

**STUDY OF POST HARVEST PATHOLOGY OF DRY FRUITS**



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**ABSTRACT:**

Fruits are excellent source of food having good taste & flavor. They are rich in various organic acids, vitamins, minerals, salts & water. They provide energy without influencing blood sugar level. Extensive loss of fruit due to disease occurs not only in orchard but also in the market & storage places. The loss due to market and storage diseases of fruits is perhaps more costlier than the disease in filed level. The study of disease of fruits in market or after harvest is known as ' Post Harvest Pathology '.

**KEYWORDS**

*Post Harvest Pathology, Dry Fruits, vitamins, minerals, salts & water.*

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## INTRODUCTION :

Most of the fruits in the market have their spoilage or deterioration because of fungal inhabitant diseases get spread during transportation & handling & may cause great loss due to their perishable nature hence market pathology was started to isolate & to know the fungal pathogens. This needs their proper survey hence work was undertaken to study some selected dry fruits from Udgir & Ahemadpur market. The fruit under studies were Almond, Coconut, Fig, Date palm & betel nut.

## MATERIALS & METHODS:

**Study of Mycoflora:** The association of fungi may be detected by direct examination of dry fruits and by studying three well known methods- These methods include Blotter method, PDA method & suspension method.

### I. Blotter Paper Method:

The basic principle of this method to provide a high level of relative humidity. Optimal light & temperature conducive for fungal development. Blotter papers are soaked in water & placed in petriplate after draining off the excess water. A fixed number of dry fruits are placed equidistance from one another & their number depends upon size of fruit e.g. in case of Almond five fruits in petriplates of 9 cm. After placement of fruits culture, fruits are incubated & are examined within eight days. Fungal growth is noted.

### II. Preparation of PDA medium:

#### Method for preparing PDA (Potato Dextrose Agar) medium: -

PDA is suggested to identify the fungal organism associated on the fruits based on growth & colonies characteristics on nutrient medium.

This extract is prepared by taking 200 gm of fresh potato pieces. They are digested in about 500 ml of water. The yellow liquid called potato infusion will be ready. Its volume is made up to 1000 ml with water. In this 20 gm's of dextrose & 15 gm of Agar added & boiled till all the contents mix properly.

This is transferred to a conical flask (500 ml capacity - 3 flask) by cotton plugging. Medium is autoclaved at 15 P.S.I, for 20 minutes. Medium is transferred to petriplates in sterilized condition such plates are used for cultural studies.

III. Suspension method in this take a suspension of dry fruits for understanding of fungi on the PDA medium. It is based on growth & colonies characteristic on nutrient medium.

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## RESULT &amp; DISCUSSION:

Table 1: Mycoflora observed in Almond (*Prunus amygdalus* L.)

Sr. No.	Name of Fungi	Percent (%) incidence of Mycoflora		
		Standard blotter paper	Agar plate	Suspension method
1	<i>Aspergillus flavus</i>	43	51	31
2	<i>Aspergillus niger</i>	40	48	27
3	<i>Alternaria tenuis</i>	15	38	18
4	<i>Alternaria alternata</i>	12	22	11
5	<i>Penicillium ustus</i>	10	22	15
6	<i>Mucor</i>	41	38	36

Table 2: Mycoflora observed in coconut (*Cocos nucifera* L.)

Sr. No.	Name of Fungi	Percent (%) incidence of Mycoflora		
		Standard blotter paper	Agar plate	Suspension method
1	<i>Aspergillus niger</i>	28	33	42
2	<i>Alternaria alternata</i>	28	40	16
3	<i>Fusarium oxysporum f. sp. Udum</i>	36	44	34
4	<i>Penicillium citrinum</i>	17	33	31
5	<i>Rhizopus verticillium</i>	18	46	38
6	<i>Mucor</i>	13	43	39

Table 3: Mycoflora observed in Fig (*Ficus carica* L.)

Sr. No.	Name of Fungi	Percent (%) incidence of Mycoflora		
		Standard blotter paper	Agar plate	Suspension method
1	<i>Aspergillus niger</i>	28	33	23
2	<i>Aspergillus flavus</i>	28	40	16
3	<i>Rhizopus verticillium</i>	26	45	41
4	<i>Rhizopus stolonifer</i>	10	47	37
5	<i>Mucor mucedo</i>	15	37	32

Table 4: Mycoflora observed in Date palm (*Phoenix dactylifera* L.)

