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Post harvest diseases of fruits caused by fungi during storage in Cachar Distrct, Assam

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ABSTRACT

An investigation was carried out to study the post harvest diseases of fruits in Cachar district. *Aspergillus fumigatus, Aspergillus niger, Aspergillus flavus, Penicillium expansum* and *Rhizopus stolonifer* were found to exhibit the most common fungi during storage. Among them *Aspergillus niger*, was dominant among isolated fungi, followed by *Aspergillus flavus*. There is a need to undertake the storage practices and conditions that will minimize the growth of fungi on stored fruits.

KEYWORDS

Post harvest, Diseases, Storage

INTRODUCTION

Fruits are important food items of our diet. The high concentration of various sugars, minerals, vitamins and amino acids provide a good platform for the successful growth and survival of various parasitic and saprophytic forms of fungi (Fatima *et al*., 2010). Post harvest deterioration of fruits may take place in any stages viz. storage, transit or trans- shipment, during handling processes required to move the crop from the grower to the whole sale dealer and to retailer and finally to consumer. These are responsible for enormous qualitative and quantitative losses of fruits in the market. The fruit infection phase of the disease can result in serious economic loss.

In Assam, actual availability of fruits and vegetables in the market goes down by 35%to40% due to post harvest losses (State Agricultural Policy, Assam, 2004). These losses are not only due to lack of awareness about stages from its production to consumption but owing to high moisture content they are highly susceptible to attack by varieties of fungal pathogens.

The aim of the study was to identify the kind of fungi responsible for post harvest diseases of fruits during storage condition in Cachar district of Southern Assam.

MATERIALS AND METHODS

The study area

Cachar is situated on the southern part of Assam (Longitude 92^{O}15´E -93^{O}15 ´E and , Latitude 24^{O}22´-25^{O}8`) and has a tropical humid climate with average rainfall 233.25mm and temperature ranges between 8.5^{0}C-36.2^{0}C.During the study period of the survey average maximum temperature was 30.35^{0}C.

Collection of Samples

Collections were made at Sadarghat, Irongmara and Rangirkhari. 8 wild fruits were selected for the study of fruits from wooden packeted storage condition. Storage condition was in a dark room. Mature fruits as well as infected fruits were collected from these sites in a sterile polyethylene bags. All the samples were brought to the

laboratory and mature fruits incubated at room temperature (~26^{0}C) in polyethylene bags. Depending on the types of fruits, development of diseases was also different and found to be developed within a period of 1-2 weeks.

Isolation of fungi: Isolation from mature fruits was made by cutting a small section of the infected portion which was sterilized with 0.1% $HgCl_2$ solution for and rinsing in sterilized distilled water. The surface sterilized fruits showing symptoms of diseases were then sliced into 2mm^2 pieces, then plated sterile potato dextrose agar (PDA) in petri dishes and incubated in an inverted position at 26-30^{0}C for five days. Isolated fungi were purified with single spore technique and then kept in a refrigerator on PDA slants.

Identification of fungi: The morphological identification of the fungal strains is based on the morphology of the fungal culture colony, size, colour and characteristics of the spores /hyphae and reproductive structure were examined critically with reference to mycological texts (Barnett and Hunter, 1972). In some cases the infected tissues were stained by cotton blue and Lactophenol (Mc Lean and Ivimey, 1965) and observed under light compound microscope.

RESULTS AND DISCUSSION

The results of this study are preliminary observations on the fungi associated with fruits in Cachar districts. Dominant fungi isolated from the sample fruits were belongs to Ascomycetes, Deuteromycetes and Zygomycetes. Among them *Aspergillus niger* the most dominant over all the fungi isolates from all the fruits,followed by *A.flavus*. Again, a few fungal species were found to be host specific e.g. *Fusarium oxysporium* was specific to *Musa paradisiaca, Geotrichum sp*. was specific to *Psidium guajava*, *Trichoderma viride* to *Elaeocarpus floribundus,* and *Acremonium sp.*to *Mangifera indica.*

Fungi found associated with post harvest storage of fruit were *Aspergillus, Trichoderma, Cladosporium, Curvularia, Penicillium, Rhizopus* and *Geotrichum*. Similar findings were reported by Gadgile *et al.,* (2010) on post harvest fungal diseases of tropical fruits. Studies by Rathod (2010) reported that *Aspergillus niger* and *Penicillium notatum*,which is similar to fungus isolated as responsible for post harvest diseases. Bhale (2011) reported similar results on market storage diseases of some tropical fruits.

Table 1: Fruits showing symptoms and disease causing fungi.

Sr. no.	Fruits	Symptoms	Causal organisms	Stored temperature
1.	*Musa paradisiaca* Linn.	Fleshy creamy rot, white and brown floppy irregular spots, water soaked lesions	*Fusarium oxysporum, Aspergillus niger, A.flavus*	27^{O}C±2
2.	*Psidium guajava* Linn.	Linear to irregular reddish brown pustules and its becomes patches.	*Aspergillus niger, Penicillium notatum, A. flavus*	28^{O}C±2
3.	*Averrhoa carambola* Linn.	Water soaked lesions, brown spot	*Penicillium expansum, Alternaria sp., A.niger.*	28^{O}C±2
4.	*Citrus limon* Linn.	Soft decayed and water soaked lesions with brownish colour	*Rhizopus sp., A.fumigatus*	26^{O}C±2
5.	*Mangifera indica* Linn.	Brown dry spots on the surface, dark necrotic lesions	*Alternaria sp, .A.niger, Acremonium sp., Curvularia sp.*	27^{O}C±2
6.	*Phyllanthus emblica* Linn.	Bluish green lesions, dark brown spots	*Penicillium italicum, Curvularia lunata*	28^{O}C±2
7.	*Elaeocarpus floribundus* Linn.	water soaked lesions, cottony growth and bluish color on the surface,	*Aspergillus niger, Rhizopus sp., Trichoderma viride*	28^{O}C±2
8.	*Artocarpus heterophyllus* Lam.	Black colour lesions on the fruit surface	*Rhizopus sp., A. niger*	28^{O}C±2

CONCLUSION

The findings of the present study conclude that the most important fungi genera responsible for the postharvest diseases of fruits were *Aspergillus, Penicillium, Rhizopu*s. *Aspergillus niger* was the predominant fungi in stored fruits. There is a need to undertake the storage practices and conditions that will minimize the growth of fungi on stored fruits which may causes toxigenic effects on human health.

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