Antifungal Effects of *Clitocybe odora* (Bull.: Fr.) Kumm. Against The Plant Pathogen *Fusarium culmorum* and *Fusarium moniliforme*

Clitocybe odora (Bull.:Fr.)'nın Bitki Patojeni *Fusarium culmorum* ve *Fusarium moniliforme*'ye Karşı Antifungal Etkileri

Research Article / Araştırma Makalesi

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ABSTRACT

In this study, *Clitocybe odora* were dried under aseptic conditions and put thru extraction for 12 h in solvents. The extracts were filtered and dried using a rotary evaporator at 60°C and finally dried material stored +4°C. Antifungal activities were measured by Disc Diffusion method. According to this method; *Fusarium culmorum* and *Fusarium moniliforme* inoculums containing were spread on potato dextrose agar. The *Clitocybe odora* extracts were used to 6 mm discs as 10 µl. All these discs placed on the inoculated agar separately and incubated at 28°C for 48 h. For control, water and only acetone and chloroform saturated discs were used. Also in this study erythromycin and amoxycillin that commercial antibiotics were used for comparison.

Key Words
Clitocybe odora, *Fusarium culmorum*, *Fusarium moniliforme*, antifungal activity.

ÖZET

Bu çalışmada, *Clitocybe odora* aseptik şartlarda kurutuldu ve 12 saat süre ile çözgenler içinde bırakıldı. Ekstraktlar süzüldü ve evaporatör kullanarak 60°C'de kurutuldu. Elde edilen kuru materyaller +4°C'de muhafaza edildi. Antifungal aktiviteler Disk Difüzyon metodu ile ölçüldü. Bu metoda göre, *F.culmorum* ve *F.moniliforme* inokulumları patates dekstroz agar besiyeri üzerine yayıldı. *Clitocybe odora* ekstraktları 6 mm çapındaki disklerde 10 µl olacak şekilde emdirildi. Tüm diskler besiyeri üzerine ayrı ayrı bırakıldı ve 28°C'de 48 saat inkübe edildi. Kontrol için su ve sadece aseton ve kloroform içeren diskler kullanıldı. Çalışmada ticari antibiyotikler eritromisin ve amoksilin karşılaştırma için kullanıldı.

Anahtar Kelimeler
Clitocybe odora, *Fusarium culmorum*, *Fusarium moniliforme,* antifungal aktivite.

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INTRODUCTION

Natural resources, especially plants, fungi and microorganisms, new, safe and effective as antimicrobials are used. The use of plants and fungi in the treatment of disease is as old as human history, plants and fungi, and metabolites that have saved many lives. Usually, the smell of mushrooms, they have their good taste, aroma and nutrient content of foods are used because of their [1]. In addition to these features in the treatment of various diseases, fungi are also used in medicine. *A.bisporus*, *L.edodes*, *A.auricula* and *Pleurotus* spp. fungi, such as bacteria, fungi, viruses have antagonistic effects [2].

In this study, *Clitocybe* odora (Bull.: Fr) Kumm. plant pathogens *Fusarium culmorum* and antifungal effect against *Fusarium moniliforme* were investigated.

MATERIALS AND METHODS

Organism

Clitocybe odora has been collected by Dr. Turkoglu from Denizli-Buldan- Kelledere on 04.11.2006. (Figure 1). Samples are stored as Turkoglu 3051. (Figure 2).

Test organisms

In our study, the plant pathogen *Fusarium culmorum* and *Fusarium moniliforme* were used as test organisms. Organisms were obtained from the Ministry of Agriculture and Rural Affairs. *Fusarium* species was developed on potato dextrose agar (PDA) and mycelial agar discs that improved on the agar media were taken and activated on the nutrient broth for 48 h and 100 rpm

Preparation of Extracts

Clitocybe odora was dried in aseptic conditions and divided into small pieces. Dried mushrooms were powdered in the blender and 50 g of each sample taken as 300 ml acetone and chloroform were left separately. Erlenmeyer of Samples was covered with aluminum foil and was extras 7 days. Extracts were filtered through Whatman paper at the end of this period, and 40°C and vacuum dried [3].

