

EFFECT OF SEED DIFFUSATES ON GROWTH ON SEED-BORNE FUNGI OF SUNFLOWER

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SUMMARY

Of the thirty-two seed diffusates tested, ten were found to be effective against the seed-borne fungi of sunflower namely *Alternaria alternata*, *Emtericellopsis terricola*, *Fussarium solani*, *Macrophomina phaseolina* and *Stemphyllum helianthi*. Out of these ten, six seed diffusates, those of *Anethum graveolens*, *Azadirachta indica*, *Canabis sativa*, *Coriandrum sativum*, *Melia azedarach* and *Memordica charantia*, inhibited the growth higher in all fungi under test in the concentrations of 0.5 and 1.0 percent. Results of the present study indicate that seed diffusates could substitute costly chemical in controlling the seed-borne diseases.

Key words: seed diffusates, seed-borne fungi, sunflower

INTRODUCTION

Due to more awareness in environmental pollution, many research workers have been attracted to find safe and cheap control of plant diseases using extract and diffusates of plant parts. Although antifungal properties of many plants extracts and diffusates are known (Garber and Houston, 1959; Hale and Mathers, 1977; Kandasamy *et al.*, 1974; Halo and Taniguchi, 1987; Naidu and John, 1981; Rahber Bhatti, 1988; Rahber Bhatti, 1992), there are scarce information on the use of seed diffusates which inhibit the growth of sunflower pathogens. Keeping this in view, seed diffusates of 32 plants were studied to know their effectiveness in controlling seed-borne fungi of sunflower.

MATERIALS AND METHODS

Seed of thirty-two plants and shrubs were collected from vicinity of Islamabad, Rawalpindi. They were kept at room temperature during experimentation. Seeds of

each sample were crushed in a pestle and mortar and 2.5, 5.0 and 10 g of seed crush per 1000 ml of distilled water were left in the conical flask for soaking overnight. Diffusates were filtered through three layers of cheesecloth and sterilized by filtering through Millipore filter (pore size 0.22 μm) before use.

Potato dextrose agar medium was prepared by mixing 30 g of PDA (Difco) and one liter of water and autoclaved at 15 lbs/sq inch for 20 minutes. Two ml of crude diffusate was added in the 9 cm diameter petri dishes with the help of glass pipette. Then 19-20 ml agar medium was poured and allowed to solidify for some time. Seven-day cultures of different sunflower seed-borne fungi such as *Alternaria alternata*, *Emericellopsis terricola*, *Fusarium solani*, *Macrophomina phaseolina* and *Stemphylium helianthi* were taken with the help of sterilized cork borer. Three discs of culture were placed in petri dish. The experiment was conducted using RCB design with four treatments and six replications in each treatment. Control was also included without addition of seed diffusates. Petri dishes were incubated for seven days at 20°C under 12 h alternating cycle of fluorescent light. Growth of fungi was measured in mm. Data was analyzed statistically.

RESULTS AND DISCUSSION

In present study, thirty-two seed diffusates were tested for antifungal properties. Of the 32, ten seed diffusates (*Acacia nilotica*, *Anethum graveolens*, *Azadirachta indica*, *Canabis sativa*, *Capsicum annum*, *Coriandrum sativum*, *Eugenia jambulana*, *Foeniculum vulgare*, *Melia azedarach* and *Memordica charantia*) were found to inhibit the growth of seed-borne fungi namely *Alternaria alternata*, *Emericellopsis terricola*, *Fusarium solani*, *Macrophomina phaseolina* and *Stemphylium helianthi* (Table 1 and Figures 1, 2, 3, 4, 5, 6, 7, 8, 9, 10). Out of the ten seed diffusates, six (*Anethum graveolens*, *Azadirachta indica*, *Canabis sativa*, *Coriandrum sativum*, *Melia azedarach*, *Memordica charantia*) inhibited the growth higher in all the fungi under test at concentration of 0.5 and 1.0 percent. It was found that *Foeniculum vulgare* and *Capsicum annum* could not produce significant results in checking the growth of *F. solani* and *M. phaseolina*. Rahber Bhatti (1992) observed inhibition of fungal growth by diffusates of bark and cork of 37 trees and shrubs but present study revealed that not all seed diffusates of these plants are effective against seed-borne fungi of sunflower. However, Bhutta (1998) treated the sunflower seeds @ 2.0 percent concentration with four seed diffusates namely *A. indica*, *C. annum*, *C. sativum* and *Eugenia jambulana* and found that these diffusates reduced the fungal population and increased the germination of sunflower seed significantly.

