International Journal of Botany Studies
www.botanyjournals.com
ISSN: 2455-541X
Received: 19-07-2021, Accepted: 03-08-2021, Published: 19-08-2021
Volume 6, Issue 4, 2021, Page No. 776-778

Evaluation of different plant extracts against leaf spot disease of *Solanum melongena* L. caused by *Alternaria alternata*

Jadhav Sachin B
Department of Botany, KKW Arts, Science and Commerce College, Pimpalgaon (B), Nashik, Maharashtra, India

Abstract
Alternaria is a fungal genus which having many species. The genus is worldwide in distribution and causes pre and post-harvest diseases in a various fruit, vegetable, floricultural and cereal crops. The spores are present in soil microflora, when spore are exposed to leaves they infect it and then spread on fruits. It having short life cycle, easily detachable spores which are disperse by wind. Vegetables belonging to the family solanaceae, brassicaceae, cucurbitaceae etc. have nutritional and economic value. Brinjal (*Solanum melongena* L.) is one the major cash crop from Nashik which is study area and leading vegetable producing district from Maharashtra. It belongs to family solanaceae which having leaf spot disease due to Alternaria sp.Farmers bear loss in quality and quantity due to infection of fungus Alternaria. To control infection various chemical fungicides like M-45, dithane, captan are available but they have hazardous effect on ecosystem and biodiversity. In present study five plant extracts as biocontrol agent was used to control infection caused by Alternaria by ecofriendly manner. Out of five plant extracts *Lantana camara* and *Aegle mormelos* shows significant effect on growth of pathogen and reduce further damage of fruit, leaves significantly so growers can use plant extract for cultivation.

Keywords: plant extracts against, leaf spot disease, *Solanum melongena* L, *Alternaria alternata*

Introduction
Brinjal (*Solanum melongena* L.) is one the major cash crop from Nashik which is study area and leading vegetable producing district from Maharashtra. It belongs to family solanaceae which having leaf spot disease due to Alternariasp. The total area under brinjal cultivation intheworldis1864.32 thousand hectares with annual production and productivity of 49782.16 thousand Metric Tones and 26.70 MT per hectare respectively (Anonymous, 2015a) [1]. In India it is cultivated over an area of 711.30 thousand hectares with an annual production of 13557.81 thousand MT and productivity of 19.1 MT per hectare. The rapid rate of cultivation and increase in quantity is also coupled with some serious diseases on plant and fruit which tends to become a limiting factor. Farmers bear loss in quality and quantity due to infection of fungus Alternaria. The Genus Alternaria Nees. Ex Fr. belongs to the sub-division Deuteromycotina, class Hyphomycetes, family Dematiaceae (Woudenberg *et al*., 2013). Alternaria leaf blight and fruit rot diseases is most severe disease of brinjal and appears regularly, causing heavy losses in yield (Balai and Ahir, 2013). The disease first makes its appearance in young seedling. It attacks leaves and then spreads to fruits which subsequently rot and become unfit for consumption (Bochalya *et al*., 2012) [3]. *Alternaria solani* is a major destructive species of the Alternaria genus which cause early blight on solanaceous crops, more scientific studies are found on *A. solani* in literature but nowadays *A. alternata*, *A. tenuissima* and other species of genus also show increase destruction of crops. *Alternaria tennuissima* causing leaf spot and fruit rot on eggplant in India firstly reported by Raja *et al* (2005) [6]. *Atenuissima* is a cosmopolitan fungus already identified in India on pigeon pea (Kannaiyan and Nene, 1977) [5] Use of chemical fungicides have some direct harmful effect on plants including poor root hair development, shoot yellowing and reduced plant growth (Wally *et al*., 2006) [10]. Chemical fungicides are also hazardous to the environment. Therefore, the problem deserves immediate and effective management of all the Alternaria sp. To identification, understand nature and biological control of Alternaria pathogen present topic was selected for investigation.

Materials and Methods
Collection of diseased samples
Survey was conducted in Brinjal growing tehsils of Nashik district which was a study area in 2019-20. In each visited field 10 plants were randomly selected and also selected 10 leaves randomly in each plant. The diseased sample having leaf spot were collected from different localities and kept in sterilized polythene bags, labelled properly and brought to plant pathological laboratory for examination.

Isolation
Isolation of the pathogen from the diseased Brinjal plants was carried out on potato dextrose agar medium within 6–24 hours of sample collection. The infected plant parts were washed under tap water to remove dirt and rinsed with sterile distilled water, cut into convenient pieces and then disinfected with mercuric chloride solution (1:1000) for 30 seconds followed by washing with three changes of sterile distilled water to remove the traces of mercuric chloride. These pieces were then kept on sterile blotter paper to remove the excess moisture and then placed on potato dextrose agar (PDA) medium in petriplates, which were already sterilized, poured and cooled under aseptic conditions. These plates were then incubated at 27±1oC in incubator.
The petriplates were observed daily for the presence of fungal growth. When the growth of the fungus was

observed, individual colony was carefully transferred with inoculating needle to potato dextrose slants and incubated at room temperature 27±1ºC in incubator.

Identification of Isolates

The pathogens were isolated and the fungi were identified from morphological and microscopic characters (Ellis, 1971; Subramanian, 1971 and Simmons, 2007) [4, 8, 7]. Two most frequent species i.e. *Alternaria alternata* was selected for further study.

Maintenance of cultures

Isolated Alternaria species cultures were subcultured on potato dextrose agar slants and kept at 27±1ºC for seven days.

Treatment

Efficiency of various plant extract were tested against pathogens *Alternaria alternata* and *Alternaria tennusima* of Brinjal by measuring radial growth.

