

# Isolation and identification of storage fungal pathogen from onion (*Allium cepa* L.) in Maharashtra, India

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## ABSTRACT

Onion is one of important commercial vegetable crops grown in worldwide. India is second most onion producer. In India Maharashtra is leading state. Present study was investigated of the isolation and identification of storage fungal pathogen on onion, onions are infected from many fungal diseases, such as, Black mold, Blue mold, Botrytis brown stain, and Smudge, are major storage fungal diseases. A complete cause the numbers of storage onion are observed by infected fungi. Diseased sample were collected from the different locality of Maharashtra likewise, Aurangabad, Beed, Jalna, Osmanabad, Nashik, Ahemdagar and Pune districts. Fungi were isolates from the infected onions of different pathogen as like, *Aspergillus niger* *Penicillium sps* *Botrytis cinerea* *Colletotrichum circinans* etc.

**Key words:** Storage fungal pathogen, onion

## INTRODUCTION

Onion (*Allium cepa* L.) is the important commercial vegetable crops grown in worldwide. Onion is valued for its bulbs having characteristic odor, flavor and pungency, which is due to the presence of a volatile oil – Allyl-propyl-disulphide. Pungency is helps to human health (Griffiths *et al.*, 2002). India is the second largest producer country of onion after the china, and leader in production. In India occupies an area of 1.05 million hectare with the production of 16.81million tones (DA & CHD 2013). The major onion growing states in India is the Maharashtra, Bihar Orissa, Andhra Pradesh, Karnataka, Rajasthan Tamil Nadu, Haryana, and Madhya Pradesh. Maharashtra is the pioneer state in onion production contributing 25% of country's onion (Gadge *et al.*, 2012). In Maharashtra the major onion producing districts are Pune, Ahmadnagar, Satara, Solapur Dhulia, and Nashik. Nashik district contributes 35 to 40 % of the onion production. Onions are cultivated in three different seasons' *Kharif* and *Rabi*. In Maharashtra, the production of onion likewise season, late *Kharif* (35-40%), and *rabbi* (40-45%) *Kharif*, (20%), respectively. (Data source: NHRDF, Nashik 2006).

Chemical composition of onion is anti-inflammatory, anticancer, anticholesterol, and antioxidant properties such as quercetin (Slimestad *et al.* 2007). The fungicidal and insecticidal properties of onion are also well identified (Mishra, 2014). The onion also losses due to the causes of same Virus, bacterial, Mycoplasma Nematode and fungi is the major Field bulb diseases of onions. These concept understanding, chosen the most important think is isolation and identification of storage fungal pathogen on onion.

## MATERIAL METHODS

### Collection of samples

Infected sample was collected from the fields, in the polythine bags, that bags was sterilized or aseptic in condition and brought in to the laboratory of Dr Babasaheb Ambedkar Marathwada University, Department of Botany, Plant pathology Fungal Biotechnology laboratory for further experiments.

### Isolation and Identification causal pathogen:

The infected onion leaves collected from the fields directly in polythine bags of different areas of Maharashtra. Likewise, Aurangabad, Beed, Jalna, Latur, Nashik, Osmanabad, and Pune districts. These collected samples were cleaned and washed by sterilized water then surface sterilized with 1% HGCL<sub>2</sub> solution, the rinsed several times in sterilized water and dried, the surface sterilized sample were inoculated on to Potato Dextrose Agar (PDA) medium and incubated at 24°C. After 4-5 days incubation period, the developed fungal colonies were purified by hyphal tip and single spore isolation technique. Identification and the fungal isolation were carried out by using the morphological characteristic of mycelia and spore as described by (Kritzman,1983).

