

1 **Evaluation of novel group fungicides against *Alternaria zinniae*, (*Dothideomycetes:Pleosporales*)the incitant of leaf spot and Flower**
2 **blight of Marigold**
3

4 **Abstract**
5

6 Marigold belonging to family Asteraceae, are most common in plant kingdom. It is an
7 important commercial ornamental plant and garden flower. It is found in different colours and
8 different fragrances. Yellow colour is most common. Leaf spot and flower blight is serious
9 disease of marigold causing yield loss in crop. The present investigation was carried out with
10 an objective to study the efficacy of new fungicides available in the market in *in-*
11 *vitro* condition. Eleven fungicides such as azoxystrobin, tebuconazole, azoxystrobin
12 +tebuconazole, difenoconazole, azoxystrobin + difenoconazole, tebuconazole + sulphur, wet
13 sulphur, mancozeb, metalaxyl, chlorothalonil, chlorothalonil + metalaxyl were evaluated at the
14 concentration of 0.1%, 0.15%, 0.1%, 0.1%, 0.1%, 0.15%, 0.25%, 0.3%, 0.2%, 0.3%, and
15 0.3% respectively. It has been found that, the combination of azoxystrobin + tebuconazole
16 recorded mycelia growth inhibition of (97.30) % followed by tebuconazole + sulphur
17 (95.95%) and Metalaxyl of 95.05%. The least inhibition of 18.47% was recorded by wettable
18 sulphur. Further the effectiveness of new fungicides may be tested under field condition
19 against *Alternaria zinniae*.

20 Keywords : fungicides, marigold, alternaria, odisha, azoxystrobin+tebuconazole.
21

Comment [KA1]: Fungicides

22 **INTRODUCTION**

23 Marigold (*Tagetes erecta* L.) also commonly known as gendaphoolas marigold belonging
24 belongs to the genus *Tagetes* and family *asteraceae* Asteraceae, also known as genda phool- originated
25 from Mexico and America. Fifty species of both annual and perennial herbaceous plant occur in India.
26 About 8000-10000 ha of land of marigold is cultivated in India. From which 70,000 mt (Negi *et al.*
27 1998) marigold was produced (Negi *et al.* 1998). Due to each in cultivation longer blooming period and
28 beautiful flower with excellent shelf life the flower spread very rapidly, then they are also known for
29 their rapid growing and annual flowering plant. The height of the plant ranges for between 6 inch-3ft.
30 Mostly in India it is mostly used for ornamental and medicinal purpose. It is used medicinal against
31 several diseases such as rheumatism, cold and bronchitis. Each part of the plant is valued for its
32 medicinal nature, the leaves are generally used in as an antiseptic, in kidney troubles and also as a cure
33 for piles. The flower have more ayurvedic composition which is useful for fever, scabies and liver
34 complaints and also use for eyes. The shoot part of the plant is commonly used for making teas in
35 Mexico. The bioactive substances present in the flower acts both as an insecticides and
36 fungicides. The leaves and flower possess medicinal values having phenolic and Antioxidants activities
37 and are equally important and pharmaceutical industry (Tripathy and Gupta 1991; Khalil *et al.*
38 2007). The essential oil of marigold which is in high demand in the perfume industry (Naik *et al.*
39 2003). The

Formatted: Font: Italic

Formatted: Highlight

Comment [KA2]: The sentence is not clear.
Could you re-phrase it.

Formatted: Highlight

Comment [KA3]: Delete, you have already
stated it above.

1 major marigold growing in district in ~~odisha~~Odisha are dhenkanala, koraput, sambalapur,
2 sundergah ~~and~~balasore. The production is higher except in hot summer months.

3 The major ~~reason~~ of yield loss in Marigold production could be attributed to is because of
4 ~~infections-infectious cause by~~diseses ~~caused by~~fungi, virus ~~and~~-bacteria and nematodes ~~cause high~~
5 ~~damage resulting yield loss~~. Flower blight, wilt, and stem rot, *Alternaria* leaf spot, *Fusarium* wilt are
6 some ~~are of~~ the fungal diseases that occur on marigold plant. Most serious prevalent disease are flower
7 blight and leafspot caused by *Alternaria zinniae*.

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

Formatted: Highlight

Comment [KA4]: This write-up is not clear! Ask someone to help you!

Formatted: Highlight

16 MATERIALS AND METHODS

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

20 Twenty ml of medium was poured into 90 mm sterilized Petri dishes and all plates inoculated with
21 actively growing 5 mm mycelia disc of test fungus. Three replications were maintained for each
22 treatment. These plates were incubated at 25 ± 1 °C for seven days and the ~~the~~ colony diameter was
23 recorded. The per cent inhibition over control was calculated according to formula given by Vincent
24 (1947).

