INTERNATIONAL RESEARCH JOURNAL OF PHARMACY

www.irjponline.com ISSN 2230 – 8407

Research Article

ANTIBACTERIAL STUDIES ON *BENINCASA HISPIDA* AND *NIGELLA SATIVA* OIL

Lubna Tahir*, Benazir Chand, Salma Rahman

Applied Chemistry Research Centre, Pakistan Council of Scientific and Industrial Research, Ferozepur Road, Lahore, Pakistan

Email: lubnatahir@yahoo.com

Article Received on: 12/02/13 Revised on: 07/03/13 Approved for publication: 11/04/13

DOI: 10.7897/2230-8407.04422

IRJP is an official publication of Moksha Publishing House. Website: www.mokshaph.com

© All rights reserved.

ABSTRACT

Fixed oil of seeds of *Benincasa hispida* and *Nigella sativa* was found active against various resistant pathogens of both gram positive and gram negative bacteria. The maximum zone of inhibition was observed against *S.aureus* (24mm) for *Nigella sativa* but when 1:1 combination of both the plants was used, good activity against all the tested pathogens i.e., *M. luteus, E. coli, S. aureus, P. multocida, P. aeruginosa* and *B. subtilis* (20.31 to 18.61mm) was observed proving seeds as a strong candidate for formulations based on these oils to treat various diseases caused by these resistant pathogens.

Key words: seeds oil, *Benincasa hispida, Nigella sativa*, antibacterial

INTRODUCTION

Benincasa hispida (*B. hispida*), commonly known as winter melon, is a popular herb in Asia as well as in other countries. The plant belonging to family of Cucurbitaceae is being cultivated for at least 2000 years[1], and is reported effective in treatment of nervous disorders, ulcer and acidity[2,3].The expectorant effect of the *B. hispida* seeds extract due to mucus secretion prevents gastric ulcer reported by[4] and[1]. In addition, *B. hispida* seeds extract could enhance immunoreactions, resulting in histamine secretion inhibition[5, 6]. Methanolic fruit extract has anti diarrheal activity and reduction in gastro intestinal motility was also reported[7], while methanolic extract of seeds are reported to be beneficial as natural anti oxidant in the treatment of inflammation and pain[8].

The seeds of *Nigella sativa* L.(*N. Sativa*) commonly known as kalunji, belong to family Ranunculaceae are small, black in color with aromatic odour, found in southern Europe, Asia Minor and northern Africa. It is used in folk medicines as a natural remedy for eczema, asthma, diabetes, fever and gastrointestinal disturbances and hypertension[9]. Its oil has analgesic and anti neoplastic activity[10,11] reported the presences of Thymoquinone, an active constituent of *N. sativa* seeds, a pharmacologically active quinone, which has different properties like anti-inflammatory and analgesic actions.

The objective of present research was to evaluate the efficacy of seeds of *N. sativa* and *B. hispida* against different microbes that are resistant to various prescribed medicines.

MATERIALS AND METHODS

Collection of sample and oil extraction

Mature seeds of *N. sativa* and *B. hispida* were purchased from local market and were washed with water to remove the dust, straw and other particles, and then stored in a desiccator at 25˚ C for two days. 100grams of seeds of *N. sativa* and *B. hispida* was ground in a grinder and extracted for 12 hours in a soxhelt extraction with 500mL n-hexane at 70˚C.The fixed oil was then concentrated on rotary evaporator using Heidolph, (Germany) VE-11 rota evaporator and stored in glass vials for further use[12].

Antimicrobial Activity

Test microorganism

Clinical strains of Pseudomonas aeruginosa, Staph. aureus, E-coli, B.subtilis, Micrococcus luteus and Pasteurella multocida were obtained from Pakistan Council of Scientific and Industrial Research, (PCSIR); Lahore. The microorganisms were sub-cultured on Brain heart infusion agar and Nutrient agar and incubated aerobically at 37ºC.

Combinations of seeds used for efficacy study

Different samples were made to testify their antimicrobial activity. *B. hispida*, *N. sativa* and combination of both in 1:1 ratio.

