Out of 20 angiospermic taxa leaves of *Nepeta hindostana* exhibited volatile fungitoxicity against *Pythium aphanidermatum*, *Pythium debaryanum* and *Rhizoctonia solani* inciting damping-off diseases. The minimum inhibitory concentration (MIC) of Nepeta oil was found to be 500 ppm against *Pythium aphanidermatum* and *Pythium debaryanum* while 1000 ppm against *Rhizoctonia solani*. This was more effective than the prevalent synthetic fungicides used against damping-off diseases.

**Key words**: Nepeta oil, *Rhizoctonia solani*, *Pythium* spp., Fungitoxicity.

Fungicides are generally employed for the management of damping-off pathogens but the use of most of them has now been cautioned due to their carcinogenicity, teratogenicity and other residual toxicities (Bajaj and Ghosh 1975). Moreover, the excessive use of such fungicides may pose serious disturbance of treated ecosystems.

Recently several plants and their constituents have been screened against different plant pathogenic fungi and most of the plant constituents have proved their fruitfulness as less phytotoxic, more systemic, easily biodegradable and host metabolism stimulatory fungitoxicants (Fawcett and Spencer, 1970; Beye 1978, Kubo and Nakanishi 1979). In the present piece of work an attempt has been made to screen some local higher plants against *Rhizoctonia solani*, *Pythium aphanidermatum* and *Pythium debaryanum* - the common damping-off pathogens.

**MATERIALS AND METHODS**

Isolation of the pathogens and test of pathogenicity: Regular trips were made to different nursery beds of vegetables of the locality and *Rhizoctonia solani*, *Pythium aphanidermatum* and *Pythium debaryanum* were isolated from the diseased seedlings of tomato (*Lycopersicon esculentum*). The culture of isolated fungi were maintained on potato dextrose agar medium and their pathogenicity was confirmed following the Koch’s postulates.

Screening of plants against the test fungi: Leaves of local 20 angiospermic taxa were screened by the inverted Petri plate method of Bocher (1938) for their volatile fungitoxicity against the test fungi. The Petri plates containing potato dextrose agar medium were inoculated with fungal discs separately and were then inverted upside down. Five ml of the leaf extracts of the plant prepared in distilled water were aseptically pipetted out to lid of the Petri plate. Control sets were prepared using sterilized water in place of the extracts. The fungitoxicity of the extracts was observed after a week in terms of inhibition of growth of test fungi.

**Phytotoxic studies with fungitoxic Nepeta oil**: Phytotoxic properties of the Nepeta oil was observed by the technique of Dikshit et al. (1979), with respect to germination and seedling growth of tomato. 5 gm seeds of tomato were soaked separately for 6 h in 500 ppm and 1000 ppm of the oil prepared in distilled water containing potato dextrose agar medium were inoculated with fungal discs separately and were then inverted upside down. Five ml of the leaf extracts of the plant prepared in distilled water were aseptically pipetted out to lid of the Petri plate. Control sets were prepared using sterilized water in place of the extracts. The fungitoxicity of the extracts was observed after a week in terms of inhibition of growth of test fungi.
water. The treated seeds were placed on moist filter papers and then percent germination and seedling growth were compared with those of control sets containing seeds soaked in distilled water only.

All the experimental sets contained three replicates and were repeated twice.

RESULTS AND DISCUSSION

During the screening of leaf extracts of twenty angiospermic taxa, only Nepeta hindostana was found to exhibit absolute volatile fungitoxicity inhibiting the growth of test fungi completely. Rest of the leaf extracts could exhibit either poor (below 50%) or moderate (above 50%) toxicity. The minimum inhibitory concentration of essential oil of Nepeta leaves which was isolated as volatile fungitoxic factors was found to be 500 ppm against Pythium aphanidermatum and Pythium debaryanum but 1000 ppm against Rhizoctonia solani and it was altogether fungicidal in nature even at the MIC (Table 1). The oil was found to exhibit broad range of activity showing complete inhibition of 11, 26 and 28 fungi at its 500, 1000 and 2000 ppm concentrations respectively. A. Flavus A. niger were found to be highly resistant fungi which were not inhibited even at the 2000 ppm of the oil. However, eleven fungi viz. Fusarium solani, F. oxysporum, Mucor racemosus, Microsporum gypseum, Penicillium citrinum, P. regulosum, P. italicum, Pythium aphanidermatum, P. debaryanum, Rhizopus arrhizus and Trichoderma viride were found to be highly sensitive (Table 2) which were inhibited even at 500 ppm of the Nepeta oil. The minimum inhibitory concentration of Nepeta oil was lower than that of Agrosan G.N. and Captan, the commonly used synthetic fungicides used for the management of damping-off pathogens and thus it was found superior to these fungicides. Moreover, it exhibited nonphytotoxic nature without showing adverse effect of germination and seedling growth of the treated tomato seeds.

Table 1: Minimum inhibitory concentration of the Nepeta oil.

<table>
<thead>
<tr>
<th>Concentration (ppm)</th>
<th>P. aphanidermatum</th>
<th>P. debaryanum</th>
<th>R. solani</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2000</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1000</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>500</td>
<td>100</td>
<td>100</td>
<td>96.0</td>
</tr>
<tr>
<td>250</td>
<td>92.5</td>
<td>94.0</td>
<td></td>
</tr>
</tbody>
</table>

Thus findings of the present study indicate the potentiality of Nepeta oil as novel fungitoxicant for management of the damping-off pathogens. It is economically and commercially feasible fungitoxicant superior to synthetic ones.

REFERENCES


Nepeta oil - A potential fungitoxic factor


