PREVENTION OF AFLATOXIN PRODUCTION ON SOME CEREALS AND OIL-SEEDS BY O-VANILLIN

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AFLATOXINS have received considerable attention in recent years due to their hepato-carcinogenic nature and wide occurrence under natural conditions. These coumarin derivative compounds are the secondary metabolites produced by the toxigenic strains of Aspergillus flavus Link ex Fries group of fungi. A. flavus, A. parasiticus and A. oryzae are the main producers of aflatoxins.

Phenolic compounds are well-known for their antimicrobial properties. These compounds were found to be effective in inhibiting the production of aflatoxins in liquid medium and on some solid substrates. An attempt has, therefore, been made to prevent the production of aflatoxins on some cereals and oil-seeds by a common phenol, O-vanillin.

Twenty-five gram of each of seeds viz., rice (var. Sita), wheat (var. S-308), maize (var. Ganga-2), groundnut (var. AK12-24) and mustard (var. BR-13) were soaked in 500 ppm aqueous solution of O-vanillin for 2 hr in 150 ml Erlenmeyer flask. Control seeds were soaked in distilled water. After decanting extra amount of solution/water, the seed lots were autoclaved. On the following day, the seeds were inoculated with 0.5 ml spore suspension of an aflatoxin producing strain of Aspergillus parasiticus (NRRL-3240). The infected seeds were incubated for 7 days at 28 ± 1°C. Aflatoxins were extracted by the method of Jones and estimated spectrophotometrically.

In order to evaluate the toxic effects of O-vanillin the percentage of seed germination was also recorded (table 1).

Aflatoxin production by A. parasiticus was markedly checked by O-vanillin on the cereals and oil-seeds. Maximum inhibition was recorded on rice (85-6%), followed by groundnut (76-25%), wheat (54-2%), maize (52-3%) and mustard (51-1%). O-vanillin did not have any pronounced effect on seed germination. Maximum inhibition in seed germination was 10-6% in the case of mustard.

Production of aflatoxins by A. parasiticus has been successfully checked by the aqueous plant extracts in liquid media and on some solid substrates. The results of the present investigations also indicate the possibility of preventing the production of this potent mycotoxin on economically important seeds by using mild phenols like O-vanillin which do not have any adverse effect on seed germination.

<table>
<thead>
<tr>
<th>Seeds</th>
<th>% inhibition in Aflatoxin production</th>
<th>Seed germination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>85-63</td>
<td>—</td>
</tr>
<tr>
<td>Wheat</td>
<td>54-18</td>
<td>2-22</td>
</tr>
<tr>
<td>Maize</td>
<td>52-27</td>
<td>0</td>
</tr>
<tr>
<td>Groundnut</td>
<td>76-25</td>
<td>8-24</td>
</tr>
<tr>
<td>Mustard</td>
<td>51-06</td>
<td>10-56</td>
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</tbody>
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