Biochemical changes in the leaves of ebony tree affected with black mildew

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Black or dark mildews are the meliolaceous fungi belonging to the family Meliolaceae of the order Meliolales. These are obligate biotrophs and produce black colonies on the host surface. Most of them do not produce any pathogenic effect on the host plants. When colonies are peeled off, it is hard to believe that the portion was infected.

The ebony tree, Diospyros ebony Koen. (Ebenaceae), growing in the vicinity of the Tropical Botanic Garden and Research Institute, Palode was found infected with the black mildew disease. The infection was unusual, sooty in appearance on the upper surface of the leaves and the infection was extended to leaf petiole, tender and corky stems. About 56% of the foliage was covered by the fungal colonies. The causal organism was Meliola diospyri Sydow, having 30-90% opposite hyphopodia. The pathogen has also been reported on Diospyros malabarica, D. montana, D. nigrescence, D. pruriens and D. sylvestica in the Western Ghats of Peninsular India (3,4).

Peripheral healthy leaves, free from the infection and severely infected leaves were randomly collected separately and employed for analysis. Fungal colonies were peeled-off from the infected leaves by nail polish technique (5) so as to avoid the interference in the biochemical analysis. Soluble sugar and starch, total protein, total aminoacid, total phenol, proline and total chlorophyll contents were estimated in the healthy and infected leaves by following standard methods (1, 2, 7-10).

The biochemical analyses showed a reduction in the primary metabolites of the infected leaves except for the total phenol and proline content compared to healthy leaves (Table 1).

Total chlorophyll, starch and soluble sugars (reducing sugars) decreased to half in the infected leaves. This might be due to the black colonies of the fungus on the leaves, which prevented the entry of sunlight and thereby inhibited photosynthesis. Increased polyphenol content in the infected leaves can be attributed to the resistance reaction of the plant to infection. Reduced protein and aminoacid contents along with starch and soluble sugars in the infected leaves indicate a decrease in the metabolic activity in leaves. Upadhya and Dwivedi (11), and Kaur and Deshpande (6) have also reported the reduction in metabolic activity of fungus infected leaves of Eucalyptus globulus and Cowpea. No significant difference in the proline content of healthy and infected leaves was noticed. It indicates that the infection did not exert any biotic stress as accumulation of proline in a stress reaction in plants.

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Table 1: Total chlorophyll, soluble sugar, starch, protein, amino acid, total phenol and proline contents in the healthy and infected leaves of *Diospyros ebony*

<table>
<thead>
<tr>
<th>Chemical constituents</th>
<th>Healthy leaves (mg/f.wt.)</th>
<th>Infected leaves (mg/f.wt.)</th>
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</thead>
<tbody>
<tr>
<td>Total chlorophyll</td>
<td>0.65 ± 0.01</td>
<td>0.28 ± 0.01</td>
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<tr>
<td>Soluble sugar (reducing sugar)</td>
<td>40.25 ± 0.16</td>
<td>26.28 ± 0.15</td>
</tr>
<tr>
<td>Starch</td>
<td>31.00 ± 0.85</td>
<td>15.80 ± 0.28</td>
</tr>
<tr>
<td>Protein</td>
<td>1.7 ± 0.02</td>
<td>1.04 ± 0.00</td>
</tr>
<tr>
<td>Aminoacid</td>
<td>7.48 ± 0.04</td>
<td>4.79 ± 0.01</td>
</tr>
<tr>
<td>Total phenol</td>
<td>0.547 ± 0.01</td>
<td>0.797 ± 0.01</td>
</tr>
<tr>
<td>Proline</td>
<td>2.21 ± 0.01</td>
<td>2.28 ± 0.01</td>
</tr>
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REFERENCES


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