Asian Journal of Pharmaceutical and Health Sciences
www.ajphs.com

Comparison Studies of Phyto Chemical Screening and Antibacterial Activities of *Allium cepa bulb* and *Allium sativum bulb* Extracts

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ARTICLE HISTORY

Received: 07-May-2011
Accepted: 05-Jun-2011
Available online: 10-Aug-2011

Keywords:
Allium cepa bulb, *Allium sativum* bulb, Antibacterial, Zone of inhibition

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ABSTRACT

Phyto chemical screening and antibacterial activities of *Allium cepa* bulb *and Allium sativum* bulb extracts was investigated and compared. Analysis of data confirms that antibacterial activity was maximum at 50µg/ml of *Allium cepa* bulb and *Allium sativum* bulb ethanolic extract against Bacillus subtilis, Bacillus pumilis, Escherichia coli and Pseudomonas aeruginosa compared with 50µg/ml of ciprofloxacin standard. These results suggest that the both ethanolic extracts of *Allium cepa* bulb and *Allium sativum* bulb have similar potent antibacterial activity due to the presence of flavonoids.

INTRODUCTION

The plant *Allium cepa* and *Allium sativum* belongs to the family Alliaceae and genus Allium. They are cultivated abundantly in India. The bulbs of the above species are known as 'Onion' and 'Garlic' in English 'Vengayam' and 'Vellaipundu' in Tamil. Garlic products are produced from the bulbs (cloves) of garlic and are usually standardised according to the content of the sulphur-containing compounds, alliin, allicin (produced by the action of the enzyme alliinase on alliin) and/or γ-glutamyl-(S)-allyl-L cysteine. The sulphur compounds such as allylmethyltrisulfide, allylpropyldisulfide, diallyldisulfide, diallyltrisulfide, ajoene and vinyldithiines, and mercaptan are also present. Garlic also contains various glycosides, monoterpenoids, enzymes, vitamins, minerals and flavonoids based on kaempferol and quercetin. It is believed to possess lipid-lowering properties. Garlic alone reduced low-density-lipoprotein cholesterol, and combined use with fish oil reversed the increase of low-density lipoprotein cholesterol seen with fish oil alone and produced a reduction similar to that seen with garlic alone [1-2]. Hence, we have conducted this present study to compare the antibacterial activity of *Allium cepa* bulb and *Allium sativum* bulb extract.

MATERIALS AND METHODS

Test organisms, Escherichia coli, Bacillus subtilis, Bacillus pumilis and Pseudomonas aurogenosa were obtained from SRT Institute of Pharmaceutical Sciences, Nalgonda, Andhra Pradesh. Nutrient agar, Peptone and Beaf extract were obtained from Himedia labs, Mumbai. All the solvents were procured from E.Merck, Mumbai.

The bulb of *Allium cepa* and *Allium sativum* was collected from local market, Alwarkurichi, Tamilnadu and authenticated by Botanist from Ayyannadar Janakiammal College of Art's and science, Sivakasi, Tamilnadu. The bulbs were washed with water to remove the earthy matters; sliced and made into slurry form with hexane by using hand grinder mixer. 100 gm of slurry of *Allium cepa* bulb and *Allium sativum* bulb individually were packed and subjected to soxhlet extraction for continuous hot extraction with hexane, chloroform and ethanol. Then each extracts were filtered and filtrate was concentrated under vacuum using rotary vacuum evaporater. The yield of each extract of allium cepa bulb and allium sativum bulb individually was present in table 1. The extract obtained was subjected to various chemical tests as per the procedure mentioned in the standard reference books [3-5].

