In -vitro evaluation of fungicides against 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.*)is one of the most popular and important annual commercial plant growth for both private and commercial use throughout the year. The native of marigold is considered to be both the central and south America, especially Mexico.

It occupied prominent place in floriculture, both in area and production in compression to other flower, marigold grained popularity amongst garden and flower dealers on account of its easy cultivation and widely adoptability to divers soil and climatic condition. it s habit of profuse flowering, wide spectrum of attractive colours, shape and size, good keeping quality and long shelf life attached to attention of flower growers .it is extensively used on religious and social function.

There are two categorise of marigold. African marigold (*tagetes erect L.*)and French marigold (*Tagetes patuala L.)* Marigold flower and petals are of economic importance. flowers are sold loose in the form of garland (Tomar and singh ,2009) and its petals are used for decoration and extraction of xanthophill pigment which has became an of the source of edible colour of processing food product, for poultry feed and also used for extraction of oil which is used in

perfume industry, also its oil act repellent to flies (mainly *Tsignata*and *T. Minuta)*. Marigold flower are useful in reducing inflammation ,wound healing and as an antiseptic historically ,Marigold was used to treat various skin disease ,ranging from skin ulcerations to eczema internally .the soothing effects of marigold are used of stomach ulcers and inflammation .its intercropping has resulted in significant reduction of several phytosanitary problems in some crops and therefore ,it is used in crop rotation as well as intercrop to control certain plant parasitic nematodes as trap crop (Tomar and Singh, 2009).Now a day's floriculture is a remunerative avocation for the rural peoples. The income received from a hectare of marigold cultivation is much more than the income either from cereal or pulse crops.

Marigold crop is affected by several diseases caused by fungi,bacteria,and viruses. Major fungal disease of marigold isAlternaria leaf spot (*Alternaria tagetica, Alternaria zinnia or Alternariaalternata)* wilt or stem rot (*Phytophthora cryptogea*)damping off (*Rhizoctoniasolani*), flower bud rot /flower blight (*Alternaria dianthi*) powdery mildew (*Oidium sp.* And *leveillulataurica*) viral disease are mosaic (cucumber mosaic virus) and aster yellows. among these disease *Alternaria* leaf spot /blight incited by *Alternaria tagetica* /*Alternaria* (Shome and Mustafee, 1966) is an economically important and widely distributed disease of marigold and other flowering crop, causing accountable quantitative as well as qualitative loses.

The characteristics and diagnostic symptom of disease are necrotic lesions on leaves initial chlorotic to brown spot (1-3 mm) which gradually enlarge and coalesce and later turn dark brown with brownish purple margins,spots dry after become perforated in the centre,resulting early blight of affected leaves. similar lesions also develop on stem, pedicles calyx and petals. plant have numerous lesions under moistcondition. marigold is attacked by Alternaria leaf spot / blight disease causing considerable reduction in yield and quality the affect market value of marigold flowers (Shome and Mustafee 1966; Mondal and Choudhary ,1976 Mazumdar 2000)

The yield losses in the range of the 50 to 60 per cent (Shome and Mustafee, 1966; Neher1989; Rantna and Shukla ,2002) and 100 per cent reduction in flower pigments due to Alternaria leaf spot by *Alternariaspp*. are reported (Mazumdar 2000; singh *et al* 2006 Tomar and singh 2009).

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

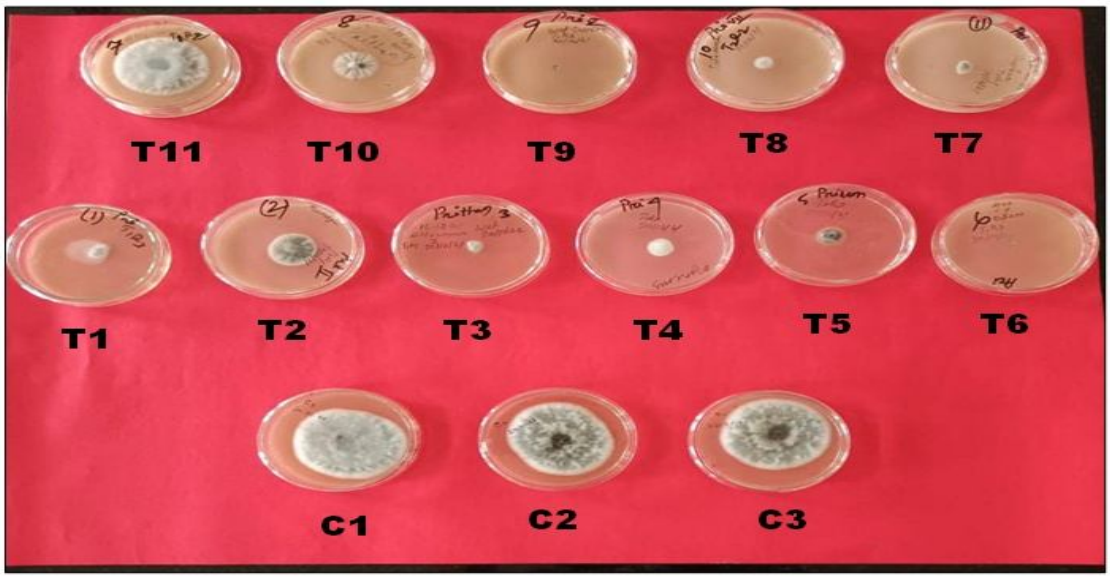
RESULT

It wasseen from the table 2 that azoxystrobin +tebuconazole recordedmaximum 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

The percentage mycelial growth inhibition recorded with all the fungicides tested (azoxystrobin +tebuconazole , tebuconazole +sulphur , metalaxyl), however , azoxystrobin +tebuconazole ,sulphur +metalaxyl were most effective and recorded significantly highest mean mycelial growth inhibition (100.00%) the third and fourth fungicides were metalaxyl (87.38%) and difenconazole (81.98%) .rest of the fungicides also recorded significant inhibition of the test pathogen which ranged form 58.11% (tebuconazole)to 76.58% (Chlorothalonil).

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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REFERENCERS

1. Shome, S.K. and Mustafee, T.P. (1966). Alternaria tagetica, causing blight of marigold (Tagetes sp.). Curr. Sci. 35 (3) : 70-73.

2.Tomar, B.S. and Singh, K.P. (2009). Marigold for year round livelihood. Indian Hort. Jan-Feb. 19-21.

3. Mondal, N. and Chaudhari, S. (1976). Flower bud rot of marigold CTagetes erecta L.) caused by Altemaria dianthi (Stevens and Hall) in West Bengal. Curr. Sci. 45 (2) : 75.

4. Neher, R. (1989). Monograph of genus Tagetes. Ph.D. Thesis, Michigan, USA. pp : 149-150.

5.Mazumdar, N. (2000). Epidemiological factors in relation to development of Altemaria leaf blight of marigold and fungicidal control. PI. Dis. Res. 15 (1) : 28-33.

6.Roat, B.L.; Jeewa, R. and Chaudhary, S.L. (2009). Effect of partially purified plant product preparations against Alternaria.

7.Singh, G. and Milne, K.S. (1973). Laboratory evaluation of fungicides against fungi causing flower blight of chrysanthemum. New Zealand J. Eptl. Agric. 2 (2): 181-183.