International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2017; 5(5): 2222-2225

Received: 05-07-2017
Accepted: 06-08-2017

Srinivasan VM
Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Krishnamoorthy AS
Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Correspondence
Srinivasan VM
Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Compatibility of azoxystrobin and chaetoglobosin biomolecules with fungal antagonists

Srinivasan VM and Krishnamoorthy AS

Abstract
The compatibility of azoxystrobin and chaetoglobosin biomolecules with fungal antagonists was tested by using poison food technique. Azoxystrobin amended at 1500 ppm concentration completely arrested the mycelial growth of *Chaetomium* sp, *Baeuveria bassiana* and *Trichoderma viride* under *in vitro*. Whereas in control 41.80, 36.47 and 73.16 mm mycelial growth observed on 5th d after inoculation. In the case of chaetoglobosin, the highest concentration (2000 ppm) showed 21.84 and 36.74 mm mycelial growth of *Baeuveria bassiana* and *Trichoderma viride* respectively on 5th d after inoculation. In control 39.81 and 71.26 mm mycelial growth of the same bio inoculants was recorded on 5th d.

Keywords: Azoxystrobin, chaetoglobosin, compatibility, antagonist

Introduction
In terms of usage of agrochemicals, compatibility means the state of existence of two or more agrochemicals together without any change in their potential action against target organisms; and also without causing any adverse problem to the host or environment. Applying a tank mix of pesticides, or a pesticide and a liquid fertilizer, could save time, labour, energy and costs. In order to develop an effective disease management programme, the compatibility of fungicides with potential biocontrol agents and botanicals need to be established (Priti and Venkattaravanappa, 2017) [11]. Combination of chemicals and bioinoculants in an IDM strategy protected the seeds and seedlings from soil-borne and seed-borne pathogens (Dubey and Patil, 2001) [1]. Integration of compatible bioinoculants with pesticides, enhanced the effectiveness of disease control and provided better management of soil borne diseases (Papavizas and Lewis, 1981) [9]. A combination treatment with biological control agents and fungicides provided almost a similar kind of disease suppression as would have been achieved with higher doses of fungicides (Monte, 2001) [3]. The combined use of biocontrol agents and chemical pesticides has given synergistic or additive effects in the control of certain soil-borne pathogens (Kumar *et al.*, 2016) [2]. The efficiency of the biocontrol agent was further improved when it was applied along with the recommended fungicide, used at a lower concentration (Silimela and Korsten, 2001) [1].

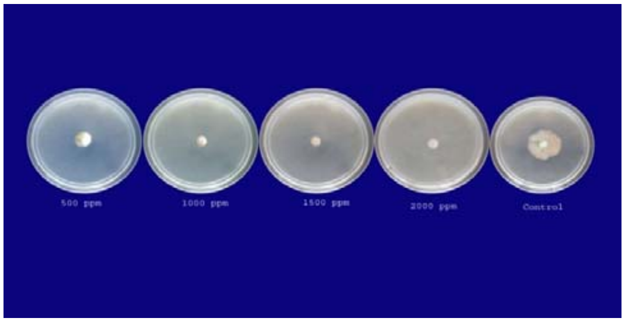
Materials and methods
The compatibility of the azoxystrobin and chaetoglobosin biomolecules with the fungal antagonists was tested using poisoned food technique.

Compatibility of Azoxystrobin and Chaetoglobosin with Fungal Antagonists
Mycelial disc of fungal antagonists (9-mm dia) was cut from 7-day old culture and placed in the centre of petri plates containing PDA medium amended with azoxystrobin and chaetoglobosin seperately at 500, 1000, 1500 and 2000 ppm concentrations. PDA medium inoculated with each isolates and without addition of azoxystrobin and chaetoglobosin served as a control. The plates were incubated at room temperature 28 $\pm$ 2 ^{0} C until the control plate was completely covered by the test fungi. Each treatment was replicated four times. The per cent growth inhibition of the test pathogen was calculated as per the standard formula derived by Schmitz (1930) [13].

