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Research Article

In vitro Anti fungal effect of Allium sativum and Thymus vulgaris on two pathogenic fungi

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Abstract: Infectious diseases accounts for high proportion of health problems in the developing countries including India. Microorganisms have developed resistance to many antibiotics and as a result, immense clinical problem in the treatment of infectious diseases has been created. Susceptibility tests were performed by the disc diffuse on method of Bauer et al. In this study garlic has a fungicidal effect on 2 strains of fungi but thyme have a fungicidal effect on Mucor Hymalys and inhibit from growth of Candida albicans. This study showed that Allium sativum and Thymus vulgaris has antifungal effect on Mucor Hymalys and Candida albicans.
Keywords: In vitro, Anti fungal, Allium sativum, Thymus vulgaris, pathogenic fungi.

INTRODUCTION

Medicinal plants have served through ages, as a constant source of medicaments for the exposure of a variety of diseases. The history of herbal medicine is almost as old as human civilization. The plants are known to provide a rich source of botanical anthelmintics, antibacterials and insecticides[1-3].

Infectious diseases accounts for high proportion of health problems in the developing countries including India. Microorganisms have developed resistance to many antibiotics and as a result, immense clinical problem in the treatment of infectious diseases has been created [4].

There are alarming reports of market opportunistic fungal infections[5]. The infections caused by opportunistic fungi are included under new spectrum of fungal pathogens. Such fungi were earlier reported from various plants as pathogens. But now they are known to cause disease in human beings. There is an increasing awareness amongst clinicians and microbiologists pertaining to importance of infection caused by opportunistic fungi[6,7].

In the People's Republic of China, commercial A. sativum extracts are widely used to treat patients with systemic fungal infections [8-10].

Numerous studies have documented the antifungal [11-12] and antibacterial[13-14] eVects of plant essential oils. Screening experiments with 13–52 essential oils and major active components against 5–25 microorganisms[16-17]. It also reported that thyme, clove, cinnamon, bay, oregano, garlic and lemongrass to be some of the best broad spectrum candidates for inhibition of food-borne pathogens and spoilage organisms [18].

The aim of this study is In vitro Anti fungal effect of Allium sativum and Thymus vulgaris on two pathogenic fungi.

MATERIAL AND METHODS

Collection of plant material

Thymus vulgaris were collected on March 2014 from around of Urmia city. Allium sativum were prepared from Rasht city on June 2014.

Culture and Maintenance of Fungi

Fungi were prepared from Iranian Research Organization for Science and Technology (IROST). After preparation this agent was sub cultured. Fungi were cultured on Saburd dextrose Agar media.

Table 1: characteristics of Fungi

S. No	Name	Type	PTCC No
1	Mucor Hymalys	Fungi	PTCC5292
2	Candida albicans	Yeast	PTCC5027

Preparation of plant essential oil

After collecting plants peeling and dry was done. After drying, essential oil with Clevenger apparatus method was done. 100gram from dry mater added to 400cc sterile water and boiled on heater for 4 hours.

Media Preparation and Its Sterilization

For the plates we prepared Saburd dextrose media. All the media prepared was then sterilized by autoclaving the media at (121°C) for 20 min.

Disc diffusion method:

Susceptibility tests were performed by the disc diffuse on method of Bauer et al [19].

RESULTS

In these tests, the effect of the essential oil on the fungi, garlic and thyme essential oils showed antifungal properties.

Table 2: Diameter of inhibition zone from garlic essential oil on ten day of the following described fungi

Fungi	Replication	First day	Third day	Tenth day
Mucor Hymalys	Rep1	Not growth	Not growth	Not growth
	Rep2	Not growth	Not growth	Not growth
	Rep3	Not growth	Not growth	Not growth
	Rep4	Not growth	Not growth	Not growth
Candida albicans	Rep1	Not growth	Not growth	Not growth
	Rep2	Not growth	Not growth	Not growth
	Rep3	Not growth	Not growth	Not growth
	Rep4	Not growth	Not growth	Not growth

Table 3: Diameter of inhibition zone from thyme essential oil on ten day of the following described fungi

