INTERNATIONAL RESEARCH JOURNAL OF PHARMACY
www.irjponline.com
ISSN 2230 – 8407

Research Article

ANTICANCER ACTIVITY OF *CAPPARIS DIVARICATA* LAM LEAVES EXTRACT

R.V. Hirave [1]*, M.S. Kondawar [2]
[1]Sahyadri College Of Pharmacy Methwade, Sangola Dist-Solapur, Maharashtra, India
[2]Appasaheb Birnale College of Pharmacy, South Shivaji nagar, Sangli, Maharashtra, India
*Corresponding Author Email: rupahirave_29@rediffmail.com

Article Received on: 20/06/16 Revised on: 11/07/16 Approved for publication: 25/07/16

DOI: 10.7897/2230-8407.07890

ABSTRACT

Capparis divaricata Lam commonly known as caper brush, belonging to genus Capparis of family Capparidaceae, found throughout the India. The present study was carried out to study anticancer activity of *Capparis divaricata* Lam leaves. The study includes preparation of different extracts by successive solvent extraction like Pet. ether, Chloroform, acetone, ethanol, ethyl acetate. Preliminary qualitative chemical test for different extracts showed presence of alkaloids, glycosides, flavonoids, fixed oil and fats, phenolic compounds, protein, tannins, gum and mucilage and carbohydrates. The Chloroform and ethyl acetate extracts showed cytotoxic activity due to presence of flavonoid as compared to ethanol extract.

Keywords: *Capparis Divaricata* Lam, Anticancer activity, Hela cell line, MTT assay.

INTRODUCTION

Over the past decade, herbal medicines have become a topic of global importance, making an impact on both world health and international trade. Medicinal plants continue to play a central role in the healthcare system of large proportions of the world's population. This is particularly true in developing countries, where herbal medicine has a long and uninterrupted history of use. Recognition and development of the medicinal and economic benefits of these plants are on the increase in both developing and industrialized nations. Continuous usage of herbal medicine by a large proportion of the population in the developing countries is largely due to the high cost of Western pharmaceuticals and healthcare. In addition, herbal medicines are more acceptable in these countries from their cultural and spiritual points of view [1].

The *capparis divaricata* is a native Mediterranean plant and certain species of capers have been cultivated. *Capparis divaricata* Lam. commonly known as caper bush, belonging to the genus Capparis of family Capparidaceae, found throughout the India especially in the Deccan Peninsula from Maharashtra southwards to Tamil Nadu. It has been reported that the genus Capparis consists of nearly 80 species. Capparis species exhibit different pharmacological activities. The fruits, roots, and seeds of Capparis have been used traditionally as antirheumatic, tonic, expectorant, antispasmodic and analgesic agents in Turkey and other countries.

In general, Capparidaceae family members contain glucosinolates, alkaloids, and flavonoids and have phytochemical differences in plant parts[2].

Every year, millions of people are diagnosed with cancer, leading to death in a majority of the cases. According to the American Cancer Society deaths arising from cancer constitute 2–3% of the annual deaths recorded worldwide[3].

A greater emphasis has been given towards the researches on complementary and alternative medicine that deals with cancer management. Plants have long history of use in the treatment of cancer [4]. Several studies have been conducted on herbs under a multitude of ethno botanical grounds .The purpose of cancer prevention is to cause delay in onset of cancer, progression from precancerous lesion or recurrence after treatment, as an alternative to treatment of cancer cases after clinical symptoms have appeared. Therefore, ultimate goal of cancer prevention is preferably to live without cancer or with cancer without suffering from symptoms until the natural termination of life[5]. This study was explored the anticancer activity of leaves against Hela cell line. A HeLa cell is an immortal cell line used in medical research. The cell line was derived from cervical cancer cells taken from Henrietta Lacks, who died from her cancer in 1951. Initially, the cell line was said to be named after a "Helen Lane" in order to preserve Lacks's anonymity[6].

MATERIAL AND METHODS

Plant material

The fresh leaves of *Capparis divaricata* Lam. (Capparidaceae) were collected at the flowering stage in the month of August from Sangli district, Maharashtra State, India. It was authenticated and taxonomically identified and approved by Botanist, Botanical Survey of India Collection voucher No.RVP 01(2012).

Preparation of crude drug for extraction

The authenticated fresh leaves were dried under shade and used for the preparation of extract. These leaves were coarsely powdered with the help of mechanical grinder and passed through sieve no.60.The powder was stored in an air tight container for further use[7].

Method of extraction

Continuous hot percolation (successive solvent extraction) process by using soxhlet apparatus and cold maceration method. Extraction of dried leaves with different solvent extraction like Chloroform, Ethyl acetate and Ethanol.

