

# REPORT OF SOME FUNGI FROM SOME OF THE CONDIMENTS OF DAILY USE IN STORAGE

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The isolation of fungi associated with the condiments of daily use in storage has been done. Fourteen species of fungi viz; *Circinella mucoroides*, *C. muscae*, *Aspergillus candidus*, *A. fumigatus*, *A. nidulans*, *A. niger*, *A. niveus*, *Aspergillus* species, *Penicillium frequentans*, *Alternaria humicola*, *Curvularia tetramera*, *Monilia geophila*, *Fusarium* species and *Rhizoctonia* species have been isolated from five important condiments *Coriandrum sativum* L. (*Dhania*), *Cuminum cyminum* L. (*Jeera*), *Curcuma longa* L. (*Haldi*), *Foeniculum vulgare* Miller (*Saunf*) and *Trigonella foenum-graecum* L. (*Menthi*) in storage have been isolated *Penicillium frequentans* and *Curvularia tetramera* could be isolated from only one source *Coriandrum sativum* and *Trigonella foenum-graecum* respectively. *Circinella mucoroides* and *C. muscae* are the first record from these sources in our country. *Monilia geophila* and *Rhizoctonia* species too have been reported for the first time from *Curcuma longa* and *Trigonella foenum-graecum* respectively. It may be added that the fungi found in association with the condiments may be pathogenic to the plants but if the condiments are thoroughly dried, exposed to bright sunlight and cleaned before utilization, they can be rendered safe for human consumption.

Several fungi found on market seeds used in spices are known to cause considerable damage either directly to those that carry them or to the crops that are raised from such contaminated seed stocks. Generally we see that the condiments which are used daily in our food material and which are easily stored in our houses get infected by fungi after some time. Mathur<sup>1</sup> is of the opinion that the viability of seeds is lost due to the effect of fungi found on the surface of the seeds and that the vegetable seeds lose their viability rapidly during storage.

For laying down health standards against seed borne diseases of condiments considerable background information is needed with regard to mycoflora associated with such seeds, their role if any, on the disease outbreaks and the nature and extent of damage they cause. It has been reported<sup>2</sup> that the fungi found on the surface of the vegetable seeds are pathogenic and affect the germination of seeds. It may be interesting to note that due to the presence of some fungi on condiments both their qualitative and quantitative values are very much reduced. It may have considerable effect where they are purchased and stored in bulks for instance in our defence units. Keeping in view the health standards of the consumers their qualitative value has to be considered. There is also a considerable economic loss to the nation due to decaying and rotting of condiments because of fungi and other microorganism.

Suryanarayana and Bhombe<sup>2</sup> have enumerated both externally and internally occurring fungi on a variety of vegetable seeds and isolated species of thirteen fungi which affect the germination of seeds. Sinha<sup>3</sup> has studied the surface mycoflora of the stored seeds and isolated eleven species of *Aspergillus*, five species of *Fusarium*, two species of *Alternaria* and *Curvularia* each, five species of *Penicillium* and many other species of about seven fungi.

The authors in present study have tried to isolate fungi from the condiments of daily use in storage at Gyanpur which is situated only 6 km away from Gopiganj a town on G.T. Road and having many store houses for grains and condiments.

## MATERIAL AND METHODS

The following five important condiments of daily use viz., *Coriandrum sativum* L. (*Dhania*), *Cuminum cyminum* L. (*Jeera*), *Curcuma longa* L. (*Haldi*), *Foeniculum vulgare* Miller (*Saunf*) and *Trigonella foenum-graecum* L. (*Menthi*) were selected for studying the mycoflora associated with them. The isolation of fungi was done by dilution method<sup>2,4</sup> as well as by direct inoculation method<sup>2,5</sup>. In case of direct inoculation method both the standard blotter and Agar plating methods<sup>2,5</sup> were employed. Martin's Rose Bengal Agar, P.D.A. and Czapeck's Agar media were used separately for the isolation and subsequent culturing of these fungi.

