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21. Incidence of Post - Harvest Diseases in Vegetable and Fruit Market

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Abstract

Survey and collection of the marketed Vegetable and fruit with rot symptoms were conducted in the Vegetable and fruit market of Beed in 2017 and 2018 from January 2017 to December 2018 for the study of post harvest diseases in market. Vegetable and fruit showing rot symptoms that are displayed for sale in different market places in city were collected and examined. The loss of vegetable and fruit after harvest is a major problem of vegetable and fruit growing countries of the world. There are reports of losses of millions of rupees annually due to post-harvest diseases caused by different types of mycoflora during transportation and storage periods. In order to make plan for the disease control, it is very essential to have knowledge of pathogenic organism associated with fruits during storage periods. The aim of study of vegetable and fruit diseases of market is to develop perfect disease management strategies that are economically significant. The diseases causes change in color, shape and biochemical alteration of the fruit due to interaction of the pathogen and the fruit becomes unfit for consumption. The vegetable and Fruits selected for study were, Onion, Potato, tomato, Mango, apple, Banana and strawberry. The mycoflora from the isolate by food poisoning technique on P.D.A. (Potato Dextrose Agar) medium. The pathogenicity was tested according to Koch's postulates. There was variation in the mycoflora according to the type of vegetable and fruit. The common fungi were *Colletotrichum capsici*, *Fusarium semitectum*, *Alternaria alternata*, *Aspergillus flavus*, *Aspergillus niger*, *Cladosporium oxysporum*, *Diplodiana*, *Penicillium*, *Gleosporium* and *Verticillium*

Key words: Vegetable and fruits, fungal spore, post-harvest diseases, survey.

Introduction

Man's dependence on plant for the essential of his existence has been of paramount importance in his life since human race began. The production and distribution of plant products

have found influence on the economic and social life of the nation. The food value of vegetable and fruit is comparatively low owing to the large amount of water present even so they rank next to cereals as a source of carbohydrate food.

Fruits are the best sources of many vitamins, minerals and dietary fibers. Fruits improve overall health of human beings. Fruits provide all types of minerals that are required to our body. The nutritionists placed fruits and green vegetables on the top because; fruits contain all types of essential ingredients which are required for healthy living being. Fruits contain 50-90% moisture.

Almost all plants are attacked and destroyed by fungi and these fungi produce toxins which are harmful to human being. In severe condition these toxins produce kidney failure, liver damage complete unconsciousness and even death and some fungi produce carcinogenic toxins called aflatoxin. So it is very necessary to study the different post harvest diseases of vegetable and fruit and to control these diseases.

Different types of fungal forms are found to be associated and responsible for postharvest diseases of fungi. A citrus fruit and sweet orange infected by *Penicillium italicum* (Shafa Khan, 2005). The fungus *Aspergillus niger* was found to be associated with rot of orange; Sumia, et. al, (2006) reported white rot of papaya by caused by *Sclerotium rolfsii*. Major loss of harvested fruits is caused due to fungi. The diseases caused before harvest of fruits also responsible for degradation of quality and cost of fruits in market. Post-harvest loss of fruits may be due to susceptibility of fruits to the fungal growth.

Material and Method

The fruits and vegetable were collected from different places of market. The selected fruits and vegetable for investigation for study were Sweet orange (*Citrus sinensis* Linn.), Mango (*Mangifera indica* Linn.), Banana, and Apple (*Malus domestica* Borkh) etc. A separate polyethylene bag was used for each type of infected fruit and vegetable in all cases. The pathogenic fungus responsible for storage rots of fruit was isolated on PDA (Potato Dextrose Agar) medium. Initially the fruit were surface sterilized with the solution of 0.1% HgCl₂. To remove the traces of HgCl₂ the fruits were washed with distilled water for 3-4 times. Then a small piece of infected region of fruit was removed with the help of sterile needle and the piece was inoculated on PDA (Potato Dextrose Agar) medium amended petriplate in sterile condition. The petriplate were incubated at room temperature 27°C (Shafa Khan 2015). The fungus growing from the infected piece was removed and re inoculated on PDA

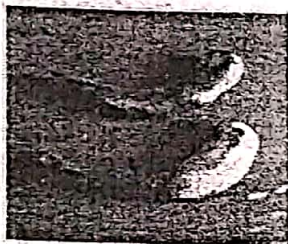
medium for several times to get pure culture. The pathogenicity of each type of fungus was studied according to Koch's postulates. A 4mm disc of growing fungal colony was removed by sterile borer in sterile condition and inoculated on healthy fruit at the region of superficial puncture made artificially with sterile needle. A set of 3 fruits were used to confirm pathogenicity. The fungi were identified on the basis of morphological, reproductive spore's features, type of colony growth, and color of colony and shape of spores on the basis of standard literature.

