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Isolation of fungi associated with post harvested fruits of cucumber collected from local markets of Kosi division

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ABSTRACT

Altogether, 10 species of fungal pathogens belonging to 7 genera were isolated on PDA medium, from fruit rot of cucumber isolated fungal pathogens were *Fusarium oxysporum, Rhizopus* sps., *Aspergillus* sps., *Mucor* sps., *Candida* sps., *Phytopthora* sps., *Geotrichum* sps.. Percentage incidence and pathogenicity of all isolates studied. Percentage incidence varied from 6% to 16%. Maximum incidence was observed in Singheshwar market followed by Saharsa market. *Aspergillus* sps. were observed in cucumber rot of all markets while *Phytopthora* sps. and *Geotrichum* sps. were observed only in cucumber rot of Madhepura market. *Fusarium oxysporum* was observed in cucumber rot of Bakhtiyarpur market and Singheshwar market

Key Words - PDA, cucumber fruit rot, disease incidence, pathogenicity

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INTRODUCTION

Cucumber is one of the most important vegetable used in Salad, pickles or cocked as vegetable. It belongs to family cucurbitaceae. There are several varieties of cucumber including Pusa long green, Poinsett, Poonakhira, Pant khira-1, Japanese long-gree, Agrigreen and several hybrids including KPCH2, PantC2, JK manali, USM-Rani, Nazia F1, Sgaun and Sheetal. Regarding origin of cucumber, different authors have different opinion. According to Sebastian *et al.,* (2010) and Lv J. *et al.,* (2012) cucumber originated from foot hills of Himalayan Mountain in India. It was cultivated 3000 years ago in India. Abulude *et al.,* (2010) also consider origin of cucumber from Asia. Cucumber fruits have several health benefits. It is nutritious and its extract is used in many topical skin preparations (Mateljan *et al.,* 2006). The deep cleansing action of its extract is due to its chemicals constituents like glycolic acid, lactic acid and salicylic acid (McGraw Hill dictionary of chemistry-984). Seeds of cucumber are diuretic, efficient taeniacide and used as anemetic substance (Mateljan *et al.,* 2006). The quality of cucumber fruits is affected by pest harvest handling, transportation and storage (Agrios *et al.,* 2005). Naureen *et al.,* (2009) isolated several post harvested fungi from cucumber rot including *Aspergillus, Rhizopus, Cladosporium* and *Fusarium*.

In the present study, post harvested fruits of cucumber were collected from local markets of Bakhtiyarpur, Saharsa, Supaul and Madhepura of Kosi division to investigate infection of fungi in cucumber fruits.

MATERIAL & METHODS

Collection of Samples:

Cucumber fruits were collected from local markets of Bakhtiyarpur, Saharsa, Baijnathpur, Madhepura, Singheshwar and Supaul. In each market, fifty fruits were randomly examined and the rotted fruits were collected in polythene bags. Details of market and date of collection were tagged on polythene bags.

Samples were brought to laboratory for further study.

Disease incidence: Disease incidence in each market was calculated by the formula:

$$Disease\ incidence = \frac{No.\ of\ rotten\ fruits}{Total\ no.\ of\ fruits\ examined} X100$$

Isolation of fungi from rotten fruits: Collected diseased fruits were washed thoroughly in running tap water. Infected part of fruits was cut out from the fruits and surface sterilized in 0.5% sodium hypochlorite solution for 2 minutes. Finally surface sterilized samples were washed 3-4 times with autoclaved water and transferred aseptically in a sterilized petridish.

Potato dextrose agar medium was prepared and sterilized by autoclaving at 15lb/inch^2 pressure for 15 minutes. Medium was transferred aseptically in pre-sterlized laminar air flow. Medium was supplemented with ampicillin to inhibit bacterial growth and dispensed into sterile petri-dishes. Sterilized diseased fragments of cucumber rot were inoculated in PDA plates and incubated at 28±2^{0}C temperature in dark for 72 hours. Fungal colonies/ mycelium was subcultured to obtain pure culture. Temporary slides were prepared in cotton blue and lactophenol. Slides were observed in microscope and identified on the basis of morphological characters of mycelium/ spores/ conidia/ sporangium/ conidiophores etc. as described in "Laboratory manual of microbiology 5th ed. Fawole *et al.,* 2007."

Pathogenicty test: Isolated fungi were tested for their ability to infect healthy fruits of cucumber. Ten healthy fruits of cucumber were taken for each fungal isolate. Healthy fruits were surface sterilized with 75% ethanol and washed with autoclaved water. In each healthy fruit a hole was made with the help of a cork borer and the plug as pulled out. Mycelium of pure culture was introduced in to the hole and plug was replaced. Wounded part of fruit was sealed with petroleum jelly. Fruits were incubated at 28±2°C temperature for 10 days. Incubated fruits were observed at two, four, six, eight and ten day for rot development. No. of infected fruits and uninfected fruits were counted.