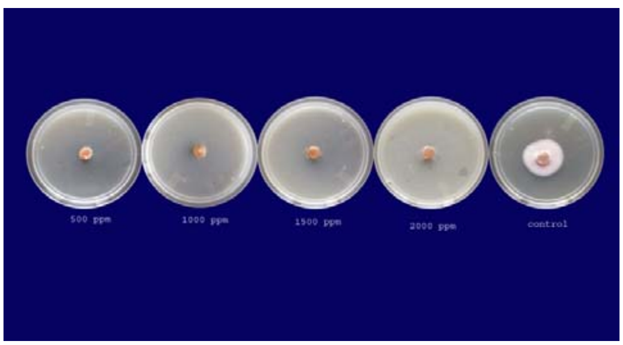
Results

Azoxystrobin at 1500 ppm concentration completely arrested the mycelial growth of *Chaetomium* sp, *Baeuveria bassiana* and *Trichoderma viride*. Whereas in control 41.80, 36.47 and 73.16 mm mycelial growth observed on 5th d after inoculation. In the case of chaetoglobosin, the highest concentration (2000 ppm) showed 21.84 and 36.74 mm mycelial growth of *Baeuveria bassiana* and *Trichoderma viride* respectively on 5th d after inoculation. In control 39.81 and 71.26 mm mycelial growth of the same bio inoculants was recorded on 5th d.

Compatibility of azoxystrobin with fungal bio-inoculants



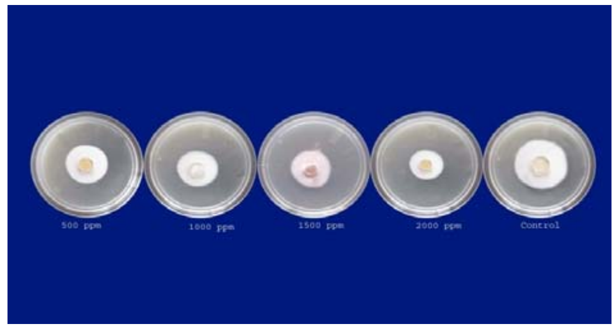
Effect of azoxystrobin on *Chaetomium* sp



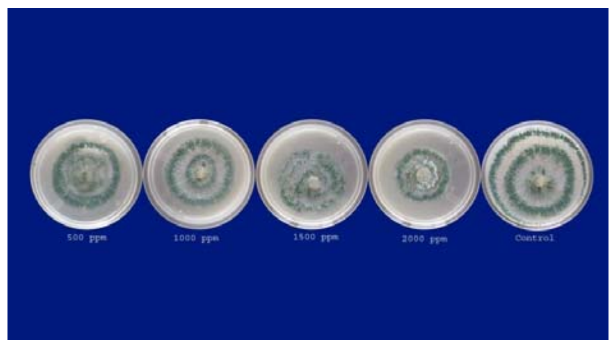
Effect of azoxystrobin on *Baeuveria bassiana*

Effect of azoxystrobin on *Trichoderma viride*

Effect of chaetoglobosin on *Baeuveria* and *Trichoderma viride*



Baeuveria bassiana



Trichoderma viride

Table 1: Effect of azoxystrobin on *Chaetomium, Baeuveria and Trichoderma.*

Days after inoculation	Concentration of azoxystrobin (ppm) / Diameter of mycelial growth (mm)														
	Chaetomium					*Baeuveria*					*Trichoderma*				
	500	1000	1500	2000	Control	500	1000	1500	2000	Control	500	1000	1500	2000	Control
1	10.00^{d}	10.00^{c}	10.00 ^{a}	10.00^{a}	10.00^{de}	10.00^{b}	10.00^{a}	10.00^{a}	10.00^{a}	10.00^{d}	10.00^{b}	10.00^{b}	10.00^{a}	10.00^{a}	18.69^{e}
2	10.00^{d}	10.00 ^{c}	10.00 ^{a}	10.00 ^{a}	12.14 ^{d}	10.00^{b}	10.00^{a}	10.00^{a}	10.00^{a}	10.00^{d}	10.00^{b}	10.00^{b}	10.00^{a}	10.00^{a}	32.61^{d}
3	15.31 ^{c}	10.00^{c}	10.00 ^{a}	10.00^{a}	23.36^{c}	10.00^{b}	10.00^{a}	10.00^{a}	10.00^{a}	14.29^{c}	10.00 ^{b}	10.00^{b}	10.00^{a}	10.00^{a}	53.72^{c}
4	21.36^{b}	10.48 ^{b}	10.00^{a}	10.00^{a}	33.61^{b}	10.00^{b}	10.00^{a}	10.00^{a}	10.00^{a}	28.61^{b}	17.62 ^{b}	15.74^{b}	10.00^{a}	10.00^{a}	62.16^{b}
5	33.47^{a}	21.08 ^{a}	10.00^{a}	10.00 ^{a}	41.80^{a}	15.23^{a}	10.00^{a}	10.00^{a}	10.00^{a}	36.47^{a}	37.48^{a}	21.63^{a}	10.00^{a}	10.00^{a}	73.16^{a}

