November 2006 Volume 2 Issue 3-4

Trade Science Inc.

Natural Products

An Indian Journal

Full Paper

NPAIJ, 2(3-4), 2006 [71-73]

Inhibitory Effect Of Ayurvedic Medicines Against Isolated Microorganisms From *Brassica Oleracea* L.

Aditi Grover
Department of Biotechnology,
S.B.S (PG) Institute of Biomedical Sciences and Research, Balawala,
Dehradun (UA). 248 161 (INDIA)
E-mail: aditi_biotech@rediffmail.com

Jeevan J.Kaushik[1], Atul Kaushik[2]
[1]Department of Microbiology, S.B.S (PG) Institute of Biomedical Sciences and Research, Balawala, Dehradun (UA). 248 161 (INDIA)
[2]Department of Pharmaceutical Sciences, S.B.S (PG) Institute of Biomedical Sciences and Research, Balawala, Dehradun (UA). 248 161(INDIA)

Received: 18th May, 2006
Accepted: 23rd June, 2006

Web Publication Date : 14th November, 2006

ABSTRACT

Food products are the ideal sources of nutrition for microorganisms. Food deterioration and spoilage may occur when microorganisms naturally contaminating the food articles are allowed to grow beyond certain limits. Four types of bacterial strains were isolated from *Brassica oleracea* L. and biochemically characterized. They were identified as *E.coli, E. aerogenes, Staphylococcus aureus* and *Bacillus* sp. Antimicrobial activity of ayurvedic formulations namely Hajmola (Dabur), Pudin Hara (Dabur), Ginkgo biloba (Bilovas), Shankhvati (Zandu) were screened against the isolated bacterial strains. MIC and MBC were also tested. MIC obtained between the range of 3.12–25mg/ml. MBC was found between the range of 12.5 to >50 mg/ml. Pudin hara was found to be most potent as all the tested bacterial strains were inhibited by it. Hajmola was the second best drug that exhibited good antibacterial activity against *E.aerogenes* and *E.coli.* © 2006 Trade Science Inc. - INDIA

INTRODUCTION

Good food is of utmost importance to keep a balanced mind in a balanced body. Incompatible foods are considered similar to poison and artificial poisoning. These type of incompatible foods are called Virudha Ahar[1]. 'Vegetable' is the term which is applied to edible part of plants which store up food reserves in roots, leaves and fruits and which are eaten cooked or raw as salad[2]. Various food prod-

Full Paper

ucts serve as ideal sources of nutrition for microorganisms. Food deterioration and spoilage may occur when microorganisms naturally contaminating the food articles are allowed to grow beyond certain limits. Diseases associated with food borne microorganisms mainly effect gastrointestinal system and both allopathic and ayurvedic medicines are used for the treatment of such diseases[3]. Ayurveda is the system of traditional medicine prevalent in India since 2000 B.C. It derives medicines from nature and provides rational means for the treatment of many internal diseases which are considered to be obstinate and incurable in other systems of medicine. It is a form of treatment by natural remedies, which makes use of the power of nature to restore human beings to a state of balance.

MATERIAL AND METHODS

Preparation of aqueous extract *Brassica oleracea* L. leaf extract was prepared by homogenizing 50gm leaves in 500ml sterilized distilled water. Serial dilutions were prepared from 10-1 to 10-7 by using sterilized distilled water. Isolation and identification of microorganisms 0.1ml of each dilution was poured in sterilized nutrient agar plates and spreaded. All plates were incubated at 37°C incubator for 24-48 hours. Different colonies with different morphology were obtained. Slants of same were prepared and then incubated at 37°C. Microorganisms were characterized by the methods given by Collee et. al [4]and identified on the basis of characteristics as mentioned in Bergey's Manual of Systemic Bacteriology [5] .

Ayurvedic medicines used various ayurvedic formulations that were used to study antimicrobial activity were procured from local market, Dehradun. These were Pudin hara (Dabur), Ginkgo biloba (Bilovas), Hajmola (Dabur) and Shankhvati (Zandu).

