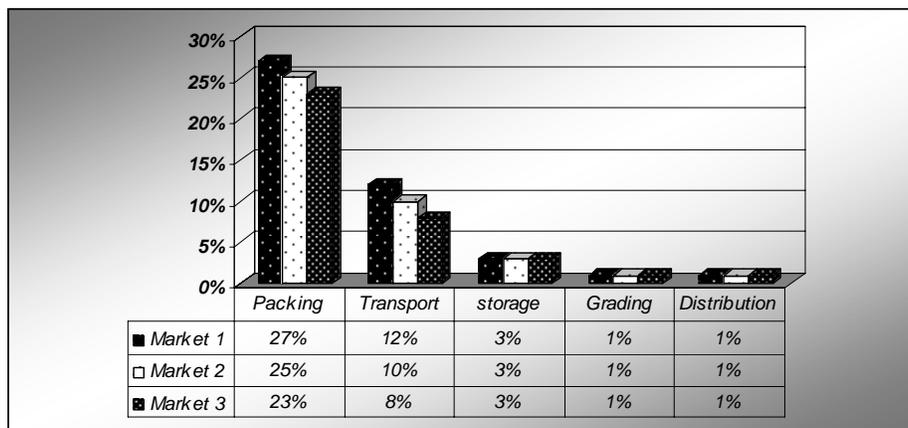


Fig 1: Post harvest losses of tomatoes in the markets of Lahore district.

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