



Research Article

A COMPREHENSIVE ANALYSIS OF THE EFFECT OF *BRASSICA* OIL ON *ALTERNARIA ALTERNATA*

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Article Received on: 28/04/19 Approved for publication: 10/06/19

DOI: 10.7897/2230-8407.1008246

ABSTRACT

The mustard plants are one of the oil containing plants that have lots of Phytochemicals. The present study was aimed at screening the potential of ethanolic extract of mustard plant on *Alternaria alternata* using poisoned food method. The result of triplicate treatment has been indicated that maximum inhibition of fungus growth (67.94%) at 100 percent concentration of oil. The growth retardation was promoted with increasing the concentration of oil. The natural and safe effects are justifying the use of oil as a fungicide. Mustard oil was used as a triplicate treatment of each concentration of oil with respect to control. Fungus growth was measured in percent inhibition with the use of Vincent formula.

Keywords: phytochemical, Mustard oil, *Alternaria*

INTRODUCTION

Brassica sp. is the indigenous and folklore of South Asia. It is economically important and chief oil seed crop. Approximately twelve percent of world's production comes from India¹. Mustard belongs to genus *Brassica* that contain different phytochemicals such as beta carotene, vitamins, beneficial fibers, proteins and omega-3 fatty acids². Oils and different extracts contain phytochemicals that shows good resistant against different pests. Potential of lemon grass oil as a cell penetration effect on *Candida* spp. was found antifungal³. Due to presence of glucosinolates and their hydrolytic products in mustard seeds oil is shows potent pest inhibitor⁴. *Brassica* oil is also rich with Erucic acid, Linoleic acid, α -Linolenic acid, Tocopherol, Glucosides and Glycoside sinigrin^{1,5}. Mustard has serves emulsifying, antifoaming, softening and anti-corrosion properties due to erucic acid. The oil is use in formation of different products like soaps, detergents, cosmetics, plastics, lubricants and pharmaceuticals. *Brassica* seeds contain higher level of glycoside sinigrin that potentially bioactive as pesticides. Isothiocyanates, 3-carbinol and related compounds present in mustard shows protective effect against cancer, chronic diseases, oxidation and mutagens⁶. The oil is use in making traditional food, curry and pickles from ancient time. Plant is gives green vegetables and remaining part for animal's forage. The essential oil shows resistance power without any hazardous side effects as well as biodegradable in nature. So, we investigated the fungi toxic nature of *Brassica* oil for protection of food and agricultural stuffs.

MATERIALS AND METHODS

The infected tomatoes were carried from nearby market and fungus was isolated by dilution method. The isolated fungus has been grown on czapek dox agar and incubated at $25 \pm 2^\circ\text{C}$. The

fungus colony was shown green color initially, later it turns dark green to black. The infected fruit part was cleaned thoroughly with distilled water and taken it a small part then transferred to sterile petri plates and incubated at $25 \pm 2^\circ\text{C}$. Apply both serial dilution and streaking for obtained pure culture⁷. Lactic acid was used as an antibiotic for inhibition of bacterial contamination. The fungus identified as *Alternaria alternata* by IARI (Indian Agriculture Research Institute, New Delhi, ID no.-10916.18, Ref no. pop/1639). Figure 3(1) shows conidial chain of *Alternaria*. Ghani is the ancient cold pressing method of oil extraction. In this method seeds crushed very slowly at low velocity and room temperature. The oil was stored in pure form without any preservative and hazardous chemicals. The oil was mixed with Alcohol and prepared solution of different concentrations (20%, 40%, 60%, 80% and 100%) at the ratio of 1:3(w/v) shows in Figure 1(1). The effectiveness of *Brassica* oil was investigated by poisoned food technique⁸. Pre sterile petri plates were taken and poured 15 ml media with 0.5 ml solution of different concentrations of mustard oil and allowed it to solidify. The 5 mm mycelial disc of test fungus was cut from margin of 10 days old culture and applied on the center of treatment plates then incubated at $25 \pm 2^\circ\text{C}$. The control maintained only on media without oil shows in Figure 1(2) whereas treated set contain different oil concentrations in triplicates. The diameter of mycelia was measured on 15th day after inoculation. The growth has been taken in cm for assessment of different percentage of oil. The inhibition of fungus shows in Figure 3(2).

The Percent inhibition calculated by Vincent formula as follows⁹

$$I = (C-T/C) \times 100$$

Where- I = Percent inhibition of fungus growth

C = Average growth in control set (cm)

T = Average growth in treatment set (cm)

Table 1: Inhibition of Fungus in different concentrations of Mustard Oil Solution

S. NO.	Concentration of mustard oil in percentage (%)					
	Diameter of fungal colony in cm					
	control	20%	40%	60%	80%	100%
1.	8.0	4.0	3.5	0.9	2.2	4.1
2.	8.2	6.4	1.5	3.8	2.5	0.6
3.	7.2	5.5	4.8	3.6	3.5	2.8
Mean Value	7.80	5.30	3.27	2.77	2.74	2.50
Std. Dev	0.52	1.21	1.66	1.61	0.68	1.76
I %	-----	32.06	58.08	64.49	64.88	67.94

