Evaluation of novel group fungicides against *Alternaria zinniae*, the incitant of leaf spot and Flower blight of Marigold

Abstract

Marigold belonging to family Asteraceae, are most common in plant kingdom. It is an important commercial ornamental plant and garden flower. It is found in different colours and different fragrance. Yellow colour is most common. Leaf spot and flower blight is serious disease of marigold causing yield loss in crop. The present investigation was carried out with an objective to study the efficacy of new fungicides available in the market in *in-vitro* condition. Eleven fungicides such as azoxystrobin, tebuconazole, azoxystrobin +tebuconazole, difenoconazole, azoxystrobin + difenoconazole, tebuconazole + sulphur, wet sulphur, mancozeb, metalaxly, chlorothalonil, chlorothalonil + metalaxly were evaluated at the concentration of 0.1%, 0.15% ,0.1%, 0.1%, 0.1%, 0.15%, 0.25%, 0.3%,0.2%, 0.3%, and 0.3% respectively. it has been found that combination of azoxystrobin + tebuconazole recorded mycelia growth inhibition of (97.30) % followed by tebuconazole + sulphur (95.95%) and Metalaxly of 95.05%. The least inhibition of 18.47% was recorded by wettable sulphur. Further the effectiveness of new fungicides may be tested under field condition against *Alternaria zinniae.*

Keywords : fungicides ,marigold ,alternaria ,odisha ,azoxystrobin+tebuconazole.

INTRODUCTION

Marigold (Tagetes erecta L.) commonly known as marigold belonging to genus Tagetes, family asteraceae also known as genda phool originated from Mexico and America. Fifty species of both annual and perennial herbaceous plant in India. About 8000-10000 ha of land of marigold is cultivated in India. From which 70,000mt (Negi *et al*. 1998) marigold produced. Due to each in cultivation longer blooming period and beautiful flower with excellent shelf life the flower spread very rapidly, then they are also known for their rapid growing and annual flowering plant. The height of the plant ranges for 6inch-3ft. Mostly in India it is used for ornamental and medicinal purpose. it is used medicinal against several diseases such as rheumatism, cold and bronchitis. Each part of the plant is valued for its medicinal nature, the leaves are generally used in antiseptic, in kidney troubles and also cure piles. the flower have more ayurvedic composition which is useful for fever, scabies and liver complaints and also use for eyes. The shoot part of the plant commonly used for making teas in mexico. bioactive substance present in the flower acts both insecticides and fungicides. The leaves and flower posses medicinal values having phenolic and Antioxidants activities and are equally important and pharmaceutical industry (Tripathy and Gupta 1991; Khalil *et al*. 2007). The essential oil of marigold which is in high demand in the perfume industry (Naik *et al*. 2003. The major marigold growing in district in odisha are dhenkanala, koraput ,sambalapur , sundergah, balasore . The production is higher except hot summer months.

The major reason of yield loss is because of infections cause by fungi, virus and bacteria and nematodes cause high damage resulting yield loss. Flower blight, wilt, and stem rot, *Alternaria* leaf spot, *Fusarium* wilt are some are the fungal diseases that occur on marigold plant. Most serious prevalent disease are flower blight and leafspot caused by *Alternaria zinniae*.

We are using old fungicides continuously for the management of the disease .as a result there is development of resistance in the plant pathogens for that fungicides. Due to which the management of plant disease is becoming difficult day by day. The application of fungicides more effective than botanical and biological content. Now a day many new fungicides produced by various companies are available in the market. Keeping in view of these facts, the investigation on evaluation of new fungicides against plant pathogens. was under taken in the department of plant pathology, institute of agricultural sciences, Siksha o Anusandhan (deemed to be) university Bhubaneswar, Odisha (India).

MATERIALS AND METHODS

All the fungicides were tested at specified concentrations by adopting poisoned food technique. The required concentrations of chemicals were prepared and incorporated into sterilized cooled potato dextrose agar medium.

Twenty ml of medium was poured into 90 mm sterilized Petri dishes and all plates inoculated with actively growing 5 mm mycelia disc of test fungus. Three replications were maintained for each treatment. These plates were incubated at 25±1 0C for seven days and then colony diameter was recorded. The per cent inhibition over control was calculated according to formula given by Vincent (1947).

$$I = \frac{(C - T) \times 100}{C}$$

I = Per cent inhibition of mycelium
C = Growth of mycelium in control
T = Growth of mycelium in treatment