Some common Market and Storage fungal diseases reported during the Study periods

Sr. No	Name of the Disease	Causal organism
1	Alternaria rot of Apple	<i>Alternaria solani</i>
2	Aspergillus rot of Apple	<i>Aspergillus niger</i>
3	Alternaria rot of Banana	<i>Alternaria solani</i>
4	Soft rot of Tomato	<i>Rhizopus sp.</i>
5	Soft rot of Potato	<i>Rhizopus sp.</i>
6	Anthracoise of Banana	<i>Gleosporium musarum</i>
7	Black tip of Banana	<i>Drechslera torulosum</i>
8	Botrydipodia fruit rot of Banana	<i>Botrydipodia theobromae</i>
9	Cigar end damage of Banana	<i>Verticillium theobromae</i>
10	Pink mould rot of Banana	<i>Trichothecium roseum</i>
11	Fusarium rot of Banana	<i>Fusarium moniliforme</i>
12	Blue mould of citrus	<i>Penicillium italicum</i>
13	Green mould of citrus	<i>Penicillium digitatum</i>
14	Soft rot of citrus	<i>Diplodiana natalensis</i>
15	Black Spots of Citrus	<i>Aspergillus citri</i>
16	Rot of Citrus	<i>Aspergillus niger</i>
17	Fruit rot of Tomato	<i>Alternaria solani</i>
18	Anthracoise of Mango	<i>Colletotrichum gloesporioides</i>
19	Brown rot of Apple	<i>Sclerotinia fructigena</i>
20	Black rot of Onion	<i>Aspergillus niger</i>
21	Rhizopus rot of Apple	<i>Rhizopus sp.</i>
22	Pear Rot	<i>Aspergillus japonicus</i>
23	Pear Rot	<i>Diplodiamukla</i>

Plates

Plate No. 09

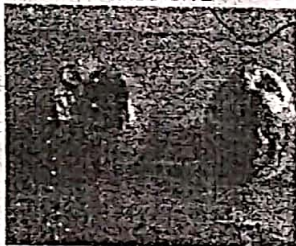


Anthracnose of Banana

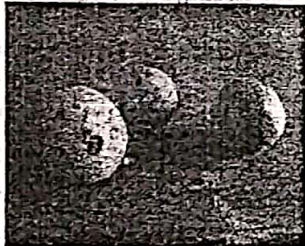


Aspergillus rot of Pomegranate

Plate No. 12

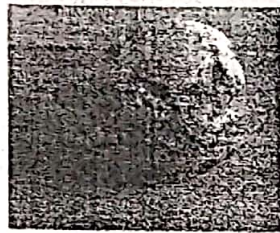


Infected Apple



Aspergillus rot of Lemon

Plate No. 10

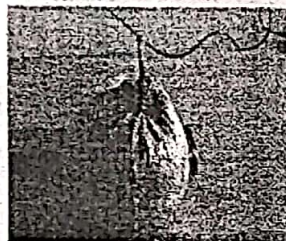


Thielaviopsis rot of Papaya



Fusarial rot of Guava

Plate No. 13

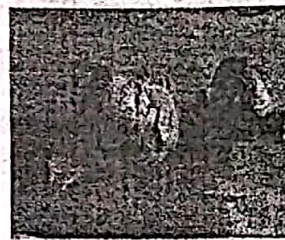


Aspergillus rot of Pear



Fruit rot of Tomato

Plate No. 11

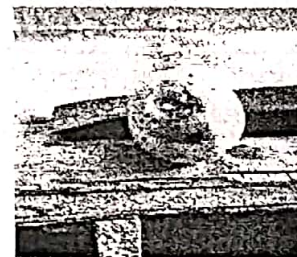


Black rot of Onion



Late Blight of Potato

Plate No. 14



Penicillium rot of Aonla

Result

Pathogenesis of fungal diseases in Vegetables and fruits were also tried by using Koch's postulates. During the period of investigation different diseased fruits and vegetables are collected from the market areas during all seasons throughout the study periods and they are brought to the laboratory in polythene bags and in laboratory the pathogen which are associated with that infected vegetables and fruits are isolated and identified with standard literatures and observed the pathogen which is responsible for causing post harvest diseases and these pathogens are inoculated and transfer to sterilized vegetable and fruits for confirmation of pathogen as per Koch's Postulates.. Different 23 three post harvested diseases were observed during the period of study. Majority of the disease were caused by the pathogens which were trapped during study periods such as Alternaria ,Aspergillusrhizopus , FussariumPenicillium

which causes rot diseases in economically important crops while the other fungal like *Drechslera* and *diplodia* spores causes less loss to the fruits and vegetables. The high concentration of fungal spores which were responsible for causing post harvest diseases in market were recorded during the period July to January and the lowest in February to June in both the years. During July to January the disease incidence was more in market as compared to February to June. .

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