ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES

Published by JK Welfare & Pharmascope Foundation Journal Home Page: www.ijrps.com

Antifungal potential of Fenugreek Seeds (Trigonella foenum-graecum) Crude Extracts against *Microsporum gypseum*

Puneet Sudan*[1], Manish Goswami[2], Jitender Singh[3]

[1]Chandigarh College of Pharmacy-Landran and Research Scholar at UIPS Chandigarh University-Gharuan (Mohali), Punjab, India
[2]UIPS Chandigarh University- Gharuan-Mohali, Punjab, India
[3]College of Pharmacy- Career Point University- Hamirpur, Himachal Pradesh, India

Article History:

Received on: 25.08.2019
Revised on: 12.11.2019
Accepted on: 27.11.2019

Keywords:

Antifungal, Trigonella foenum-graecum, Microsporum gypseum

ABSTRACT

Trigonella foenum-graecum (*fabaceae*) is commonly used as condiments and spices in Indian and Asian food to flavour, colour, and texture of food, and it is employed in various medicinal purposes in traditional systems. The biological activity of fenugreek can be easily accessed from previous research conducted by several researchers. The present research was conducted to find out the antifungal potential of various extracts of dried powder of fenugreek seeds by means of paper disc diffusion method, with petroleum ether, ethyl acetate, ethanol, and aqueous solvents in 25 μml, 50 μml and 100 μml concentrations against Microsporum gypseum. Clotrimazole was used as a standard. The present study revealed that fenugreek is a potent antifungal agent against *Microsporum gypseum*. The ethanol extract of fenugreek using 100 μml concentrations depicted the highest zone of inhibition of 16.510+ 0.85mm and 38.395% of mycelial inhibition against a tested pathogen. While drug extracts in other solvents also revealed reasonable to least antifungal potential. This finding tells us that fenugreek extracts tested proved to be a potent antifungal agent against *Microsporum gypseum*. It was found that ethanol extract of fenugreek is best effective against tested strain. This exploration of fenugreek extracts has confirmed its importance, particularly in the area of influence on dermatophytic fungal strain.

*Corresponding Author

Name: Puneet Sudan
Phone: 9855937822
Email: cgc.ccp.ps@gmail.com

ISSN: 0975-7538

DOI: https://doi.org/10.26452/ijrps.v11i1.1870

Production and Hosted by

IJRPS | www.ijrps.com

INTRODUCTION

The microbial and fungal infections are becoming crucial trouble to mankind, and they are the foremost reason of morbidity and mortality of many developing countries (Ahmed *et al.*, 2012). Many antimicrobial agents are presently accessible for the treatment and management of infectious diseases (Karuppiah and Rajaram, 2012). In order to overcome the ill effects and resistance caused due to synthetic drugs, the World Health Organization have motivated many researchers to exploit natural products for their great therapeutic potential (Talebi *et al.*, 2014). A huge variety of herbal antifungal agents derived from traditional medicinal plants are existing for the treatment of dermatophytoses (Kimm *et al.*, 2015). In the present scenario, medicinal plants and their phytoconstituents are gaining attention owing to the fact that herbal drugs are lesser in cost, easily accessible, and with fewer or no side effects (Malik *et al.*, 2015). Trigonella

foenum graecum (Fenugreek) belong the family Fabaceae is one of the ancient traditional medicinal plants and has a long history of its therapeutic uses (King *et al.*, 2015). It contains lysine and L-tryptophan rich proteins, mucilaginous fibre and other rare chemical constituents such as saponins, coumarin, fenugreeke, nicotinic acid, sapogenin-sphytic acid, scopoletin and trigonelle which has therapeutic effects (Billaud and Adrian, 2001).

MATERIALS AND METHODS

Preparation of plant extract

Fenugreek dried seeds were purchased from the local market for the preparation of the extract. The dried seeds of methi were grounded to form a powder with the help of a mechanical grinder. Herbarium sheet is submitted with the Pharmacognosy department Chandigarh college of Pharmacy-Landran Mohali with voucher no. CCP/TFG/069. Extracts were prepared by extracting methi seed powder successively with petroleum ether, ethyl acetate, ethanol, and aqueous solvents and tested against *Microsporum gypseum*. The prepared extract was weighed and stored in airtight sample bottles. The filtered extracts were tested against dermatophytes at three different concentrations viz. 25 μml, 50 μml, and 100 μml.

Procedure and Procurement of strain

The antifungal potential of an extract of dried seeds of methi was evaluated by the Paper disc diffusion method. The test organisms used were the dermatophyte strains of *Microsporum gypseum, which*was procured from IMTECH, Chandigarh. MTCC No. was 2829. Sabouraud Dextrose agar was used as a culture media according to the manufacturer's direction. The dermatophyte cultures were aseptically inoculated on Sabouraud agar plate and subjected to incubation at 28^{o}C for approximately 3 days.

