ORIGINAL ARTICLE

Antifungal Activity of Freshly Growing Seeds of Fennel (Foeniculum Vulgare)

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ABSTRACT

Foeniculum vulgare commonly known as fennel, belongs to family Apiaceae. The aqueous, alcoholic, acetone, ethylacetate, chloroform extracts of fresh seeds of Foeniculum vulgare were evaluated against different strains of fungus for their antifungal activity against.The method used for determination of antifungal activity was diffusion disc method. The inhibition of zones were measured with the help of zone reader.The data showed that the zone of inhibition of alcohol extract were greater as compared to other extracts.

Keywords: Antifungal activity, seed extract, Fennel,zone of inhibition.

INTRODUCTION

Fennel belongs to family Apiaceae. Fennel is an indigenous herb which is distributed in central Europe and Mediterranean sea shores and also present on the river banks (rather at all 2012). It is cultivated throughout the year in tropical regions of the world for its fruit. It is used as spices in our kitchen. The chemical investigation from the fennel include essential oil, fatty acid, tannins, flavonoids, cardiac glycosides saponins and other compounds also (he and hucng 2011).

Fennel is used in a lot of cosmetics and used in herbal medicine (khalid *at al* 2012).Anend *at al* 2008 reported that fennel also has anticancer property. The oil of fennel also shown antioxidant and anti-microbial activity (Abed 2007, choi and Hweng 2004). Reddy at all 2010 also reported that fennel also help to pievent fungal growth.

The phytochemical screening is the procedure in which isolation of many constituents of plant for assessing their biological activities.The importance of of plants are due to the presence of that specific chemical substance,which have particular action on living organism.

In present study the funnel seeds are collected in spring season because during this season the plants are in peak life cycle stage. At spring season plants have high quantities of all nutrients, vitamins, enzymes.

Although the chemical composition and antimicrobial properties of fennel oil have been studies. The aim of the present study was conducted to investigate chemical composition and anti-fungal activity of fresh fennel seeds extracts against fungal pathogens and also effect of alkaloids saponins, steroids, and flavonoids glycosides of tannins against fungal strains.

MATERIAL OF METHOD

Plant material: Fresh growing seeds of Fennel were collected from Ayub agriculture research institute. Jhang road Faisalabad. The plant material (seeds) were identified by taxonomist, department of botany, university of agriculture Faisalabad.

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Fennel extracts: The fennel seeds extracts were prepared by the following procedure as per pre-established guidelines with some modification. Fresh growing seeds were collected and washed with distilled water. A weight portion of seeds were dried under shade to cheek the amount of water then fresh seeds were weighted and grinded in measured amount of acetone, ethyl acetate, chloroform, alcohol and water.

All the extracts were filtered. The filtrates were concentrated in rotary evaporator. The remaining amount of solvents were evaporated in incubator at their standard temperatures to achieve maximum evaporation of solvents the amount was measured in terms of per gram crude powder.

Phytochemical tests: The fennel seeds were used to test the presence of alkaloids, glycosides, saponins, flavonoids, steroids, tannins end anthraquinone were carried out by the method of Brain and Turners (1975)

Microorganisms: The Pathogenic strains of Aspergillus Niger, candidaAlbican, Trichoderma and Meta-rhizium were obtain from department of microbiology, University of Agriculture Faisalabad. The identified pure fungal culture were maintained at 32˚C by culturing it on PDH media.

Determination of Antifungel Activity of fresh growing seeds of funnel extracts: The antifungal activity of acetone, alcoholic, ethyl acetate, chloroform and water extracts of fresh growing seeds of funnel against test fungi by the method of dextrose agar plates. The dextrose agar plates were inoculated with inoculum of 0.2ml of fungal suspension C10^{8}sporeper ml. The different concentrations of all fennel seeds extracts were added on 10mm what man 1 filter paper discs. The antifungal activities of funnel seeds extracts and phytochemical constituents against fungi were evaluated by measuring inhibition zone diameter surrounding each disc. The grisofulvin was used as positive control for fungi.