Fungi	Replication	First day	Third day	Tenth day
Mucor Hymalys	Rep1	Not growth	Not growth	Not growth
	Rep2	Not growth	Not growth	Not growth
	Rep3	Not growth	Not growth	Not growth
	Rep4	Not growth	Not growth	Not growth
Candida albicans	Rep1	6 cm	6 cm	4.5 cm
	Rep2	5 cm	5 cm	4.5 cm
	Rep3	6.5 cm	6.5 cm	4.5 cm
	Rep4	5 cm	5 cm	3.5 cm

Table 4: Diameter of colony in the following described fungi as control sample on ten day

Fungi	Replication	First day	Third day	Tenth day
Mucor Hymalys	Rep1	Not growth	5 cm	Complete growth
	Rep2	Not growth	5 cm	Complete growth
	Rep3	Not growth	5 cm	Complete growth
	Rep4	Not growth	5 cm	Complete growth
Candida albicans	Rep1	Not growth	4 cm	Complete growth
	Rep2	Not growth	4.5 cm	Complete growth
	Rep3	Not growth	4.5 cm	Complete growth
	Rep4	Not growth	4 cm	Complete growth

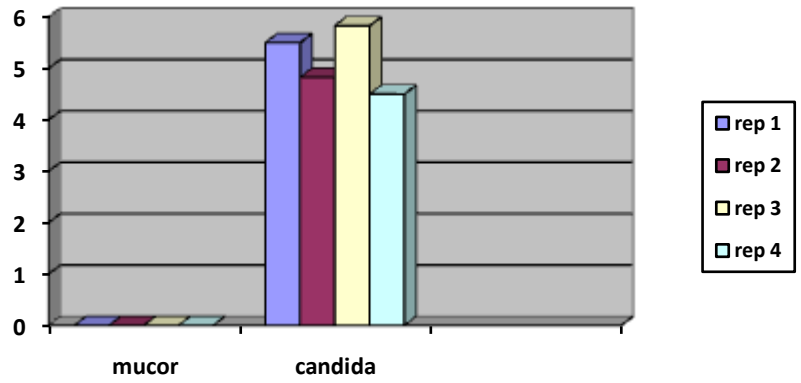

Fig 1: Average of Diameter of inhibition zone from thyme essential oil on ten day (with cm)

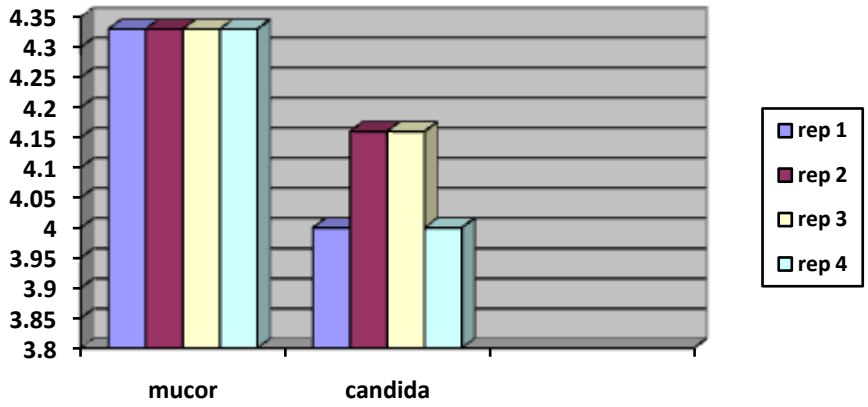

Fig 2: Average of Diameter of colony in control sample on ten day (with cm)

DISCUSSION

In this study garlic has a fungicidal effect on 2 strains of fungi but thyme have a fungicidal effect on Mucor Hymalys and inhibit from growth of Candida albicans. This study showed that Allium sativum and Thymus vulgaris has antifungal effect on Mucor Hymalys and Candida albicans. Sunita Bansod and Mahendra Rai in 2008 showed that garlic has antifungal effect [7]. In 2001 Zafar Iqbal et al proved Anthelmintic Activity of Allium sativum [3]. In another study Maryam Omidbeygi et al in proved antifungal activity of thyme on *Aspergillus flavus*[18]. Despite these studies, conclude that Allium sativum and Thymus vulgaris has antifungal effect on 2 strains of fungi.

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