Phytochemical screening

Tests for alkaloids, glycosides, flavonoids, fixed oil and fats, phenolic compounds, protein, tannins, gum and mucilage and carbohydrates, saponins and terpenoids were performed for the extract [9].

Anticancer activity

The MTT assay (a tetrazolium salt reduction assay) was performed to evaluate cell cytotoxicity. Seed cells in a 96 well plate at density $1x10^3$ cells /well in 150µl media and incubated in a humidified atmosphere at 37^0C for 1–2 days, so that the cells were in the exponential phase of growth. Cells were treated with different concentrations (200,400,600,800,1000 µg/mL) of test drugs in triplicates and added the media to make final volume 300µL per well. Incubated the 96 well plates in a humidified atmosphere at 37^0C for 3 days. At the end of the drug exposure period, 20 µL of MTT was added to all of the wells and wraped the plates in aluminium foil, and incubated them for 4 h in a humidified atmosphere at 37^0C. Medium and MTT from the well were removed. Dissolved the remaining MTT-formazan crystals by adding 100 µL of DMSO to all of the wells. Recorded absorbance at 570 nm immediately. All assays were performed using samples in the replicates.[10,11].

Calculation was carried out by Surviving cells (%) = Mean OD of test compound / Mean OD at control ×100.

RESULTS AND DISCUSSION

Table 1: Anticancer activity of Chloroform, ethyl acetate, Ethanol extract of *Capparis divercata* Lam leaves

Test Compound	Concentration µg/ml	Absorption	Mean	NC	Surviving Cells in %
NC		0.507	0.503	NC	
		0.531			
		0.470			
Chloroform	200µg/mL	0.454	0.494		
		0.435		0.503	98.21
		0.593			
Chloroform	400µg/mL	0.557	0.539		
		0.523		0.503	107.22
		0.538			
Chloroform	600µg/mL	0.505	0.587		
		0.610		0.503	116.63
		0.645			
Chloroform	800µg/mL	0.370	0.383		
		0.322		0.503	76.14
		0.457			
Chloroform	1000µg/mL	0.356	0.349		
		0.361		0.503	69.44
		0.331			
Ethyl acetate	200µg/mL	0.441	0.4886667		
		0.471		0.503	97.15
		0.554			
Ethyl acetate	400µg/mL	0.736	0.772		
		0.780		0.503	153.47
		0.800			
Ethyl acetate	600µg/mL	0.412	0.4473333		
		0.510		0.503	88.93
		0.420			
Ethyl acetate	800µg/mL	0.384	0.3526667		
		0.291		0.503	70.11
		0.383			
Ethyl acetate	1000µg/mL	0.360	0.2963333		
		0.264		0.503	**58.91**
		0.265			
Ethanol	200µg/mL	0.581	0.707		
		0.661		0.503	140.55
		0.674			
Ethanol	400µg/mL	0.661	0.6345		
		0.608		0.503	126.14
		0.707			
Ethanol	600µg/mL	0.555	0.5053333		
		0.530		0.503	100.46
		0.431			
Ethanol	800µg/mL	0.477	0.444		
		0.438		0.503	**88.27**
		0.417			

Ethanol	1000µg/mL	0.525	0.4726667		
		0.548		0.503	93.96
		0.345			
Conc.	Paclitaxel	0.247	0.251		
		0.251		0.503	**49.90**
		0.255			

From observation table the results indicate the surviving cell in the chloroform; ethyl acetate and ethanol are observe more in lowest concentration. The extract chloroform and ethyl acetate, at higher concentration (1000 µg/mL), the growth and multiplication of cancer cell are inhibited and also leads to possibility that the plant contain a phytoconstituent which should be isolate a new promising compound with efficient anticancer activity.

CONCLUSION

The Phytochemical constituents were extracted by successive solvent extraction like Chloroform, Ethyl acetate and Ethanol and identified by chemical tests. These tests showed the presence of Alkaloids, Carbohydrate, tannins, glycosides, phenolic compounds and flavonoids. The Chloroform and ethyl acetate extracts showed cytotoxic activity due to presence of flavonoid as compared to ethanol extract and standard compound.

ACKNOWLEDGEMENT

The Authors are grateful to extend special thanks to Prof. D.D. Chougule, Principal of Appasaheb Birnale College of Pharmacy, Sangli, for providing all kind of facilities and his valuable support for this work.

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Cite this article as:

R.V. Hirave, M.S. Kondawar. Anticancer activity of *Capparis divaricata* Lam leaves extract. Int. Res. J. Pharm. 2016;7(8):13-15 http://dx.doi.org/10.7897/2230-8407.07890

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

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