Preparation of Samples

Activated *Fusarium* spp. were spread with spatula on the potato dextrose agar (PDA) as 500 µl separately and dried in aseptic conditions. On the dried samples were left that absorbed with 10 seconds 6mm discs of acetone and chloroform. For antifungal effects of extracts; disc diffusion method was used [4]. All samples were incubated at 28°C. At the end of incubation period; the inhibition zones diameters were measured and photographed. Sterile distilled water were prepared using a control group of study. All tests were prepared in three replications.

RESULTS AND DISCUSSION

In our study, antifungal effects of *Clitocybe odora* were found against *Fusarium culmorum* and *Fusarium moniliforme*. This effect was seen that tested *Clitocybe odora* mushroom extracts by the inhibition zone to be clearly visible (Figure 3). All antifungal effects were shown in Table 1.

From the table, as seen *Clitocybe odora* chloroform and acetone was prepared with extracts observed inhibition zones is taken into account; chloroform extracts *F.moniliforme* the measured values of 28 mm and 30 mm (mean 29 mm) ($p > 0.05$) *F.culmorum* for the 25 mm and 30 mm (average 27.5 mm) ($p > 0.05$) values measured for acetone extracts *F.moniliforme* 25 mm and 36 mm (mean 25.5 mm) ($p > 0.05$), the 40 mm and 35 mm for *F.culmorum* (mean 37.5 mm) ($p > 0.05$). *Clitocybe odora* chloroform extract was prepared as a result of *F.moniliforme* at *F.culmorum* from extracts prepared with acetone is more effective when *F.culmorum* and *F.moniliforme* is also more effective. Also study commercial antibiotics amoxycillin and erythromycin discs were also used for comparison. With both antibiotics but no inhibition zone observed in experiments is not prepared for the test organism and the *F.culmorum* and *F.moniliforme* no effect was understood.