Mean of four replications
In a column, means followed by same letter are not significantly different at the 5 per cent level by DMRT

Table 2: Effect of chaetoglobosin on *Baeuveria* and *Trichoderma.*

Days after inoculation	Mycelial growth of *Baeuveria* and *Trichoderma* in different concentration of chaetoglobosin (mm)									
	Baeuveria bassiana					*Trichoderma viride*				
	500	1000	1500	2000	Control	500	1000	1500	2000	Control
1	10.00^{d}	10.00^{d}	10.00^{c}	10.00^{c}	10.00^{d}	10.00^{d}	10.00^{e}	10.00^{c}	10.00^{c}	13.22^{e}
2	12.61^{d}	13.16^{c}	11.48^{b}	10.00^{bc}	13.98^{d}	16.23^{d}	14.69^{d}	13.72^{c}	10.00^{c}	29.34^{d}
3	19.57^{c}	14.33^{c}	13.71^{b}	13.22^{bc}	25.17^{c}	31.86^{c}	29.26^{c}	21.89^{bc}	19.42^{c}	48.27^{c}
4	26.55^{b}	22.91^{b}	18.69^{b}	16.46^{b}	31.32^{b}	47.63^{b}	38.17^{b}	35.68^{b}	27.69^{b}	61.43^{b}
5	32.74^{a}	31.29^{a}	29.81^{a}	21.84^{a}	39.81^{a}	56.55^{a}	49.62^{a}	42.75^{a}	36.74^{a}	71.26^{a}

Mean of four replications
In a column, means followed by same letter are not significantly different at the 5 per cent level by DMRT

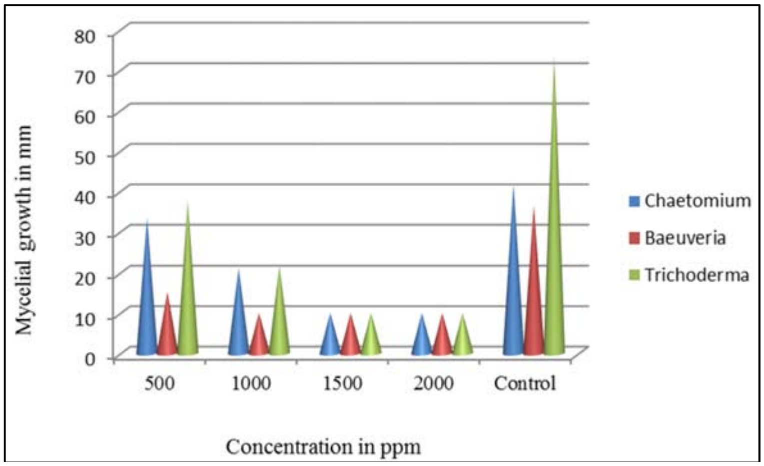


Fig 1: Compatibility of azoxystrobin with *Chaetomium* sp, *Baeveria bassiana* and *T. viride.*

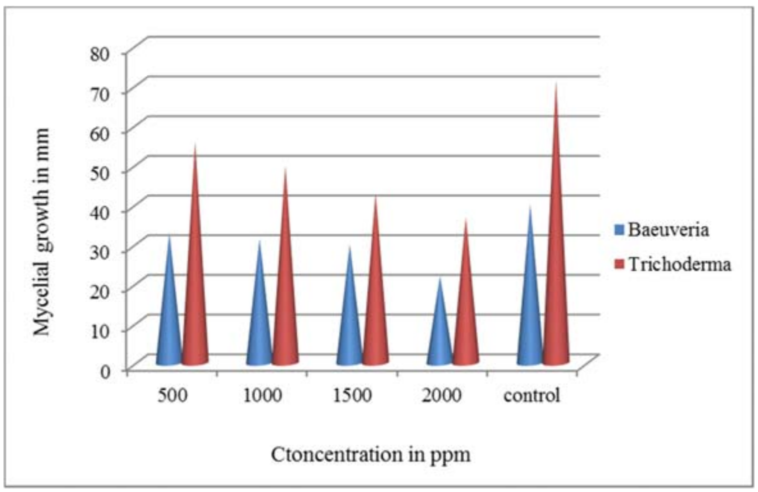


Fig 2: Compatibility of chaetoglobosin with *Baeveria bassiana* and *Trichoderma viride*