Agar well diffusion method

Antimicrobial activity of *N. sativa* and *B. hispida* was determined by agar well diffusion method of [13]. Pure isolate of each microbe was sub-cultured on the recommended specific media for each microorganism at 37ºC for 24h. A plate of each microorganism was taken and a minimum of four colonies were touched with a sterile loop and transferred into normal saline (0.85%) under aseptic conditions. Density of each microbial suspension was adjusted equal to that of 10^6CFU/ mL (standardized by 0.5McFarland standard) and used as the inoculum for performing agar well diffusion assay. 100 µL inoculum was taken on the specified plates of media. Wells of 8mm was made in the plates with the help of cork borer. The dried extracts were reconstituted in 20% Dimethyl Sulfoxide (DMSO). 100 µL of the extracts was poured in the wells. The plates were allowed to stand for 10 minutes for diffusion of the extract to take place and incubated at 37ºC for 24h [14]. The antimicrobial efficacy, shown by an inhibition zone around the well was measured if it was more than 8 mm. The experiment was performed in triplicates and the mean values of the diameter of inhibition zones with ± standard deviation were calculated[15].

Table 1: Antibacterial activity of *Nigella sativa* and *Benincasa hispida* against selected pathogens

Samples	*Micrococcus luteus*	*Escherichia coli*	*Staphylococcus aureus*,	*Pastueurella multocida*	*Pseudomonas aeruginosa*	*Bacillus subtilis*
Hispida Benicasa	11.95±0.50	12±0.66	14±0.50	13±1	15±0.98	16±0.98
Nigella Sativa	11±1	9.5±0.707	24.66±0.60	17.5±0.707	15±1.41	15±1
HB+NS (5:5)	18±0.50	20.31±0.8	18.97±0.54	18.61±0.44	11±1.41	15.79±1
ciprofloxacin	24mm	24mm	23mm	22mm	21mm	22mm

RESULTS AND DISCUSSION

The antibacterial activity of seed oil of *N. sativa* and *B. hispida* against selected pathogens are shown in Table 1. Antibacterial activity of the oil was evaluated against gram positive bacteria (M. luteus, S. aureus and B. subtilis) and gram negative bacteria (E. coli, P. multocida and P. aeruginosa) using Ciprofloxacin solution (100µg/ml) as the standard drug. The agar well diffusion method showed variations in zones against different pathogens. Maximum mean zone of inhibition was observed against S. aureus (24.66mm) of *N. sativa* seed oil and 16mm against B.subtilus of *Benicasa hispida* oil. When combinations of both seeds oil was used in ratio of 1:1 maximum mean zone of inhibition was observed against E. coli (20mm) and then S. aureus (18.97mm) and P. multocida (18.61mm) respectively. The inhibitory effect of seeds oil of *N. sativa L.* was previously determined against bacteria and other microbes' by Akgul[16] who reported the concentration dependent antibacterial and antifungal activity of *N. sativa* seed. Burits[17] reported the characterization of major component of its oil by GC-MS which include thymoquinone and carvacrol which exhibit antibacterial activity[9]. The antibacterial activity of our sample of *Nigella sativa* L. may be closely related to the high percentage of these compounds. Hayat[18] reported the presences of amino acids, titerpenoids, tannins carbohydrates in the dried seeds of *Benincasa hispida.*

CONCLUSION

In conclusion, present research was carried out to evaluate the activity of *Bennicasa hispida* and *Nigella Sativa* seed oil on common disease causing resistant pathogens. Studies should be carried out to find more unknown compounds in various species of *B. hispida* and *N. sativa* found in South Asia. As the seeds of *B. hispida* and *N. sativa* are locally used to treat various skin, stomach and heart diseases therefore these can be used to form some kind of formulation for their treatment as well.

ACKNOWLEDGEMENT

The authors are thankful to Dr. Shahzad Alam, Director General of PCSIR Labs. Complex, Lahore for providing all the required research facilities to carry out this research work.