Phytochemical screening

The different extracts were subjected to qualitative analysis for secondary metabolites such as coumarins, tannins, steroids, terpenoids, saponins, flavonoids, and alkaloids. The phytochemical tests were carried out using standard methods (Jansi *et al.*, 2013).

Antifungal activity

In this research, Paper disc diffusion method was employed, and some amount of Sabouraud Dextrose agar was dispersed in Petri dishes, which were allowed to solidify. A micropipette was employed to introduce 0.1 ml. Spores on agar medium and was spread with the help of glass rod spreader under aseptic conditions. Sterilized discs (5 mm, Whatman No. 1 filter paper) were prepared by soaking in different concentrations of the extracts, i.e., 25 μml, 50 μml, and 100 μml for approximately 5-6 hour. After this duration, discs were removed and then allowed to dry. To evaluate the antifungal potential of dried methi seeds extracts, various discs impregnated with different concentrations of the dried methi seeds extracts were positioned on the fungal spore or mycelium with the help of sterilized forceps. The Petri dishes incubated at 28 ºC for 72 hours. The antifungal potential was determined by measuring the zone of inhibition (ZOI) around the discs and percentage inhibition after the period of incubation (Rawal and Adhikari, 2016).

Data Analysis

Data from antifungal screening was analyzed with the help of simple statistics from Microsoft Excel and recorded in appropriate tables as a mean $\pm$ standard deviation of the mean.

RESULTS AND DISCUSSION

Antifungal potential of extracts of seeds of *Trigonella foenum-graecum* against the tested fungal strain *Microsporum gypseum can be seen in*Table 1. The Pet ether extract of methi showed 5.89 mm ZOI at 25 μml concentration. 50 μml concentrations were moderately effective with 10.62 mm zone of inhibition. At 100 μml, the zone of inhibition was observed to be as 12.85 mm. The ethyl acetate extract showed a 10.44 mm inhibition zone at 25 μml concentration. 50 μml concentrations were effective with 13.69 mm inhibition zone. 15.89 mm inhibition zone was observed at 100 μml. The ethanol extract showed a 12.42 mm inhibition zone at 25 μml concentration. 50 μml concentrations were moderately effective with 14.32 mm inhibition zone. At 100 μml, the inhibition zone was observed to be as 16.51 mm. While it's aqueous extract showed a 3.88 mm inhibition zone at 25 μml concentration. 50 μml concentrations were effective with a 9.74 mm inhibition zone. 10.12 mm inhibition zone was observed at 100 μml concentration. The antifungal potential was determined by comparing the activity of extracts with the Clotrimazole, in which the zone of inhibition was 43mm. Percentage inhibition was also calculated, which was 38.395 % with 100 μml ethanol extract depicted in Table 2. Many important phytoconstituents obtained from plants, having antifungal and antidermatophytic properties, is of vital significance to medicinal treatments. The results of this study showed that of all the extracts screened, *Trigonella foenum-graecum* ethanol extract had higher inhibitory activity against

Table 1: Mean Zone of Inhibition in different solvents (mm) of the *Trigonella foenum-graecum*

Crude Drug	Concentration (μml)	Mean Zone of Inhibition in different solvents (mm)				
		Pet Ether	Ethyl acetate	Ethanol	Aqueous	Clotrimazole
Trigonella foenum-graecum	25 μml	5.891+ 0.58	10.443+ 0.67	12.425+ 0.65	3.889+ 1.20	43mm
	50 μml	10.622+ 0.65	13.690+ 0.86	14.320+ 0.75	9.740+ 0.72	-
	100 μml	12.852+ 0.55	15.890+ 0.75	16.510+ 0.85	10.120+ 0.41	-

Table 2: Percentage inhibition (%) of various extracts of the *Trigonella foenum-graecum*

Crude Drug	Concentration (μml)	Percentage inhibition (%)				
		Pet Ether	Ethyl acetate	Ethanol	Aqueous	Clotrimazole
Trigonella foenum-graecum	25 μml	13.697	24.279	28.883	9.023	100
	50 μml	23.995	31.197	32.676	21.924	-
	100 μml	29.883	36.953	38.395	23.534	-

Table 3: Phytochemical tests of the extracts of the *Trigonella foenum-graecum*

Chemical compound	Petroleum ether extract	Ethyl acetate extract	Ethanol extract	Aquoes extract
Coumarins	N	N	P	P
Alkaloids	P	P	N	N
Tannins	N	N	P	P
Terpenoids	N	N	P	P
Saponins	N	N	P	P
Flavonoids	N	N	N	P

