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Production of toxins by seed borne fungi of groundnut

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SUMMARY

Toxins are important metabolites of seed moulds as they cause loss in seed germinability. Therefore, eight pathogenic seed borne fungi of groundnut were screened for their toxin production *in vitro* under different nutritional and environmental conditions. The seed borne fungi selected for study were *Aspergillus flavus*, *Aspergillus niger*, *A. fumigatus*, *Alternaria tenuis*, *Fusarium oxysporum*, *Macrophomina phaseolina*, *Rhizoctonia solani* and *Rhizopus nigricans*. The culture filtrates of the fungi grown on GN medium and Substrate medium were tested against seed germination and radicle elongation. These fungi produced maximum toxin in GN medium while most of them produced poor or nil when grown on substrate medium. The toxin from both medium proved inhibitory for radicle elongation. Effect of different substrates like carbohydrates, nitrogen, amino acids on toxin production was also studied. Carbohydrates like fructose and starch, nitrogen sources like peptone and urea and amino acids like alanine, glycine and glutamic acid were found to be stimulatory for toxin production in most of the fungi.

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Key words : Groundnut seeds, GN medium, Substrate medium, Carbohydrates, Amino acids, Nitrogen sources

India is striving hard to increase agricultural production with a view to accelerate food production to feed the ever increasing population through an integrated approach towards the application of farm technology. Seed play an important role in disseminating pathogenic organisms to areas from hitherto, they have been absent. To check the spread of such pathogens, seed health testing procedure is necessary.

Toxins are another important metabolites of seed moulds as they cause loss in seed germinability. Some selected fungi were screened for their toxin production *in vitro* under different nutritional and environmental conditions. Therefore, eight seed borne fungi obtained from groundnut seeds were, further studied for their ability to produce toxins under different physico-nutritional conditions.

MATERIALS AND METHODS

Production of phytotoxins:

The test fungi isolated from legume seeds were grown on liquid medium containing glucose 1 %, KNO_3 0.25 %, KH_2PO_4 0.1 % and $MgSO_4.7H_2O$ 0.05 %, 25 mL of the medium was poured in 100 mL conical flask and autoclaved at 15 lb pressure for 15 min. On cooling, flasks were inoculated separately with one mL of spore suspension of test fungi prepared from 7 day old cultures grown on PDA slants. The flasks were incubated at 25 ± 2^0C for nine days and were harvested by filtering their contents through Whatman filter paper No. 1. The filterates were collected in presterilized culture bottles and termed as crude toxin preparations. The preparations were tested for their toxicity.

Assay of phytotoxins:

Seed germination method:

Hundred seeds of test crop were soaked in crude toxin preparation for 24 hours. The seeds were then placed on moist blotters in sterilized Petriplates. Per cent germination / per cent inhibition of germination was recorded after a period of 10 days. The seeds soaked in freshly prepared liquid medium and germinated after 10 days served as control.

Inhibition of seedling vigour:

The method for this was adopted from Luke and Wheeler (1955) for studying the toxic effect of culture filterates on root length inhibition. It involved the use of germinated legume seeds of uniform root length, kept at

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