REFERENCES

1. Grover JK, Adiga G, Vats V, Rathi SS. Extracts of Benincasa hispida prevent development of experimental ulcers. Journal of Ethnopharmacology 2001; 78:159-164. http://dx.doi.org/10.1016/S0378-8741(01)00334-8
2. Sharma LK. Food Medicines. Practical Nature Cure. Natural cure publishing house, Pudukkottai, India, 1984. p. 169.
3. Warier PK. Indian Medicinal Plants. Orient Longman Limited, India, 1994. p. 261.
4. Kim YJ, Shin MG. Mucolytic effects of various parts of Fructus Benincasa extracts in the rat trachea. Journal of Korean Medical Society 1999;20: 165-176.
5. Yoshizumi S, Murakami T, Kadoya M, Matsuda H, Yamahara J, Yoshikawa M. Medicinal food stuffs. XI. Histamine release inhibitors from wax gourd, the fruits of Benincasa hispida Cogn. Yakugaku Zasshi 1998; 118: 188-192. PMid:9612135
6. Lee KH, Choi HR, Kim CH. Antiangiogenic effect of the seed extract of Benincasa hispida Cogniaux. Journal of Ethnopharmacology 2005; 97: 509-513. http://dx.doi.org/10.1016/j.jep.2004.12.008 PMid:15740888
7. Gill NS, Dhiman K, Bajwa J, Sharma P, Sood S. Evaluation of Free Radical Scavenging, Anti inflammatory and Analgesic Potential of Benincasa hispida Seed extract. International Journal of Pharmacology 2010; 6:652-657. http://dx.doi.org/10.3923/ijp.2010.652.657
8. Manish RA, Sunita JM. Gastroprotective effect of Benincasa hispida fruit extract. Indian Journal of Pharmacology 2008; 40:271-275. http://dx.doi.org/10.4103/0253-7613.45154PMid:21279184 PMCid:3025145
9. Ali BH, Blunden G. Pharmacological and toxicological properties of Nigella sativa. Phytother. Res. 2003; 17: 299-305. http://dx.doi.org/ 10.1002/ptr.1309 PMid:12722128
10. Abdel-Fattah AFM, Matsumoto K, Watanabe H. Antinociceptive effects of Nigella sativa oil and its major component, thymoquinone, in mice. Eur. J. Pharmacol. 2000; 400: 89-97. http://dx.doi.org/10.1016/S0014-2999(00)00340-X
11. Randhawa MA and Al-Ghamdi MS. A review of the pharmacotherapeutic effects of Nigella sativa. Pak. J. Med. Res. 2002; 41: 77-83.
12. Ozcan M. 1998. Note: Inhibitory effects of spice extracts on the growth of Aspergillus parasiticus NRRL2999 strain. Zeitschrift fur Lebensmittel Untersuchung Forschung A 1998; 207:253-255. http://dx.doi.org/ 10.1007/ s002170050328
13. Okeke MI, Iroegbu CU, Eze EN, Okoli AS and Esimone CO. Evaluation of extracts of the root of Landolphia owerrience for antibacterial activity, J. Ethnopharmacology 2001;78: 119-127 http://dx.doi.org/ 10.1016/S0378-8741(01)00307-5
14. Rajasekaran C, Meignanam E, Vijayakumar V, Kalaivani T, Ramya, S, Premkumar N, Siva R and Jayakumararaj R, Investigations on antibacterial activity of leaf extracts of Azadirachta indica A. Juss (Meliaceae): a traditional medicinal plant of India, Ethnobotanical Leaflets 2008;12: 1213-1217
15. Aneja KR, Joshi R, Sharma C, Antimicobial activity of dalchini (Cinnamomum zeylanicum bark) extracts on some dental caries pathogen. J. Pharmacy Research 2010;2: 1387-1390.
16. Akgul A. Antimicrobial activity of black cumin (Nigella sativa L.) essential oil. Gazi Journal of Faculty of Pharmacology 1989; 6:63-68.
17. Burits M, Bucar F. Antioxidant activity of Nigella sativa essential oil. Phytotherapy Research 2000; 14: 323–328. http://dx.doi.org/ 10.1002/1099-1573(200008)14:5<323::AID-PTR621>3.0.CO;2-Q
18. Hayat MM, Deepika V, Babar A, Rupinder k. A study for quality assessment of dried seeds of Benincasa hispida. Res. J. Pharmacog. And Phytochem. 2012;4

Cite this article as:

Lubna Tahir, Benazir Chand, Salma Rahman. Antibacterial studies on Benincasa hispida and Nigella sativa oil. Int. Res. J. Pharm. 2013; 4(4):121-122

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