Anti bacterial activity

Hexane, chloroform and ethanol extracts of *Allium cepa* bulb and *Allium sativum* bulb were screened for antibacterial activity done by cup plate method. The activity was compared with ciprofloxacin and control was tween 80. Various organisms used in this study, those are Escherichia coli, Bacillus subtilis, Bacillus pumilis and Pseudomonas aurogenosa. 50µg/ml concentration of hexane, chloroform and ethnolic extracts of *Allium cepa* bulb and *Allium sativum* bulb were prepared using tween 80 individually and ciprofloxacin were prepared using tween 80. All the samples and standard were studied for their zone of inhibition individually. Nutrient agar was used as a media for the study of antibacterial activity of the extracts [6]. The zone of inhibition around the cup indicates the antibacterial activity. The control was run simultaneously to assess the activity of tween 80 which

Table No.1: Percentage yield of extracts of Allium cepa bulb and Allium sativum bulb

Extracts	Allium cepa bulb			Allium sativum bulb		
	Hexane	Chloroform	Ethanol	n-Hexane	Chloroform	Ethanol
Percentage of the yield	0.12	0.317	2.11	0.124	0.327	1.74

was used as vehicle for extracts. The study was performed in duplicate. The diameter of the zone of inhibition was measured and recorded.

RESULTS AND DISCUSSION

The percentage yields were given in Table No.1. Preliminary chemical analysis of various extracts of *Allium cepa bulb* and *Allium sativum* bulb was done. From the result, it can be inferred that glycosides, steroids and proteins were present in hexane, chloroform and ethanol extracts of *Allium cepa* and *Allium sativum*; alkaloids were present in chloroform and ethanol extracts of *Allium cepa* and hexane and ethanol extracts of A*llium sativum*. and carbohydrates were present in chloroform and ethanol extracts of *Allium cepa* and *Allium sativum*; flavonoids were present in ethanol extracts of both bulbs.

In the present study, antibacterial activity of hexane, chloroform and ethnolic extracts of both bulbs individually and ciprofloxacin was performed. The data obtained for the antibacterial activity were present in Table No.2. Hexane and chloroform extracts of *Allium cepa* bulb and *Allium sativum* bulb individually has not inhibited the microorganism growth. From the result, hexane and chloroform extracts of both bulbs had not shown any kind of antibacterial activity. But all the test organisms were inhibited significantly by ethanolic extract of both bulbs individually as compared to the tween 80 extract. Finally results were compared with 50 µg/ml concentrations of ciprofloxacin. Our study results showed that flavonoids rich fraction (ethanolic extract of *Allium cepa* bulb and *Allium sativum* bulb individually) was found to be more active against human pathogenic bacteria. While comparing the allium ceba and allium sativum bulb, the results of phytochemical screening and antibacterial activity of both bulb were almost similar.

CONCLUSION

It may be concluded that the bulb of *Allium cepa* and *Allium sativum* individually were endowed with significant antibacterial activity due to the presence of flavonoids, there by justifying its use in the indigenous system of Medicine.

Table No. 2: Antibacterial activity of extracts

Concentration (50µg/ml)	Ciprofloxacin	Allium cepa bulb extracts			Allium sativum bulb extracts		
		Hexane	Chloroform	Ethanol	Hexane	Chloroform	Ethanol
Escherichia coli	13±1.73	-	-	3.3±0.57	-	-	2.6±0.57
Bacillus subtilis	11.6±2.08	-	-	4.6±0.57	-	-	5.6±0.57
Bacillus pumilis	9.3±0.57	-	-	4.3±0.57	-	-	4.3±0.57
Pseudomonas aurogenosa	12±1.73	-	-	5.3±1.154	-	-	1.6±0.57

REFERENCE

1. Elizabeth Williamson, Samuel Driver, Karen Baxter. Stockley's Herbal Medicines Interactions, London Pharmaceutical Press. 2009.

2. Sathis Kumar D, David Banji. Herbs and its derivative for treatment of obesity, Inventi Rapid : Ethnopharmacol., 1(3), 2010.

3. Khandelwal KR, Practical Pharmacognosy Techniques and Experiments, 9th ed. Nirali Prakashan, Pune, 2002. p.220-222.

4. Kokate CK. Practical Pharmacognosy. Delhi: Vallabh Vrakashan; 2008. p.149-156.

5. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. 36th edition, Pune: Nirali Prakashan;2006. p.6.18-6.24.

6. Indian Pharmacopoeia1996. Ministry of Health, Government of India, NewDelhi, Appendix 9.