

Post-harvest loss of some Rosaceous fruits by *Penicillium expansum* ex Fries

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Market diseases of fruits develop during the various handling operation required to move the crop from orchard to the consumer. Losses due to market diseases have been considered more painful and costlier than pre-harvest losses both in term of money and man hours (Stevans and Stevans, 1952). It is serious problem for the producer, distributor and consumer as it reduce the market supply, increase retail prices, impose serious malnutritional problem by reducing nutritional value and drastically cut the export value.

Among various fruits crops grown in India, Apple (*Malus pumila* Mill), Pear (*Pyrus communis* L), and Crab Apple (*Docynia indica* Dene) occupy most important position among the fruits. They are known to be rich in ascorbic acid, sugars, amino acid, phosphorus, iron and other minerals which make them susceptible to a number of rot producing fungal pathogens that develop extensively during the various phases of marketing. Therefore, it is

evident that the responsibilities of plant pathologists do not end with the production of diseases free crop in the orchard since that characteristic the termination of first phase of plant protection and beginning of the second one which is protection of the harvested produce until it has reached the consumer in a healthy condition.

In addition to the loss of food calories and nutritive elements, production of toxic metabolites (mycotoxins) by fruit rot fungi is emerging as a major health problem especially in the developing countries (Rodricks, 1976). At high concentrations many mycotoxins can produce acute disease syndromes while at lower level they can be carcinogenic, mutagenic, teratogenic and oestrogenic.

Among the various postharvest mycopathogens of rosaceous fruits, *Penicillium expansum* ex Fries is a major one that can cause infection even below 0 °C. Infected Fruits produces watery, light to dark brown lesion covered by blue spore masses. Mycelium branched, septate, hyaline, prostrate; conidiophores 6 µm wide conidia borne in tangled chains, smooth, subglobose, with rough wall. The pathogens also produce two important toxic secondary metabolites i.e. Patulin and Citrinin, in the diseased fruit tissue, which may spread into the surrounding healthy tissue.

Sample of diseased fruits were collected from the fruit shops and brought to the laboratory. Isolation from the diseased fruits was made on PDA medium, supplemented with streptomycin sulphate as bacteriostat. The inoculated Petridishes were incubated at 28 ± 2 °C for 5 days. Spores/hyphae were

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cultured, incubated at 28 ± 2 °C for 3 days, identified and pathogenicity was made.



Infected apple



Infected crab apple

Extraction of patulin and citrinin in infected fruits was estimated at the end of incubation period by following the method of Gimeno and Martins (1983). Quantitative estimation of patulin and citrinin was done by spectrophotometric method as given by Bacha *et al.* (1988).

Patulin concentration was estimated in some infected fruits in the range of 14-221 mg

/kg in apple; 28-36 mg/kg in crab apple; and 11-67 mg/kg in pear. Concentration of citrinin was also recorded in rotten fruits. It was estimated in the range of 0.10-8.04 mg/kg in apple; 0.09-6.04 mg/kg in crabapple and 0.06-4.24 mg/kg in pear. During present investigation, analysis of patulin from diseased and the surrounding healthy unaffected areas was also conducted to evaluate if this mycotoxin could migrate to area not infected by rot. Patulin in the range of 0.65 to 22.75 mg/kg was accounted in unaffected area. These value show that even if rotten areas of *P. expansum* infected apple are removed, the unaffected area are not fit to be eaten or used in certain products as the level of patulin detected in the present investigation, far exceed the safe limit (50 µg/kg for patulin) established by international committee.



Infected fruit of pear

This evaluation, therefore, shows that proper storage and sorting of fruits is very necessary before marketing so that intake of toxins above the tolerance limit is avoided this will essentially make for children and vegetarians who consume a higher quantity of these fruits.

References

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