N-Absent, P-Present

the test organism in comparison to the standard drug. This could be as a result of better extraction with ethanol solvent. Other solvents also showed promising effects against the tested pathogen. A review of the literature indicates that many investigators have reported the anti-bacterial effect of fenugreek seeds extracts (Upadhyay *et al.*, 2008; Alwhibi and Soliman, 2014; Alluri and Majumdar, 2014). Such effect seems to be related to the presence of molecular compounds, usually in the form of secondary metabolites, such as alkaloids, steroids, tannins, and phenol compounds, flavonoids, etc (Erdogrul, 2002). Standardization is a significant consideration to make sure of the relevance between the phytoconstituents and its multifarious pharmacological activities. The phytochemical tests performed, and results were recorded in Table 3.

CONCLUSIONS

The present research provides evidence about the antifungal potential of crude extracts of *Trigonella foenum-graecum* seeds against *Microsporum gypseum*. The antifungal potential is different depending on the polarity of the solvent utilized in the extraction process. From the study, it can be depicted that ethanol extract of methi seeds are promising as compared to other solvents. Furthermore, quantitative phytochemical analysis can be conducted in the future to isolate and identify the phytoconstituents liable for the antifungal potential.

REFERENCES

Ahmed, M., Djebli, N., Hammoudi, S., Aissat, S., Akila, B., Hemida, H. 2012. The additive potential of ginger starch on antifungal potency of honey against Candida albicans. *Asian Pacific Journal of Tropical Biomedicine*, 2(4):253–255.

Alluri, N., Majumdar, M. 2014. Phytochemical analysis and in vitro antimicrobial activity of calotropis gigantea, lawsonia inermis, and Trigonella foecum- graecum. *International Journal of Pharmacy and Pharmaceutical Sciences*, 6:524–527.

Alwhibi, M. S., Soliman, D. A. 2014. Evaluating the antibacterial activity of fenugreek (Trigonella foenum-graecum) seed extract against a selection of different pathogenic bacteria. *Journal of Pure and Applied Microbiology*, 8:817–821.

Billaud, C., Adrian, J. 2001. Fenugreek: Composition, nutritional value and physiological properties. *Sciences des Aliments*, 21(1):3–26.

Erdogrul, O. T. 2002. Antibacterial activities of some plant extracts used in folk medicines. *Pharmaceutical Biology*, 40:269–273.

Jansi, R. D., Rahini, D. R., Vidya, S. M. 2013. Phytochemical screening and antimicrobial activity of various solvent extracts of Annona reticulata leaves. *International Journal of Science Invention Today*, 2:347–358.

Karuppiah, P., Rajaram, S. 2012. Antibacterial effect of Allium sativum cloves and Zingiber officinale rhizomes against multiple-drug resistant clinical pathogens. *Asian Pacific Journal of Tropical Biomedicine*, 2(8):597–601.

Kimm, D., Ahn, M., Jung, J., Kwon, S., Jipark, E., Koo, K. H., Woo, J. M. 2015. Perspectives on the market Globalization of Korean herbal manufacturers: A company - Based survey. *Evidence-Based Complementary and Alternative Medicine*, 10(1):1–12.

King, K., Lin, N. P., Cheng, Y. H., Chen, G. H., Chein, R. J. 2015. Isolation of Positive Modulator of Glucagon-like Peptide-1 Signaling from Trigonella foenum-graecum (Fenugreek) Seed. SO. *J Biol Chem*, 290(43):1–37. J Biol Chem.

Malik, T., Roy, P., Abdulsalam, F., Pandey, D., Bhattacharjee, A., Eruvaram, N. 2015. Evaluation of the antioxidant, antibacterial, and antidiabetic potential of two traditional medicinal plants of India: Swertia cordata and Swertia chirayita. *Pharmacognosy Research*, 7(5).

Rawal, P., Adhikari, R. S. 2016. Evaluation of the antifungal activity of Zingiber officinale against Fusarium oxysporum Sp. lycopersici. *Advances in Applied Science Research*, 7(2):5–9.

Talebi, S., Sabokbar, A., Riazipour, M., Saffari, M. 2014. Comparison of the in vitro Effect of Chemical and Herbal Mouthwashes on Candida albicans. *Jundishapur Journal of Microbiology*, 7(9).

Upadhyay, R. K., Ahmad, S., Jaiswal, G., Dwivedi, P., Tripathi, R. 2008. Antimicrobial effects of Cleome viscosa and Trigonella foenum graecum seed extracts. *Journal of Cell and Tissue Research*, 8:1355–1360.