## RESULTS & DISCUSSION

Storage fungal diseases of onion were studied by collecting samples of onion from seven different localities and results are shows in table and photo plate. Four fungal diseases were found on the collected samples. Sample collected from Pune did not show black mold disease, conversely, Aurangabad and Nashik sample showed dense growth of *Aspergillus niger* responsible for black mold disease. Samples from Aurangabad, Osmanabad, Nashik and Ahemdagar showed moderate occurrence of blue mold disease caused due to *Penicillium sp.* *Botrytis* brown stain disease caused due to *Botrytis cinerea* showed less occurrence on samples collected from Aurangabad, Osmanabad, Nashik whereas, smudge disease caused due to *Colletotrichum circinans* showed moderate growth on the sample collected from Aurangabad and Nashik are given in table 1.

Storage fungal diseases of onion were studied by collecting samples of onion from seven different localities result and their discussion on the other hand, storage diseases like Black mould rot caused by *Aspergillus niger* and Blue mould rot caused by *Penicillium sp.* were studied with respect to symptoms. Same type of work was carried out by Aiyer (1980).

They studied about 15 different fungal diseases of onion in the storage and transit all over the world for which the loss may go up to 40%. Major storage diseases of onions are black mould caused by *Aspergillus* spp. which produced sooty black masses under surface scales, neck rot of *Botrytis* spp. showing dusty grey appearance and rot in neck of bulb, *Fusarium* spp causing *Fusarium* rot which formed white fluffy growth with soft rot at base or neck of onion and blue green mould caused by *Penicillium* spp.

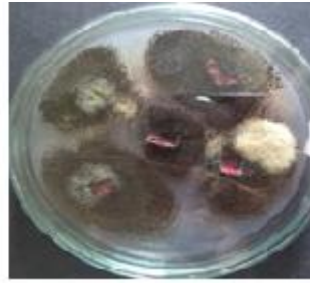
**Table 1: Storage fungal diseases of onion on different locality**

Diseases name	Causal Organisms	Locality						
		Aurangabad	Beed	Jalna	Osmanabad	Nashik	Ahemdnagar	Pune
Black mold	<i>Aspergillus niger</i>	+++	++	+	++	+++	++	-
Blue mold	<i>Penicillium sps</i>	++	-	-	++	++	++	+
Botrytis brown stain	<i>Botrytis cinerea</i>	+	-	-	+	+	-	-
Smudge	<i>Colletotrichum circinans</i>	++	-	-	+	++	+	+

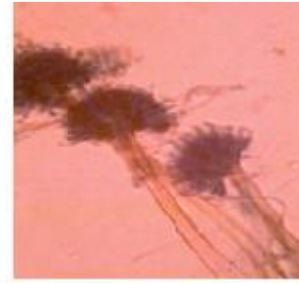
(+++)= Dense, (++) = moderate, (+) = less, (-) = absent



Black mold



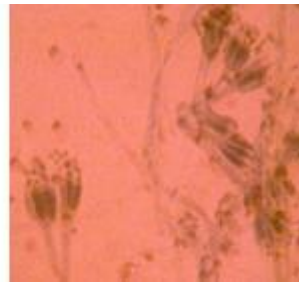
*Aspergillus niger*



Blue mold



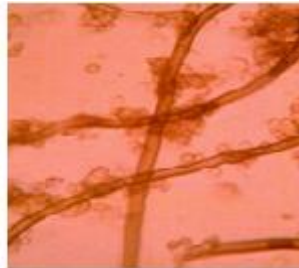
*Penicillium sps*



Botrytis brown stain



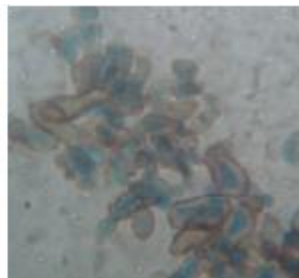
*Botrytis cinerea*



Smudge



*Colletotrichum circinans*



**Photo plates : Fungal pathogen on onions, Pure Culture and Microphotograph**

showing dusty green masses under surface scales (Jackson and Groop man, 1999). Tyson and Fullerton, (2004) also studied the black mould of onion which is primarily a post-harvest disease caused due to *Aspergillus niger* Similarly, Ara *et al.* (2008) and Pawar and Chavan (2016) also studied the storage diseases of onion.

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