Biospectra : ISSN : 0973-7057, Vol. 15(1), March, 2020, pp.365-366
An International Biannual Refereed Journal of Life Sciences

45(PS).
Plant Science

ISSN : 0973-7057

Int. Database Index: 663 www.mjl.clarivate.com

Effect of volatile and aromatic compounds on the growth of fungi in decay of garlic cloves

Sujata Suman*
University Department of Botany, B.N.M.University, Madhepura, Bihar, India

Received : 7th February, 2020 ; Revised : 23th February, 2020

Abstract : Garlic is one of the most important cultivated herb used as spices and medicine. During storage it is damaged by some pathogenic fungi to protect garlic from these pathogenic fungi, some volatile aromatic compounds are in use. To assess the inhibitory effect of three volatile aromatic compounds Camphor, Menthol and Thymol against pathogenic fungi during storage of garlic bulb present work was performed. It was observed that the inhibitory effect of Thymol is greatest against pathogenic fungi followed by Menthol and Camphor.

Key words: Pathogenic fungi, thymol, menthol, camphor

INTRODUCTION

Garlic is economically so important that it is variously used for medicinal purposes and as spices world over. The medicinal properties of garlic have been well documented in Ayurveda. The main chemical constituents found in the fleshy storage leaf are volatile oil which contains Allyl disulphide, Ally proylsulphide and polysulphide, Allicin and Allocetion I and II. These compounds serve as antibiotics. The action of garlic due to having these biochemicals is spermopoitic, aphrodisiac, oleative, digestive, bone healing, tonic, rejuvenator, diaphoretic, stomachic, diuretic, stimulant, expectorant, anti-bacterial and anti-septic. Due to these properties, garlic is used against flatulence, epilepsy, pulmonary tuberculosis, ulcer, skin diseases, throat trouble, cough and cold, asthma and respiratory trouble.

During storage, several pathogenic fungi attack garlic and damage bulb and leaves. The common fungi attacking garlic are *Aspergillus niger, Fusarium moniliforme, Fusarium solani, Fusarium culmorum, Aspergillus sydowi, Fusarium oxysporum, Aspergillus flavus* and *Aspergillus nidulans.* Some of them produces toxin which make garlic not useful. To protect garlic during storage, some volatile aromatic compounds are in use such as Camphor, Menthol and Thymol. In the present study, effect of these four volatile aromatic compounds against pathogenic fungi have been evaluated.

*Corresponding author :
Phone : 8140606666
E-mail : nandaniob@gmail.com, sharmaop02@gmail.com

MATERIAL & METHODS

20ml of Potato Dextrose agar medium was poured in sterilised glass petri dishes of 6cm diameter aseptically. On solidifying, the centre of the medium was inoculated with the fungal spores of *Aspergillus niger,Fusarium moniliforme, Fusarium solani, Fusarium culmorum, Aspergillus sydowi, Fusarium oxysporum, Aspergillus flavus* and *Aspergillus nidulans* isolated from the decaying cloves of garlic. Three petri dishes were inoculated from the culture of each fungus on slant of PDA with the help of sterile inoculating needle and three petri dishes were

the control. The petri dishes were kept inverted i.e. the bigger part of the pair lower and inoculated part of the pair to the upper. 20mg each of camphor, menthol and thymol was kept in the bigger part of the petri dishes and the two pairs were sealed with celluloid tape for the control none of the camphor, menthol and thymol was used for the observing growth of fungi. The inoculated petri dishes were incubated at 30 ± 1°C for 7 days.

After expiry of the incubation period, the diameter of the culture was measured in mm of scale from the outside of the petri dish. The mean diameter of the culture in three petri dishes was calculated.

RESULT

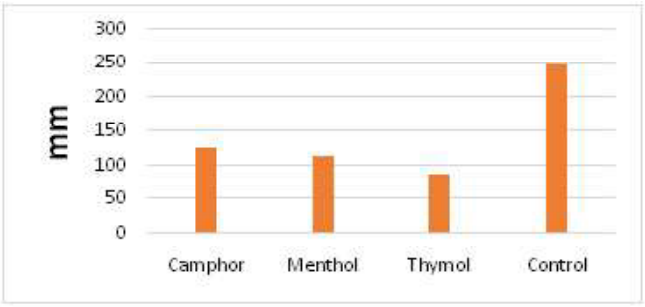
The effect of volatile aromatic compound was evaluated. It appears that growth of the fungi involved in decay of garlic bulbs is restricted by the application of volatile aromatic compounds. In this experiment three volatile aromatic compounds were used during storage, Camphor, Menthol and Thymol. It was observed that Thymol seems superior to the remaining two volatile aromatic compounds. The efficacy of these three volatile aromatic compounds in inhibiting the growth of fungi can be arranged in descending order as follows:

Thymol>Menthol> Camphor

The result is tabulated in table no. 1 and graph no. 1.

Table 1- Effect of Volatile and Aromatic compound on the growth of fungi involved in decay of garlic (diameter of culture expressed in mm)

Sl. No.	Fungi	Control	Volatile & Aromatic compound		
			Camphor	Menthol	Thymol
1.	*A. niger*	48	19	17	13
2.	*F. moniliforme*	32	16	18	14
3.	*F. solani*	27	13	15	11
4.	*F. culmorum*	25	17	13	10
5.	*A. sydowi*	33	15	13	10
6.	*F. oxysporum*	23	14	12	09
7.	*A. flavus*	41	21	16	12
8.	*A. nidulans*	20	13	11	08



Graph no. 01: Effect of Volatile and Aromatic compound on the growth of fungi involved in decay of garlic (diameter of culture based on total growth in mm)

CONCLUSION

During storage, garlic bulb and leaves are damaged due to attack of several pathogenic fungi.

To protect garlic from damage caused by pathogenic fungi, some volatile aromatic compounds are in use. The efficacy of three volatile aromatic compounds Camphor, Menthol and Thymol for the inhibition of growth of pathogenic fungi have been evaluated in the present work. It appears that growth of the fungi involved in decay of garlic bulbs is restricted by the application of volatile aromatic compounds. In this experiments three volatile aromatic compounds were used during storage, Camphor, Menthol and Thymol. It was observed that Thymol seems superior to the remaining two volatile aromatic compounds. The efficacy of these three volatile aromatic compounds in inhibiting the growth of fungi can be arranged in descending order as follows:

Thymol>Menthol> Camphor

REFERENCES

1. **Agarwal V. K. and Sinclair J.D. 1997.** Principles of seed pathology. CRC press Inc., Lewis publishers, Boca Raton, NY, London.
2. **Braida Charlene 1986.** A glorious garlic, A cookbook, Pownd, V.T. Storey Communication, 1986.
3. **Bramhavarchas 2010.** Ayurvedka Pran: Vanaushad hivigyan, YugNirmanYojna, Vistar trust, Mathura, India.
4. **Chopra, R.N., Nayar, S.L. and Chopra, I.C. 1956.** Glossary of Indian Medicinal Plants. CSIR, New Delhi.
5. **Dicklow, M.B. 2012.** UMass Extension, UMass Amherst Centre for Agriculture, Vegetable Programme, USA.
6. **Duke, J.A. 2002.** Handbook of Medicinal Herbs. *Boca Raton, CRC Press*.
7. **Kisan, Diary, 2012.** Bihar Agriculture University, Sabaur.
8. **Wheeler, H. and Luke, H.H. 1963.** Microbial toxins in Plant diseases. Ann. *Rev. Microbiol*. **17:** 223-242.

***