Table 1: Effect of seed diffusates on growth of seed-borne fungi of sunflower

| Sr. No. | Common name | Latin name | Effect of diffusates |
|---------|---------------------|---|----------------------|
| 1. | Ajwain | <i>Anethum graveolens</i> L. | + |
| 2. | Amaltas seed | <i>Cassia fistula</i> L. | - |
| 3. | Bitter gourd | <i>Momordica charantia</i> L. | + |
| 4. | Bottle brush | <i>Callistemon lanceolatus</i> DC. | - |
| 5. | Cannabis (Bhang) | <i>Cannabis sativa</i> L. | + |
| 6. | Cardamom | <i>Elettaria cardamomium</i> Maton | - |
| 7. | Carrot seed | <i>Daucus carote</i> L. | - |
| 8. | Chilli | <i>Capsicum annuum</i> L. | + |
| 9. | Coriander | <i>Coriandrum sativum</i> L. | + |
| 10. | Cotton seed | <i>Gossypium hirsutum</i> Linn. | - |
| 11. | Date palm | <i>Phoenix dactylifera</i> Roxb. | - |
| 12. | Drek, Persian lilac | <i>Melia azedarach</i> L. | + |
| 13. | Eucalyptus seed | <i>Eucalyptus rostrata</i> Schlecht. | - |
| 14. | Fennel | <i>Foeniculum vulgare</i> Miller | + |
| 15. | Guava | <i>Psidium jujava</i> L. | - |
| 16. | Henna | <i>Lawsonia alba</i> L. | - |
| 17. | Jaman | <i>Eugenia jambulana</i> L. | + |
| 18. | Jantar | <i>Sesbania aegyptium</i> L. | - |
| 19. | Karir | <i>Capparis aphylla</i> | - |
| 20. | Kikar | <i>Acacia nilotica</i> (Linn.) Delle | + |
| 21. | Lentil | <i>Lens culinaris</i> L. | - |
| 22. | Lettuce seed | <i>Lectuca sativa</i> L. | - |
| 23. | Mung been seed | <i>Vigna radiata</i> (L.) Wilezek | - |
| 24. | Neem | <i>Azadirachta indica</i> (L.) A. Juss | + |
| 25. | Okra | <i>Hibiscus esculentus</i> L. | - |
| 26. | Onion seed | <i>Allium cepa</i> L. | - |
| 27. | Saru | <i>Cupressus sempervirens</i> L. | - |
| 28. | Senna | <i>Cassia senna</i> L. | - |
| 29. | Sheesham | <i>Dilbergia sisso</i> Roxb. | - |
| 30. | Silver oak | <i>Grevillea robusta</i> A. Cunn | - |
| 31. | Tomato seed | <i>Lycopersicon esculentum</i> | - |
| 32. | Water melon seed | <i>Citrullus lunatus</i> (Thanb.) Hansf | - |

+ Effective

- Non-effective

CONCLUSIONS

Results of the present study indicate that seed diffusates are available which, used in proper amounts, may substitute the costly chemicals of synthetic origin used for disease control and thus help in the protection of environment from chemical pollution.

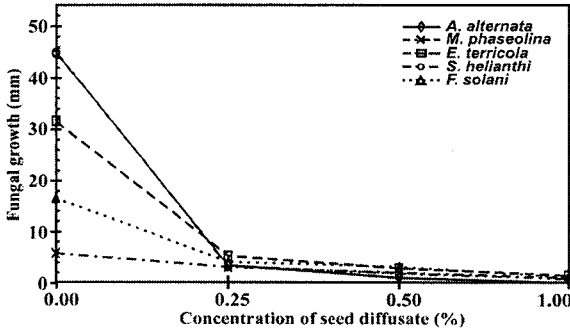


Figure 1: Effect of *Melia azedarach* seed diffusate on the growth of seed borne fungi of sunflower