Comment [KA5]: What mycelia did you use? Was it *Alternaria zinnia*? State it!

$$25 \quad I = \frac{(C - T) \times 100}{C} \text{ where,}$$

26 I = Per cent inhibition of mycelium

27 C = Growth of mycelium in control

28 T = Growth of mycelium in treatment

31 **Table 1: Different fungicides with their concentration**

32

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 were at par. wet sulphur recorded the least inhibition of 18.47%.

Comment [KA6]: How did you know they were at par? You should do statistical analysis to be able to come to that conclusion! Significant differences?!!!!

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

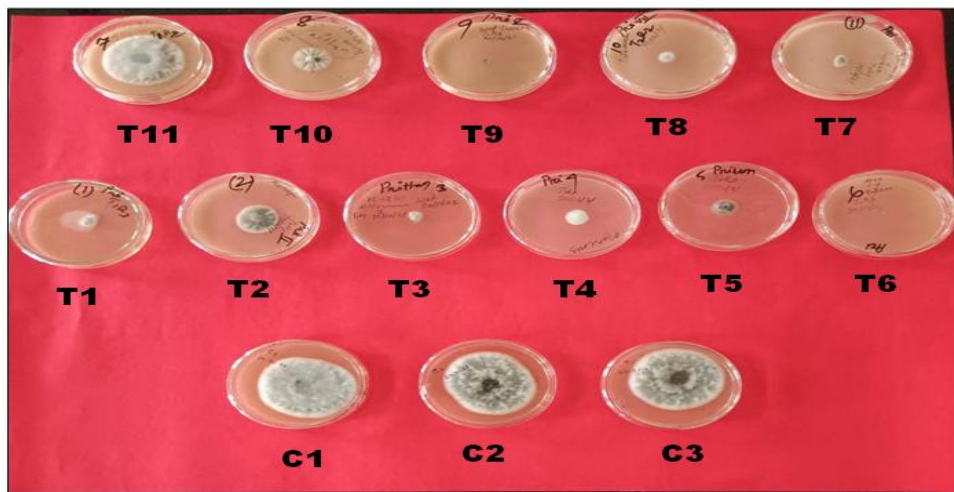


Fig 1: In vitro bio-assay showing the rate of inhibition caused by different fungicides on *Alternaria zinniae*

1 **DISCUSSION**

2 Among the eleven fungicides tested *in-vitro* against the test pathogen, Azoxystrobin
3 +tebuconazole inhibition of 97.30% followed by tebuconazole + sulphur (95.95%). Wetttable sulphur
4 recorded the least inhibition of 18.47%. The previous research work showed that mancozeb was the
5 effective fungicide against the disease which are as follows. Sunita et al(2010) reported that
6 Mancozeb showed maximum growth inhibition of the pathogen. Mancozeb (0.2%) and Carbendazim
7 (0.05%) spray can be used to control the disease at regular intervals (Aktar and Shamsi, 2015, Singh
8 et al., 2012, Bharnwal et al. 2002).

Comment [KA7]: What test pathogen did you use?

Formatted: Underline

Formatted: Underline

Formatted: Underline

Formatted: Font: Not Bold, Underline

Comment [KA8]: The discussion is poorly written! Ask someone to help you. I suggest you ask your supervisor.

Formatted: Font: Not Bold, Underline

Formatted: Underline

9 **CONCLUSION**

10 The *in-vitro* study on the effect of fungicides on the mycelia growth of *Alternaria*
11 *zinniae* revealed that azoxystrobin + tebuconazole (0.1%) recorded maximum inhibition
12 (97.30%) followed by tebuconazole + sulphur (95.95%) followed by metalxyl (95.05%). Wet sulphur
13 recorded least inhibition (18.47%). These; fungicides may be trailed under field condition to know
14 more about its efficacy against the pathogen so that it can be recommended in the farmer's use in the
15 field condition.

16 **REFERENCES**

17 Tripathy AK, Gupta KK (1991) Plant phenolics of *Tagetes erecta*. *Fitoterapia* 62 (1), 91-92
18 Naik SA, Vidyasagar D, Mishra DK (2003) Value addition in floriculture. *Floriculture Today* 8 (2), 7-
19 12
20 Negi JP, Mitra L, Dabas HK (1988) *Indian Horticulture Database*, National Horticulture Database.
21 National Horticulture Board, 490 pp
22
23 Aktar, M. and Shamsi, S. 2015. Blight of two species of marigold (*Tagetes*) caused by *Aspergillus*
24 *fumigatus* Fresenius. *Bangladesh J. Plant Pathol.* 31(1&2):1-6.
25 Chandel, S., Teixeira da Silva, J. A. and Sharma, C. 2010. Management of *Alternaria* leaf spot and
26 Neem Formulations. *Floriculture and Ornamental Biotechnology*, Global Science Book. 4(1): 79- 83.

27
28 **NOT ENOUGH REFERENCES. GOOGLE!!!**
29
30
31
32