RESULT & DISCUSSIONS

Altogether, 10 species belonging to 7 genera were isolated from post harvested cucumber fruits collected from local markets of Kosi division. Among 6 genera isolated from cucumber fruits *Aspergillus* and *Rhizopus* were most frequent in all markets. Occurrence of *Aspergillus* and *Rhizopus* in post harvested fruits, vegetables was also reported by Naureen *et al.,* (2009) from Karachi, Pakistan. Lerner *et al.,* (2001) reported occurrence of *Aspergillus* sps. and *Rhizopus* sps. in pumpkin, cucumber, melon and gourds.

Yaji *et al.,* (2016) also reported frequent occurrence of *Aspergillus* in post harvested cucumber rot. In the present study, occurrence of *Mucor* sps. was observed in fruits of cucumber collected from Saharsa, Madhepura and Baijnathpur market. Occurrence of *Fusarium oxysporum* was observed in Bakhtiyarpur and Singheshwar market. *Geotrichum* sps. and *Phytopthora* sps. were observed only in cucumber rot collected from Madhepura market. Chiejina *et al.,* (2008) reported occurrence of *Geotrichum* sps., *Mucor* sps. and *Fusarium oxysporum* from salad vegetables. Disease incidence was studied in markets of Bakhtiyarpur, Saharsa, Baijnathpur and Madhepura. Percentage disease incidence was observed from 6% to 16%. Highest disease incidence was recorded from Singheshwar market (16%) and lowest from Madhepura market.

Disease incidence in cucumber fruits collected from different markets.

Table 1: Disease incidence in cucumber fruits collected from different markets

Market	Total fruit examined	Infected fruits	Disease incidence
Bakhtiyarpur	50	5	10%
Saharsa	50	7	14%
Baijnathpur	50	4	8%
Madhepura	50	3	6%
Singhshwar	50	8	16%

Pathogenicity test for all isolates was conducted which varied from 43% to 80%. Maximum pathogenicity was recorded for *Aspergillus niger* and *Mucor mucedo*.

Table 2: Fungal pathogen from cucumber rot collected from different market

Market	Fungal pathogens
Bakhtiyarpur	*Fusarium oxysporum*
	Aspergillus niger
	Rhizopur stolonifer
	Aspergillus candidus
Saharsa	*Rhizopur stolonifer*
	Mucor plumbeus
	Aspergillus candidus
Baijnathpur	*Aspergillus niger*
	Mucor mucedo
	Mucor racemosus
	Rhizopur stolonifer
	Candida tropicalis
Madhepura	*Phytopthora colocasiae*
	Geotrichum candidum
	Mucor mucedo
	Rhizopus stolonifer
	Aspergillus niger
Singheshwar	*Fusarium oxysporum*
	Aspergillus niger
	Rhizopus stolonifer

Table 3: Percent pathogenicity of fungal pathogens

Isolate	Percent pathogenicity
Fusarium oxysporum	70%
Aspergillus niger	80%
Aspergillus candidus	78%
Rhizopus stolonifer	75%
Mucor plumbeus	70%
Mucor mucedo	80%
Mucor racemosus	74%
Candida tropicalis	52%
Geotrichum candidum	43%
Phytopthora colocasiae	60%

CONCLUSION

Cucumber fruits are most important vegetable used as salad, pickles or cooked as vegetable. The fruit is attacked by several fungal pathogens during cultivation and during post-harvest. During post-harvest fruits are attacked by fungal pathogens due to poor handling, transportation and storage. In the present study, fungal pathogens were isolated from cucumber rot collected from local markets of Kosi division (Bakhtiyarpur, Saharsa, Baijnathpur, Madhepura and Singheshwar).

Altogether, 10 species of fungal pathogens belonging to 7 genera were isolated on PDA medium, from fruit rot of cucumber isolated fungal pathogens were *Fusarium oxysporum, Rhizopus* sps., *Aspergillus* sps., *Mucor* sps., *Candida* sps., *Phytopthora* sps., *Geotrichum* sps.. Percentage incidence and pathogenicity of all isolates studied. Percentage incidence varied from 6% to 16%. Maximum incidence was observed in Singheshwar market followed by Saharsa market. *Aspergillus* sps. were observed in cucumber rot of all markets while *Phytopthora* sps. and *Geotrichum* sps. were observed only in cucumber rot of Madhepura market. *Fusarium oxysporum* was observed in cucumber rot of Bakhtiyarpur market and Singheshwar market.

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