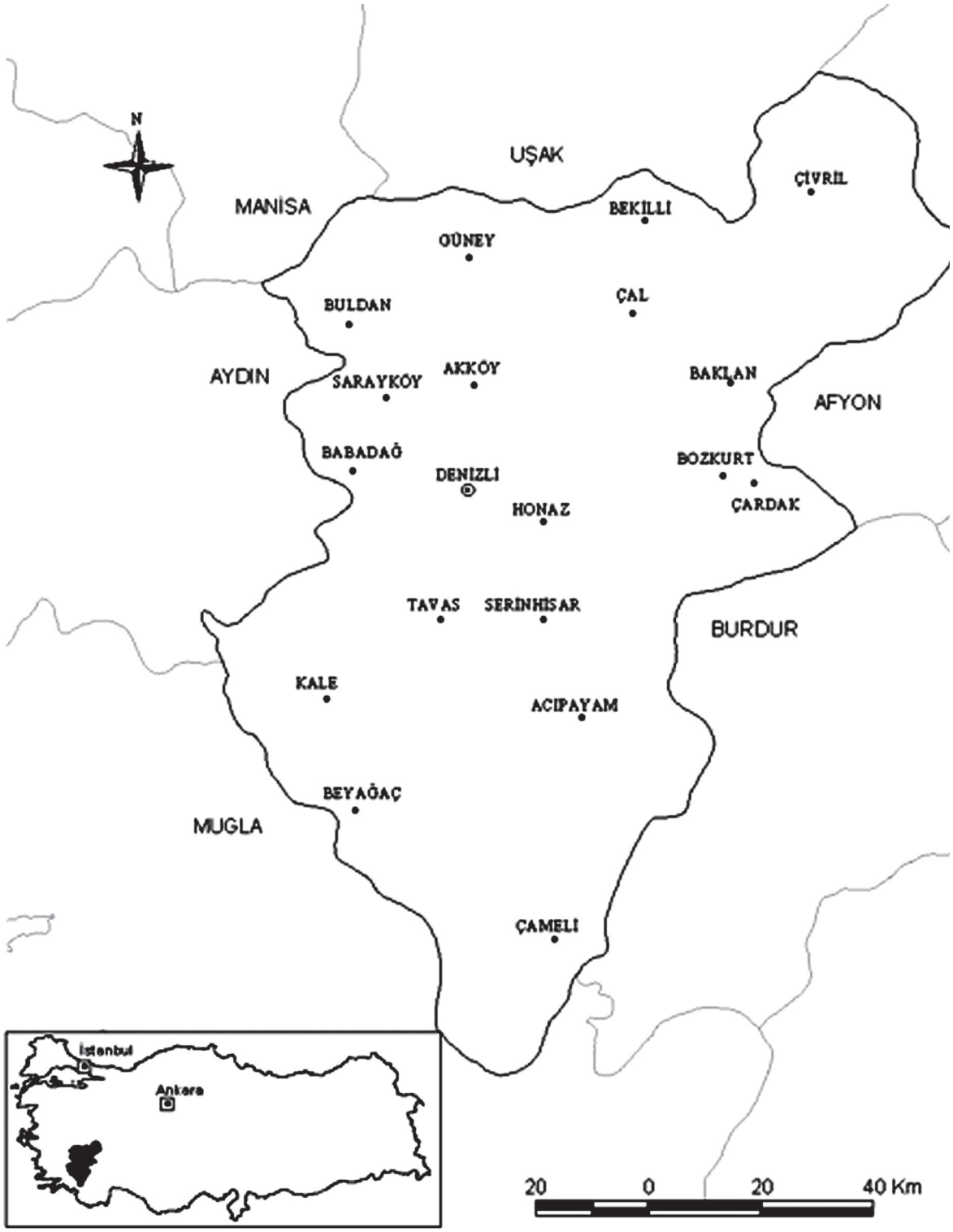

Figure 1. Study area.

Figure 2. *Clitocybe odora*.

Table 1. Antifungal effects of Clitocybe odora.

Microorganisms	Inhibition zone diameter (mm)		
	Clitocybe odora		
	Control*	Solvents	
		Chloroform	Acetone
Fusarium culmorum	0	27.5	37.5
Fusarium moniliforme	0	29	25.5

* Distilled water

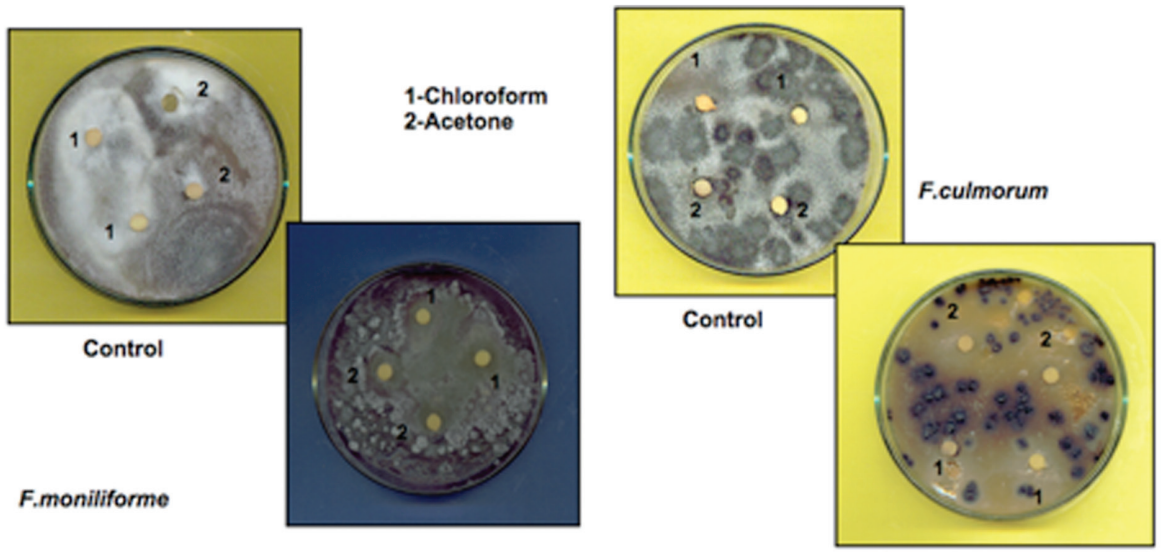

Figure 3. Antifungal effects of *Clitocybe odora*.

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