Fresh leaves of *Azadirachta indica*, *Lantana camera*, *Adhatoda vasica*, *Allium sativum* and *Aegle mormelos* were collected washed and oven dried at 45oC. The oven dried leaves of the above plant species were pulverised to obtain dry powder. 100g powder of each species was taken. Leaf extracts of each plant species was prepared with 100 ml water condensed to serve as stock extracts. The toxicity of stock extracts was determined against isolates of *Alternaria alternata*, by food poisoning technique (Mishra and Tiwari, 1992) at four (20, 40, 60 and 80%) concentrations.

The isolates of test fungi were multiplied on PDA medium. Petriplates containing PDA supplemented with different plant leaf extracts at four concentrations with their three replicates were inoculated with fresh 7 days old culture of test fungi (8 mm) cork borer discs and kept upside down. The above plates were incubated in BOD incubator (at 28 ± 2oC). Plates without plant extracts were served as control. Radial growth of the fungus on leaf extracts was measured at regular intervals. The percent inhibition was calculated by using the formula (Vincent, 1947) [9]:

$$L = C - T / C \times 100,$$

Where,

C = growth fungus in control

T = growth of fungus in treatment (mm)

Results and Discussion

Effect of treatment

The antagonistic efficacy of different plant extract was tested against the isolated pathogenic fungi.

Alternaria alternata

Plant leaf extracts was tested against *Alternaria alternata* to determine their antifungal activity. Different concentrations of plant leaf extracts (20, 40, 60 and 80%) were tested against pathogenic fungi. Among tested leaf extracts *Lantana camara* and *Aegle mormelos* showed significant reduction of radial growth of *Alternaria alternata* 80% and 83.33% respectively. These plants leaf extracts were found suitable at 80% conc. Therefore these plants are suitable for management of *A. alternata* pathogen.

There was significant reduction in the growth of *A. alternata* under the influence of various plant extracts. However, the variation among the concentrations was also significant.

Table 1: Antifungal activity of leaf extracts against *Alternaria alternate*

Plants Name	Conc (%)	Radial growth of *A. alternata* (mm)	Inhibition (%)
Azadiracta indica	20	70	22.22
	40	55	38.88
	60	42	53.33
	80	36	60
Allium sativum	20	85	5.55
	40	64	28.88
	60	50	44.44
	80	42	53.33
Adhatoda vasica	20	80	11.11
	40	68	24.44
	60	52	42.22
	80	38	57.57
Lantana camara	20	44	51.11
	40	42	53.33
	60	30	66.66
	80	18	80
Aegle mormelos	20	45	50
	40	36	60
	60	25	72.22
	80	15	83.33
Control		90	

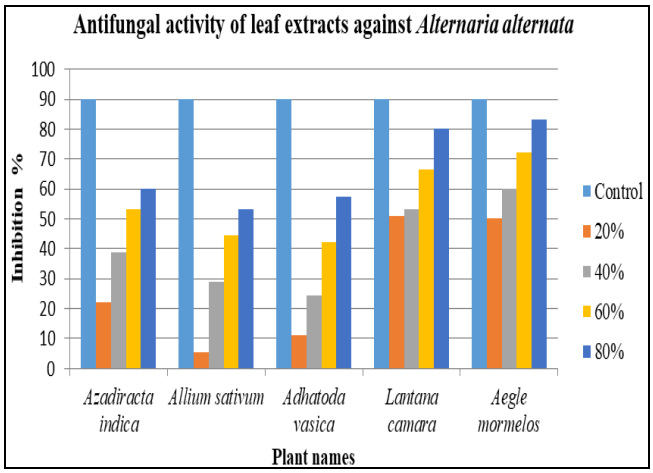

Fig 1

Conclusion

All the plant extracts inhibited mycelial growth of isolates *Alternaria alternata* over control. The highest inhibition after seven day of incubation was found in extracts of *Lantana camara* and *Aegle mormelos*. *Azadiracta indica*, *Allium sativum* and *Adhatoda vasica* can't prevent sporulation of *Alternaria alternata* significantly. Brinjal growers can use extracts of *Lantana camara* and *Aegle marmelos* as best biocontrol agent to control infection caused by Alternaria.

References

1. Anonymous. Food and Agriculture Organisation Statistics. Food and Agriculture Organisation of United Nations, Rome, Italy, 2015a, 567. <http://faostat.fao.org/default.aspx
2. Balai P, Ahir R, Yadav S. Varietal screening of brinjal genotypes against leaf spot of disease caused by

lternaria alternata. Environment and Ecology,2010:31:1276-1278.
3. Bochalya S, Shkhawat S, Singh R, Chohan PK. Studiesonage of fruit, age of inoculum and inoculum load on development of Alternaria fruit rot of brinjal caused by Alternaria alternata. Annals ofAgriBioResearch,2012:8:388-390.
4. Ellis MB. Dematiaceous hyphomycetes. Commonwealth Mycological Institute, Kew, 1971.
5. Kannaiyan J, Nene YL. Alternaria leaf spot of pigeon pea. Tropical Grain Legume Bulletin,1977:9(34).
6. Raja P, Ramana AV, Reddy, Allam US. First report of Alternaria tenuissima causing leaf spot and fruit rot on eggplant (Solanum melongena) in India. New Disease Reports,2005:12(31).
7. Simmons EG. Alternaria: Identification Manual. Utrecht, Netherlands: CAB fungal Biodiversity Centre, 2007.
8. Subramanian CV. Hyphomycetes. I.C.A.R., New Delhi, India, 1971, 801-820.
9. Vincent JM. Distortion of fungal hyphae in the presence of certain inhibitors. Nature, 1947, 150:850.
10. Wally F, Taylor A,LupwayiN.Herbicide residues & effects on nitrogen fixation in pulse crops.Farm Tech 2006, 52-55.