Table 1: Different fungicides with their concentration

Sl. No.	Chemical name	Concentration (%)
T1	Azoxystrobin	0.1
T2	Tebuconazole	0.15
T3	Azoxystrobin+tebuconazole	0.1
T4	Difenoconazole	0.1
T5	Azoxystrobin+difenoconazole	0.1
T6	Tebuconazole +sulphur	0.15
T7	Wet sulphur	0.25
T8	Mancozeb	0.3
T9	Metalaxyl	0.2
T10	Chlorothalonil	0.3
T11	Chlorothalonil+metalxyl	0.3

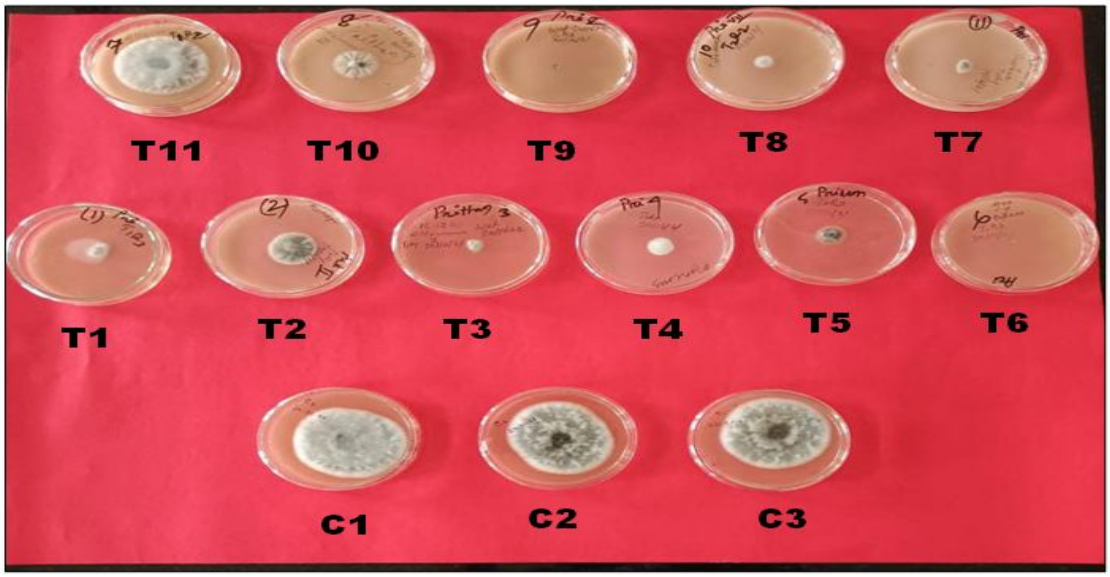
RESULT

It was seen from the table 2 that azoxystrobin +tebuconazole recorded maximum mycelia growth inhibition of 97.30% followed by tebuconazole +sulphur 95.95%. however, the both the fungicides are at par. wet sulphur recorded the least inhibition of 18.47%.

Table2: in vitro bio-assay of fungicides

Sl.no	Chemical name	Concentration	Growth inhibition (5%)
T1	Azoxystrobin	0.1	87.38
T2	Tebuconazole	0.15	58.11
T3	Azoxystrobin+tebuconazole	0.1	97.03
T4	Difenoconazole	0.1	81.98
T5	Azoxystrobin+difenoconazole	0.1	75.23
T6	Tebuconazole +sulphur	0.15	95.95
T7	Wet sulphur	0.25	18.47
T8	Mancozeb	0.3	64.41
T9	Metalaxyl	0.2	95.05
T10	Chlorothalonil	0.3	76.58
T11	Chlorothalonil+metalxyl	0.3	85.14
	CD	**15.977**	
	SE (M)	**5.413**	

Fig 1: in vitro bio-assay of fungicides



DISCUSSION

Among the eleven fungicides tested *in- vitro* against the test pathogen, Azoxystrobin +tebuconazole inhibition of 97.30% followed by tebuconazole + sulphur (95.95%). Wettable sulphur recorded the least inhibition of 18.47%. The previous research work showed that mancozeb was the effective fungicide against the disease which are as follows. Sunita et al (2010) reported that

Mancozeb showed maximum growth inhibition of the pathogen. Mancozeb (0.2%) and Carbendazim (0.05%) spray can be used to control the disease at regular intervals (Aktar and Shamsi, 2015, Singh et al., 2012, Bharnwal et al. 2002).

CONCLUSION

The *in –vitro* study on the effect of fungicides on the mycelia growth of *Alternaria zinniae* reveled that azxysotrobin + tebuconazole (0.1%) recorded maximum inhibition (97.30%) followed by tebuconazole + sulphur (95.95%) followed by metalxyl (95.05%). Wet sulphur recorded least inhibition (18.47%). These; fungicides may be trailed under field condition to know more about its efficacy against the pathogen so that it can be recommended in the farmer field condition.

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