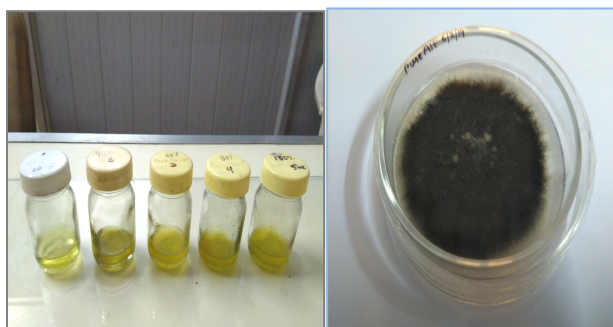


Figure 1(1): *Brassica* (mustard) oil solutions of different concentration (2): Control plate of fungus *Alternaria alternata*

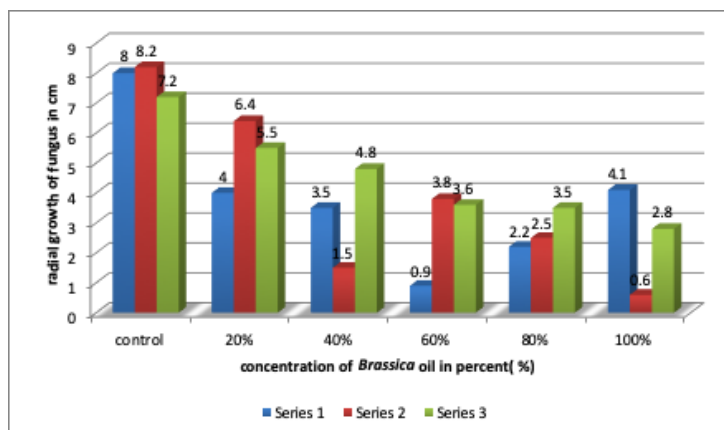


Figure 2: *Alternaria alternata* inhibition in *Brassica* oil

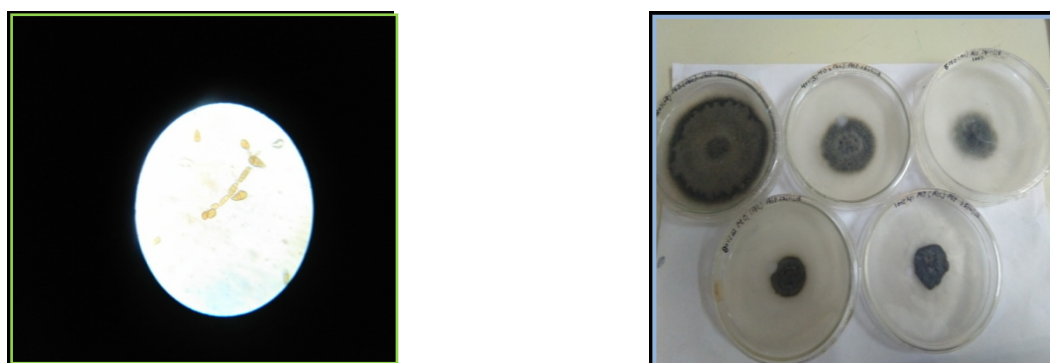


Figure 3 (1): Obclavate conidia with short beaks of *Alternaria alternata* (2) Inhibition of fungus in treatments (mustard oil)

RESULT AND DISSCUSION

Indian Ayurvedic literature says that Cruciferous (mustard) vegetables are rich with high content of isothiocyanates compound, glucosinolates and different types of acids that given to ability of biopesticides¹⁰. The average mean and standard deviation of each treatment set, and control have been calculated. The data presented in Table 1 revealed that reduction in the

growth of *Alternaria* observed in different concentrations of mustard oil. The Vincent formula has been used for calculating percent inhibition for fungus radial growth. The average mean value of fungal colony was measured with scale in all sample plates. The maximum inhibition of fungus is 67.94% at 100 percent concentration of oil while 20 percent concentration of mustard oil has been retarded the growth and activation of the

pathogen only 32.06%. The fungus growth retardation easily assesses with the help of graph which present in Figure 2.

CONCLUSION

There are many types of contaminated pollution problems in the environment by the fungicide and other chemicals. Drugs have lost their potency because pests have more resistant power due to frequently used fungicides. In the present investigation, natural methods help to control the effects of pests a contaminated pollution. The essential oils naturally present in many plants. Numerous essential oil have been tested for *in vitro* and *in vivo* antifungal activity and they had shown their biological effect on *Alternaria alternata*. Mustard oil also has the property of fungicides, easily available, cheap and healthy for plants and human. It has biodegradable secondary metabolites safe for the environment. It may be concluded that the use of traditional drugs, seed oils (mustard) and some other natural products reduce the risk of the many microbial diseases.

ACKNOWLEDGEMENT

I would be like to extend my gratitude to associate professor Rashmi Sharma for her valuable suggestions. The author is especially thankful to the principal and head of the botany department of Samrat Prithviraj Chouhan Government College, Ajmer.

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Cite this article as:

Sabeena Bano and Tahira Begum. A Comprehensive analysis of the effect of *Brassica* oil on *Alternaria alternata*. Int. Res. J. Pharm. 2019;10(8):56-58 <http://dx.doi.org/10.7897/2230-8407.1008246>

Source of support: Nil, Conflict of interest: None Declared

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