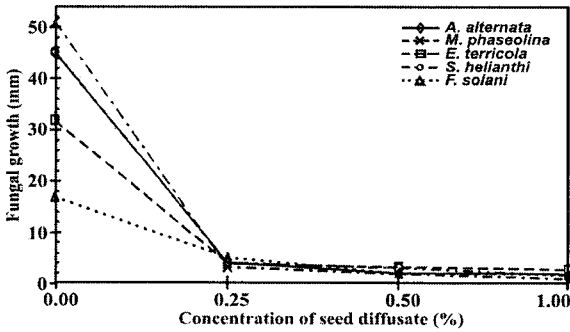


Figure 2: Effect of *Coriandrum sativum* seed diffusate on the growth of seed-borne fungi of sunflower

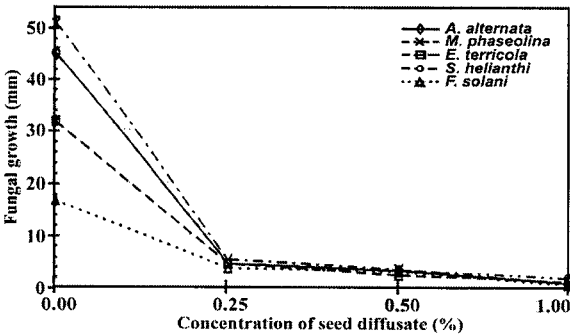


Figure 3: Effect of *Memordica charantia* seed diffusate on the growth of seed-borne fungi of sunflower

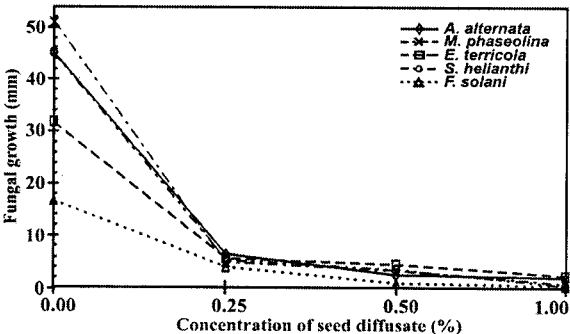


Figure 4: Effect of *Cannabis sativa* seed diffusate on the growth of seed-borne fungi of sunflower

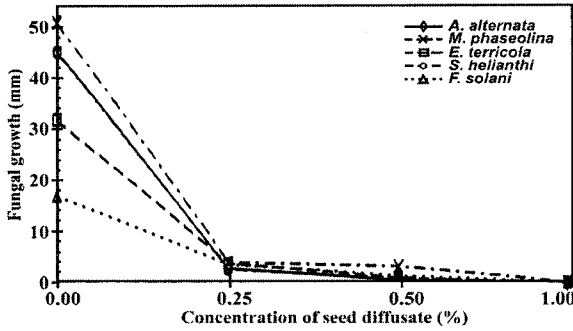


Figure 5: Effect of *Azadirachta indica* seed diffusate on the growth of seed-borne fungi of sunflower

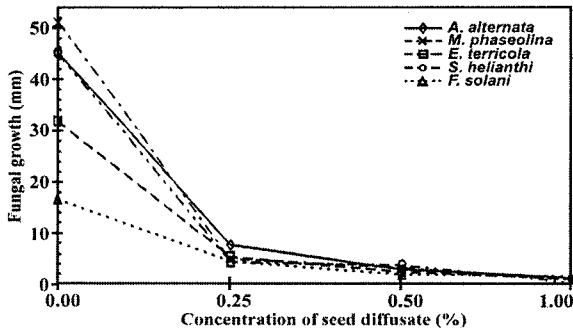


Figure 6: Effect of *Anethum graveolens* seed diffusate on the growth of seed-borne fungi of sunflower

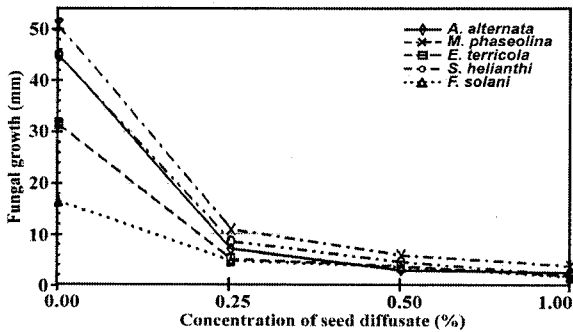


Figure 7: Effect of *Eugenia jambulana* seed diffusate on the growth of seed-borne fungi of sunflower