Sr. No.	Name of Fungi	Percent (%) incidence of Mycoflora		
		Standard blotter paper	Agar plate	Suspension method
1	<i>Aspergillus niger</i>	28	33	23
2	<i>Aspergillus flavus</i>	12	30	28
3	<i>Rhizopus</i>	26	45	18
4	<i>Mucor</i>	8	35	33

Table 5: Mycoflora observed in Betel nut (*Araca catechu*)

Sr. No.	Name of Fungi	Percent (%) incidence of Mycoflora		
		Standard blotter paper	Agar plate	Suspension method
1	<i>Aspergillus niger</i>	12	28	26
2	<i>Aspergillus flavus</i>	11	24	21
3	<i>Rhizopus</i>	18	33	27
4	<i>Mucor</i>	12	10	28
5	<i>Penicillium</i>	15	29	18
6.	<i>Fusarium oxysporum f. sp.</i>	16	32	27
7	<i>Cladosporium</i>	13	30	22

During collection of fruits I have seen that fruits like Khajur was selled along roadside & it was having direct occupation of fungi like *Aspergillus & Rhizopus* & they were contains good amount of dust also. In some places broken Betel nut was selled having growth of *Mucor, Penicillium, Rhizopus*. As for the record number of fruits are occupied by fungi causing Black mouldy rot, Blue Mould rot by *Aspergillus & Fusarium* while white, pink & green rot by *Fusarium & Penicillium*.

The study of dry fruits was conducted by Wet blotting paper technique, incubating on PDA medium & taking suspension of dry fruits on solid PDA medium. When fruits of Almond are having intercontinental transport & those micro-organisms that disturbs the quality of this dry fruits deterioration also by fungi like *Aspergillus niger, Penicillium ustus, Mucor, Alternaria alternate* Date fruits are drupe type rich in sugar as well as proteins, fats & mineral. It is selled in market as a dry as well as fleshy. Loose drupe when fruits were transferred on blotter, medium & suspension of fruits shows extensive growth of fungus *Rhizopus*.

Figs is special cyconus fleshy fruits rich in sugars, minerals & salts. They are selled in market as

fresh, fleshy fruits & we have collected pressed dry fruits rings & on Blotter it was noted that there is extensive growth of *Aspergillus niger*, *Mucor musedo*, *Rhizopus stolonifer* because of heavy moisture fruits get covered within a short time by *Rhizopus*.

Betelnut is dried ripe nut which contains some alkaloids & salts. Fruits get occupied by blue white growth of *Penicillium*, *Fusarium* & within few days nuts get occupied by growth of *Rhizopus*. Betelnut which is sold by cutting on small pieces as shown saprophytes like *Penicillium*, *Aspergillus*, ; *Cladosporium*.

Nutmeg which is actually said as spice which contains fatty oils, carbohydrates, proteins, volatile oil & some flavoring volatile materials like terpenes. When fruits transferred on Blotter fungi like *Rhizopus*, *Mucor* occupy the fruits within few days, fruits are also occupied by pinkwhite growth of *Fusarium*. On PDA medium fungi like *Cladosporium* & *Rhizopus* was noted while suspension of fruits shows good amount of growth of *Rhizopus*, *Mucor* & *Penicillium*.

Coconut-dry khopra is very rich in oil & some mineral, sugars. When pieces of this khopra was transferred on blotter fungi like *Penicillium*, *Rhizopus*, *Mucor* observed extensively while on PDA fungus like *Rhizopus*, *Fusarium* & suspension of Khopra shows fungi like *Rhizopus verticillium* & *Aspergillus niger*.

The studies on dry fruit indicate that some common deteriorating agents, which are saprophytes, were constantly noted from different sources of fruits. Fungi like *Mucor* & *Rhizopus* were most common on majority of cases & thus these common deteriorating on majority of cases & thus these common deteriorating agent occur almost in all fruits some other storage fungi like *Aspergillus* & species of *Penicillium* inhabit the fruit surface. Many times the extensive growth of *Rhizopus* & some amount of growth *Cladosporium* was noted in several cases. As the fruits are rich in sugars, salts & minerals & highly perishable materials get occupied shortly by common moulds like *Rhizopus* & *Mucor* followed by growth of *Penicillium*, *Fusarium*, *Cladosporium* etc. After eating of some damaged & affected fruits some times throat infection or some digestive tract problems occurred due to variety of reasons but some dangerous fungi like *Aspergillus flavus*, *Fusarium oxysporum* may have some role in such problems.

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