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# Efficacy of *Trichoderma asperellum* and New Molecules (Fluxapyroxad and Salicylic Acid) on Major Seed Borne Mycoflora under *In vitro*

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Groundnut (*Arachis hypogaea* L.) is a leguminous oilseed crop belonging to the family fabaceae. It is one of the most important kharif oilseed crops in India and regarded as "King of oilseed crops". India ranks first ingroundnut acreage and is the second largest producer of groundnut in the world with 101 lakhtonnes and productivity of 1816 kg per hectare in 2020-21 (1).Groundnut said to be infected with more than fifty pathogens including viruses and infection of *Aspergillus niger* was prevalent and commonly seen in groundnut and it was first reported by (2). Among the management practices to control the pathogens chemical treatments are said to show the immediate effect (3, 4). Keeping in view, destructive natureof groundnut diseases, present work was carried out to minimize collar rot disease incidence caused by *Aspergillus niger* using various new molecules.

*In vitro* efficacy of *Trichoderma asperellum* and new molecules against *Aspergillus niger* were evaluated by poisoned food technique. Thenew molecules included were salicylic acid and fluxapyroxad. Fifty milliliters of double strength PDA were mixed with 50 ml of double concentrated fungicidal solution to obtain final concentrations of 100, 250 and 500ppm of *T. asperellum*, salicylic acid and fluxapyroxad.

In 9 cm petri dishes, 20 ml of this medium was plated. The pathogen was implanted as a 6 mm mycelial disc at the center and incubated for 10 days at 28±2 °C. Untreated controls were kept in place. Each treatment was replicated thrice. After the pathogen had fully grown in the control, observations from the treated and control plates were recorded.

Per cent reduction in radial growth over control was calculated using the following formula :

$$I = \frac{C - T}{C} \quad 100$$

Where,

I = Per cent reduction in growth of *A. niger*

C = Radial growth (mm) in control

T = Radial growth (mm) in treatment

The efficacy of *T. asperellum* and new molecules against *Aspergillus niger* was evaluated at 100, 250 and 500 ppm concentrations using poisoned food technique. The observations on mycelial growth inhibition were recorded after the control plate attained full growth. The two new molecules used in the method were salicylic acid and fluxapyroxad.

The mycelial growth inhibition of *A. niger* which was cent per cent in the plates treated with salicylic acid at 500ppm, fluxapyroxad at 100 ppm,250 ppm and500 ppm followed by plates treated with *T. asperellum* at 500 ppm (86.25%). Total per cent mycelial growth inhibition was 0.00% in *Trichoderma asperellum* at 100.

Mean mycelial growth inhibition was the lowest (27.73%) in the plates treated with 100ppm and highest (71.56%)with500ppm. Plates treated with250 ppm remained moderately effective with a mean mycelial growth inhibition of 52.02 %. Among the three concentrations, 500 ppm concentration was found significantly superior over rest of the concentrations with 71.56 percent mycelial growth inhibition. This clearly indicates that with increase in effective concentration of chemical per cent mean mycelium growth inhibition increased.

Among the chemicals fluxapyroxad recorded 100% mean mycelium growth inhibition followed by salicylic acid with 57.33% and the lowest was recorded in *T. asperellum* with 44.42%.

Similar results were obtained by (6) showing the effectiveness of fluxapyroxad at 100,250 and 500 ppm in the cent per cent inhibition of mycelial growth in plates inoculated with *Aspergillus niger.* Growth of pathogens reduced in the plates treated with fluxapyroxad as reported by (7).

The studies by (8) on effect of salicylic acid against *Bipolaris oryzae* by using poisoned food technique revealed that growth of pathogen was completely arrested at higher concentrations than lower concentrations and control. With an inverse relationship between the concentration of the salicylic acid and the linear growth of *Bipolaris oryzae* i.e., as the concentration increases the

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**Table-1 : Efficacy of salicylic acid, fluxapuroxad and *Trichoderma asperellum* againt *Aspergillus niger* under *in vitro* condition.**

| | Mycelial growth inhibition (%) | | | |
|---|---|---|---|---|
| | **100 ppm** | **250 ppm** | **500 ppm** | **Mean** |
| Salicylic acid | 10.92 (19.3) | 61.07 (51.40) | 100.00 (90.00) | 57.33 (49.20) |
| Fluxapyroxad | 100.00 (90.00) | 100.00 (90.00) | 100.00 (90.00) | 100.00 (90.00) |
| *T. asperellum* | 0.00 (0.00) | 47.02 (43.92) | 86.25 (68.20) | 44.42 (41.70) |
| Control | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Mean | 27.73 (31.78) | 52.02 (46.16) | 71.56 (57.77) | |
| | **Fungicide (F)** | **Concentration (C)** | | **F x C** |
| SE m | 1.16 | 1.16 | | 2.01 |
| CD (5%) | 2.41 | 2.41 | | 4.26 |
| CV (%) | | 3.66 | | |

*Data inside the parentheses are arcsine transformed values.

linear growth decreases. The results are in confirmation with (9) using salicylic acid against green and blue mold of citrus.

The mean mycelial growth inhibition of *A. niger* was 44.42% with *T. asperellum.* In the present investigation results are in agreement with (10) showing the effectiveness of *Trichoderma* spp. in the growth inhibition over control plates treated with *Aspergillus* spp. Similar results were obtained by (11) showing significant reduction in the growth of seed mycoflora against control in the plates treated with *Trichoderma* spp.

## Conclusion

The present study indicated that all the fungicides shown had inhibitory effect on the mycelial growth of *Aspergillus niger* under in vitro conditions. Fluxapyroxad at all concentrations (100, 250 and 500ppm) and salicylic acid at 500 ppm shown cent percent mycelial growth inhibition. Whereas *T. asperellum* shows highest inhibition (86.25%) at 500ppm

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