In both the cases the plates were incubated at  $26^{\circ} \pm 2^{\circ} \text{C}$  and examined periodically after 12 to 36 hour intervals for the growth of fungi. The fast growing colonies in turn were transferred to fresh Agar plates to avoid over running of other colonies by such fungi. After first isolation the petri plates were kept upto

TABLE 1  
FUNGI ISOLATED FROM DIFFERENT CONDIMENTS

Host	Isolated fungi	Phylogenetic position
<i>Coriandrum sativum</i>	<i>Aspergillus nidulans</i>	Ascomycetes
	<i>A. niger</i>	"
	<i>A. niveus</i>	"
	<i>Penicillium frequentans</i>	"
<i>Cuminum cyminum</i>	<i>Circinella mucoroides</i>	Phycomycetes
	<i>Aspergillus candidus</i>	Ascomycetes
	<i>Aspergillus</i> species	"
	<i>Alternaria humicola</i>	Deuteromycetes
<i>Curcuma longa</i>	<i>Aspergillus</i> species	Ascomycetes
	<i>Curvularia tetramera</i>	Deuteromycetes
	<i>Monilia geophila</i>	"
<i>Foeniculum vulgare</i>	<i>Circinella mucoroides</i>	Phycomycetes
	<i>C. muscae</i>	"
	<i>Fusarium</i> species	Deuteromycetes
<i>Trigonella foenum-graecum</i>	<i>Aspergillus fumigatus</i>	Ascomycetes
	<i>A. niger</i>	"
	<i>A. niveus</i>	"
	<i>Penicillium frequentans</i>	"
	<i>Alternaria humicola</i>	Deuteromycetes
	<i>Fusarium</i> species	"
	<i>Rhizoctonia</i> species	"

20 days for the isolation of late growing species. Pure cultures of the isolates were made by colony sampling method and were subsequently maintained on P.D.A. and Czapek's Agar media. The identification of organisms was made by growing them on different media and by taking the measurements of different structures at varying stages of their growth<sup>6,7</sup>.

### RESULTS

Fourteen species of these fungi have been isolated from condiments under study, of which seven are from *Trigonella foenum-graecum*, four each from *Coriandrum sativum* and *Cuminum cyminum* and three each from *Curcuma longa* and *Foeniculum vulgare*.

### DISCUSSION

Reports of fungi from seeds, fruits and vegetables in storage are not uncommon. Members of *Mucorales* have been reported from a number of stored seeds<sup>8</sup>, onion seeds<sup>8</sup>, (Helaly *et al* 1964, cited in ref 3), stored vegetable seeds<sup>2</sup> and guar seeds<sup>8</sup>. The authors too have recorded *Circinella mucoroides* and *Circinella muscae* from *Cuminum cyminum* and *Foeniculum vulgare*. These species have so far not been isolated from this source in our country.

Reports of various species of *Aspergillus* are on record from seeds of vegetables<sup>2</sup>, the surfaces of stored seeds of different plants<sup>8</sup>, castor oil seeds and guar seeds<sup>8</sup>, cauliflower seeds<sup>9</sup>. Six species of *Aspergillus* have presently been observed by the authors from different condiments.

*Penicillium frequentans* could be isolated from *Coriandrum sativum* only during the present studies although the species is of common occurrence on stored seeds<sup>8</sup>, vegetable seeds<sup>2</sup>, rice<sup>5</sup>, barley<sup>10</sup> and cauliflower seeds<sup>9</sup>.

Members of Fungi Imperfecti observed from different sources during the present study include *Curvularia tetramera*, *Alternaria humicola*, *Monilia geophila*, *Fusarium* species and *Rhizoctonia* species. Species of *Alternaria* have been found in association with a variety of vegetable seeds<sup>2</sup>, ragi seeds<sup>11</sup>, different stored seeds<sup>8</sup>, castor oil and guar seeds<sup>8</sup> and cauliflower seeds<sup>9</sup>. The present species *Alternaria humicola* is a new record from *Cuminum cyminum* and *Trigonella foenum-graecum*.

Presence of species of *Curvularia* on seeds of different plants has been reported by various workers<sup>2,3,5,11</sup>. During the present studies *Curvularia tetramera* could be isolated only from one source *Trigonella foenum-graecum*.

The presence of *Monilia geophila*, *Fusarium* species and *Rhizoctonia* species have been recorded from the condiments of daily use in storage for the first time although many workers have reported the presence of *Fusarium* species from a number of stored seeds vegetable seeds and vegetables. *Rhizoctonia* species from vegetable seeds<sup>2</sup> and seeds of *Linum usitatissimum*<sup>12</sup>.

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