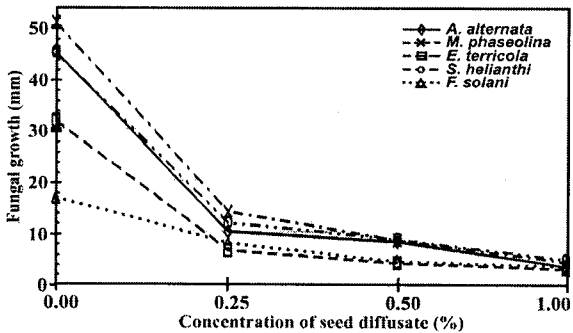


Figure 8: Effect of *Acastia nilotica* seed diffusate on the growth of seed-borne fungi of sunflower

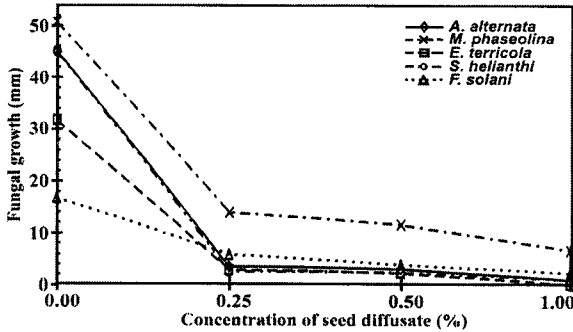


Figure 9: Effect of *Capsicum annuum* seed diffusate on the growth of seed-borne fungi of sunflower

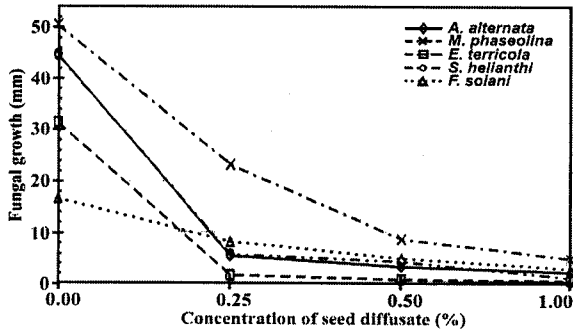


Figure 10: Effect of *Foeniculum vulgare* seed diffusate on the growth of seed-borne fungi of sunflower

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EFFECTO DE DIFUSATO DE SEMILLAS AL CRECIMIENTO DE HONGOS TRASLADADOS POR SEMILLAS DE GIRASOL

RESUMEN

De 32 difusatos de semillas investigados, 10 eran eficaz contra los hongos *Alternaria alternata*, *Emericellopsis terricola*, *Fussarium solani*, *Macrophomina phaseolina* y *Stemphylium helianthi*, que se trasladan con semillas de girasol. De estos 10 difusatos, 6 originados de *Anethum graveolens*, *Azadirachta indica*, *Canabis sativa*, *Coriandrum sativum*, *Melia azedarach* y *Memordica charantia*, impedían el crecimiento de todos hongos investigados en las concentraciones de 0,5 y 1,0 por ciento. Los resultados del presente estudio indican que los difusatos de semillas pueden substituir los productos quimicos caros que se utilizan para la supresion de enfermedades trasladadas por semillas.

EFFET DES EXTRAITS DE SEMENCE SUR LE DEVELOPPEMENT DES CHAMPIGNONS TRANSMIS PAR LA SEMENCE DE TOURNESOL

RÉSUMÉ

De trente-deux extraits de semences, dix se sont montrés efficaces contre les champignons *Alternaria alternata*, *Emericellopsis terricola*, *Fussarium solani*, *Macrophomina phaseolina* et *Stemphylium helianthi* transmis par la semence de tournesol. De ces dix extraits, six originaires de l' *Anethum graveolens*, l'*Azadirachta indica*, le *Canabis sativa*, le *Coriandrum sativum*, le *Melia azedarach* et le *Memordica charantia* ont empêché le développement de tous les champignons examinés à des concentrations de 0.5 et 1.0 pour cent. Ces résultats indiquent que des extraits de semence peuvent remplacer les produits chimiques onéreux utilisés pour diminuer les maladies transmises par les semences.