Discussion

Since fungicides may have lethal effects on the pathogen as well as antagonist, an understanding of the effect of fungicides on the pathogen and the antagonist, would provide information on the selection of suitable fungicides and fungicide resistant antagonist in combination to combat plant pathogens. The idea of combining biocontrol agents with fungicides is for the development or establishment of desired microbes in the rhizosphere (Papvizas and Lewis, 1981) [9]. Use of some strains of *Trichoderma harzianum* tolerant to fungicides have been reported for the integrated control of plant diseases (Papavizas *et al.*, 1982) [10]. Integration of foltaf at 0.125 per cent with G. *virens* as seed treatment bio-agent effectively reduced chickpea wilt disease (Upadhyay and Singh, 1995) [14]. *T. harzianum* and *T. viride* did not combine with carbendazim even at a concentration of 10 µg / ml while, both the organisms tolerated thiram up to 50 µg / ml (Pandey and Upadhyay, 1998) [4]. In the present study both azoxystrobin and chaetoglobosin biomolecules suppressed the fungal antagonists but the efficacy of azoxystrobin was comparatively higher than the chaetoglobosin in arresting the growth of fungal antagonists. Azoxystrobin at 1500 ppm concentration completely arrested the mycelial growth of *Chaetomium* sp, *Baeuveria bassiana* and *Trichoderma viride* but in the case of chaetoglobosin, even at the highest concentration (2000 ppm) showed 21.84 and 36.74 mm mycelial growth of *Baeuveria bassiana* and *Trichoderma viride* respectively on 5th d after inoculation. Through this study it was concluded that both molecules are incompatible with fungal antagonists.

References

1. Dubey SC, Patil B. Determinations of tolerance in *Thanetophorus cucumeris Trichoderma viride*, *Gliocladium virens* and *Rhizobium* sp. to fungicides. Indian Phytopathol. 2001; 54:98-101.
2. Kumar KC, Babu A, Bordoloi M, Benarjee P, Rajbongshi H. Comparative Bioefficacy of Fungicides and Trichoderma spp. against Pestalotiopsis theae, Causing Grey Blight in Tea (Camellia sp.): *An In Vitro Study.* Int. J. Curr. Res. Biosci. Plant Biol., 2016; 3(4):20-27.
3. Monte E. Understanding *Trichoderma.* Between biotechnology and microbial biology. *Int. Microbiol.*, 2001; 4:1-4.
4. Pandey KK, Upadhyay JP. Sensitivity of different fungicides to *Fusarium udum*, *Trichoderma harzianum* and *Trichoderma viride* For integration approach of disease management. *Vegetable Science*, 1998; 25:90-93.

9. Papavizas GC, Lewis JA. Introduction and augmentations of microbial antagonists for the control of soil borne plant pathogens. Biological control in Crop Production, 1981, 305-322.
10. Papavizas GC, Lewis JA, Abd-el Molty TH. Evaluation of new biotypes of *T. harzianum* for tolerance to benomyl and enhanced biocontrol capabilities. Phytopathology, 1982; 72:126-132.
11. Priti S, Venkataravanappa. Compatibility Studies of Trichoderma harzianum Isolate with Fungicides used against Soil Borne Disease in Coorg Mandarin-Pepper-Coffee Plantations. Int. J. Curr. Microbiol. App. Sci., 2017; 6(8):346-354.
12. Silimela M, Korsten L. Alternative methods for preventing pre and post-harvest diseases and sunburn on mango fruits. S.A. Mango Growers' Assoc. Yearbook. 2001; 21:39-43.
13. Schmitz H. Poisoned food technique Industrial and Engineering Chemistry. Analyst, 1930; 2:361.
14. Upadhyay JP, Singh RN. In Recent Advances in Phytopathological Research. M.D. Publication Pvt. Ltd., New Delhi, 1995, 85-91.