RESULT AND DISCUSSION

The antifunfal activity of acetone, ethylacetate, chloroform, alcohol and water extracts of fresh growing fennel seeds constituents were assessed against different strains of fungi .The positive sign (+) indicate inhabitation zone and – ve sign indicate no inhabitation of fungal growth by extracts as shown in table (2-8). The minimum concentration of inhibition was 100 µg.

Table 1: Detection of important phyto-constituents in fresh growing seeds of Fennel.

Constiruents	Fresh Seeds of Fennel +ve / -ve
Alkaloids	+ve
Saponins	+ve
Steriods	+ve
Flavonoids	+ve
Glycoside	+ve
Tannins	+ve
Anthraquinone	-ve

Table 2: Zones of inhibition of test fungi on PDA (potatoes dextrose agar) at various concentration of ace tonic extract of fresh growing fennel seeds.

Tested Fungi	Zone of inhibition at different concentration(µg)			
	75	100	125	150
Aspergillus Niger	-	-	+	14.00
Trichoderma	-	-	+	13.9
Metarhizium	-	-	-	12.2
Candida Albican	-	-	-	11.2

Table 3: Zone of inhibition of test fungi (diameter in mm) on PDA (potato dextrose agar) at various concentrations of ethyl acetate extract of fresh growing fennel seeds.

Tested Fungi	Zone of inhibition at different concentration (µg)			
	75	100	125	150
Aspergillus Niger	-	+	+	13.00
Trichoderma	-	-	+	12.80
Metarhizium	-	-	+	11.50
Candida Albican				

Table 4: Zone of inhibition of test fungi (diameter in mm) on PDA (potatoes dextrose agar) at various concentrations of chloroformic extract of fresh growing seed of fennel.

Tested Fungi	Zone of inhibition at different concentration(µg)			
	75	100	125	150
Aspergillus Niger	-	+	+	14.50
Trichoderma	-	+	+	13.50
Metarhizium	-	-	+	12.00
Candida Albican				

Table 5: Zone of inhibition of test fungi (diameter in mm) on PDA (potatoes dextrose agar) at various concentrations of alcoholic extract of fresh growing seeds of fennel.

Tested Fungi	Zone of inhibition at different concentration(µg)			
	75	100	125	150
Aspergillus Niger	-	+	12.00	15.50
Trichoderma	-	+	11.20	14.00
Metarhizium	-	+	10.70	12.50
Candida Albican				

Table 6: Zone of inhibition of test fungi (diameter in mm) on PDA (potatoes dextrose agar) at various concentrations of aqueous extract of fresh growing seedsof fennel.

Tested Fungi	Zone of inhibition at different concentration (µg)			
	75	100	125	150
Aspergillus Niger	-	+	+	12.00
Trichoderma	-	-	+	11.80
Metarhizium	-	-	+	11.50
Candida Albican				

Table 7: Zone of inhibition of test fungi (diameter in mm) on PDA media of reference drug.

Zone of inhibition at different concentration (µg)	Grisofulvin (150 µg)
Aspergillus Niger	19
Trichoderma	17
Metarizium	18
Candida Albicans	15

Results showed that alkaloids, saponins, steroids, tannins are present in fresh growing seeds of fennel but anthraquinune are absent as shown in Table-1 . Table-2-6 shows that acetonic extracts of fresh growing fennel, ethyl acetate extracts, chloroformic extracts were found to inhibit aspergillus, Trichoderma and metarhizium where as both alcoholic extract of fresh growing fennel and aqueous extracts were found to be ineffective against aspergillus but effective against Trichoderma and metarhizium. The result were also supported by work of Meetu*ata*l2013. She showed that alcoholic and aqueous extracts of fennel were ineffective against aspergillus niger.

Samah Awed etel 2017 also reported that fennel oil showed antifungal activity against A-flevus, A-niger and M-canis,Kamel *etel* in 2015 also reported the antifungal activity against candida albinos.

CONCLUSION

As the microbes showed resistance to currently used antibiotics and as well as the production of the synthetic drugs have high cost. The pharmaceutical companies are now search for some alternatives. The medicine plants are safe and cost effective and also less side effects. Present work showed that fresh growing seeds extracts of fennel have good antifungal activity.

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