ANTIMICROBIAL ACTIVITY

The disc diffusion method[6] was used to determine *in vitro* antimicrobial activity of ayurvedic medicines. The cultures were sub cultured in nutrient broth and incubated at 37°C for 24 h. 0.1µl of bacterial cultures were plated on agar medium. Sterile discs of different concentration of ayurvedic formulations were used for antibacterial activity against isolated bacterial cultures from *Brassica oleracea L.* and were placed on agar plates against DMSO. 1g of ayurvedic formulation was dissolved in 1ml DMSO. Plates were incubated at 37°C for 24 h and observed for zone of inhibition. The test was conducted in triplicates. Minimum inhibitory concentrationMIC of ayurvedic formulations were evaluated against isolated bacterial strains by dilution of the ayurvedic formulations to various concentrations. 0.0060-50 mg/ml respectively. Equal volume of ayurvedic formulation and nutrient broth were mixed in a test tube. Specifically 0.1 ml of standardized inoculum (1.2 × 107 cfu/ml) was added to each tube. The tubes were incubated aerobically at 37°C for 18-24 h. Two control tubes were maintained for each test batch. These included antibiotic control (tube containing extract and the growth medium without inoculum) and organism control (the tube containing the growth medium, physiological saline and the inoculum). The lowest concentration (highest dilution) of the ayurvedic formulations that produced no visible bacterial growth (no turbidity) when compared with the control tubes was regarded as MIC. However, the MBC was determined by sub culturing the test dilution on to a fresh drug-free solid medium and incubated further for 18-24 h. The highest dilution that yielded no single bacterial colony.

RESULTS AND DISCUSSION

On the basis results obtained after characterization of cultures, the cultures were identified as *E. aerogenes*, *E.coli*, *Staphylococcus aureus* and *Bacillus sp.*

TABLE 1: Antimicrobial activity of different ayurvedic formulations against bacterial cultures isolated from *Brassica oleracea* L.

Organism	Ayurvedic Drugs Used			
	Hajmola	Shankhvati	Ginkgo biloba	Pudin hara
	Zone of Inhibition (mm)			
E.aerogenes	25	19	13	45
E.coli	17	15	12	20
Staphylococcus aureus	12	16	13	15
Bacillus sp.	15	13	9	19

***Size of Disc has been deducted.**

Full Paper

TABLE 2: Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) of ayurvedic formulations.

Organism	MIC (mg/ml)				MBC (mg/ml)			
	Hajmola		Shankhvati		Ginkgo biloba		Pudin hara	
	MIC	MBC	MIC	MBC	MIC	MBC	MIC	MBC
E.aerogenes	12.5	25	25	>50	25	>50	3.12	12.5
E.coli	12.5	>50	25	>50	25	>50	6.25	25
Staphylococcus aureus	25	>50	25	>50	25	>50	25	>50
Bacillus sp.	12.5	>50	12.5	25	25	>50	12.5	25

These cultures were tested against all the ayurvedic formulations and it was found that Pudin hara was most potent as all of bacterial strains were inhibited by it and the maximum zone of inhibition of 45 mm was observed in the case of *E.aerogenes*. Hajmola also exhibited good antibacterial activity against *E.aerogenes* (25 mm)and *E.coli* (17 mm) (TABLE 1).

MIC and MBC of different ayurvedic formulations against all the cultures were found between 3.12 to 25 and 25 to >50 mg/ml respectively (TABLE 2).

CONCLUSION

The antibacterial properties observed can be attributed to ingredients of these ayurvedic preparations. Earlier studies have shown Ginkgo biloba posses antibacterial properties[7]. Mentha pipperata, Piper longum, Emblica officinalis, Citrus limon which form part of Pudin hara, Hajmola and Shankhvati respectively have shown antibacterial properties as individual as well as part of herbal preparations.

ACKNOWLEDGEMENT

The authors are immensely thankful to Management, S.B.S. (PG) Institute of biomedical sciences and research, Balawala, Dehradun (U.A.) for providing the requisite facilities and support.

REFERENCES

[1] G.J.Banwart; 'Basic Food Microbiology', Van Nostrand Reinhold **(1989)**.
[2] C.T.Dwarakanath et al; Food Sci., **8**, 35 **(1984)**.
[3] J.N.Hamilton-Miller, S.Shah; Int.J.Antimicrobial Agents, **18**,81-83 **(2001)**.
[4] J.Collee, B.P.Marmion, A.G.Fraser; A.Simmons; 'Practical Medical Microbiology', Churchill, Livingstone, 317-327 **(1996)**.
[5] P.H.A.Sneath; 'Bergey's Manual of Systematic Bacteriology', N.S.Mair, M.E.Sharpe, J.G.Holt (eds.), Williams & Wilkins, Baltimore, U.S.A., **2**, 105-1139 **(1986)**.
[6] A.W.Bauer, W.M.M.Kirby, J.C.Sherris, M.Turck; American Journal of Clinical Pathology, **45**, 493-496 **(1996)**.
[7] Y Rong, Z. Genz; Free Radic.Biol.Mel., **20(1)**, 121-127 **(1996)**.