

INTRODUCTION

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A fungicide is a chemical compound that kills or inhibits the growth of fungi. In Agriculture, fungicide is used to control fungi that destroy crops. So those fungicides have become an integral part of agriculture.

Now a days use of fungicide is having many problems. One of them is development of fungicide resistance in the pathogenic fungi. There are many workers who noticed in cases of fungicide resistance in pathogenic fungi from developed, developing and under developed countries e.g. USA, European countries and Japan. In India there are few cases of fungicide resistance (Reddy et al.1979; Pan and Sen, 1981; Gangawane and Reddy, 1985, 1988; Annamalai and Lalitakumari, 1987, 1990; Gangawane and Waghmare, 1991; Arora et al, 1992; Gangawane and Kamble, 1993 and Gangawane et al.1995).

Gerbera (Gerbera jamesonii) H. Bolux ex J.D.Hook is an important commercial flower crop grown through out the world in a wide range of climatic conditions. It is the 5th most used cut flower in the world. It is ideal for beds, borders, pots and rock gardens. The Gerbera flower mostly used in arrangement of cut flowers because of its size and the wide variety of colors that are available. The cut blooms when placed in water remain fresh for a reasonable amount of time. It is attractive flower with different colors and their prolonged life. So these flowers are used in any festivals, party and wedding ceremony etc.

The Gerbera flower is native of Transvaal, South Africa. Gerbera belongs to family 'Asteraceae'. It is perennial herb with deeply lobed leaves covered with silky hairs arising from crown. The inflorescence is borne on a long stalk.

The daisy-like flowers grow in a wide range of colors including yellow, orange, cream-white, pink, brick-red, scarlet, maroon, terracotta and various other intermediate shades. The double cultivars sometimes have bicolor flower which are very attractive. The flower stalk is long, thin and leafless.

There are many diseases of Gerbera; out of these leaf spot of Gerbera caused by *Alternaria alternata* is very serious. The symptoms of the disease on the leaves were characterized by the development of brown, small, scattered dots which gradually increase, enlarge, oval, circular/irregular brown to black lesion with concentric rings. Affected plant shows lower vitality, suppressed development, smaller distorted flowers. Therefore, in the present investigation efforts were made to manage leaf spot of Gerbera which is caused by *Alternaria alternata*.

Leaf spot of Gerbera caused by *Alternaria alternata* (Fries) Keissler occurs in several polyhouses of the world. The disease completely destroys the plant. According to our knowledge, there are few reports on management of this disease. The disease is managed by using different fungicides like Tridemorph, Ziram and Mancozed (Ghosh, et al;2002). The objectives of these studies were; chemical management of leaf spot of Gerbera through following steps:

1. To determine MIC of carbendazim against *Alternaria alternata* causing leaf spot of *Gerbera Jamesonii*.
2. To study effect of passage on the development of carbendazim resistance in the pathogen.
3. To study synergistic effects of agrochemicals on development of carbendazim resistance in the pathogen.

Gerbera leaf samples infected with *Alternaria alternata* were collected from different districts of Maharashtra (Kolhapur, Satara, Sangli and Pune). The samples were collected in sterile polythene bags and were brought to laboratory. Four isolates of *Alternaria alternata* were obtained from these samples. The isolates were maintained on Gerbera leaf extract agar medium at 4⁰C. *In vitro* MIC of carbendazim against four isolates was determined by food poisoning technique against carbendazim both *in vitro* and *in vivo*.

After determination of MIC of carbendazim, the effect of passage on the carbendazim resistance in pathogen was observed. This was studied by individually, alternate treatment of fungicides with two different mode of action and mixture of both on the development of resistance in the pathogen both *in vitro* and *in vivo*.

Synergistic effect of agrochemicals on the development of carbendazim resistance in *Alternaria alternata* was also studied. In this experiment, agrochemicals such as fungicides such as herbicides, insecticides, antibiotics, fertilizers and salts etc were used with carbendazim to study development of fungicide resistance in *Alternaria alternata* both *in vitro* and *in vivo*.