Research Article

ANTICANCER ACTIVITY OF *LAGENARIA SICERARIA* FRUIT EXTRACTS AGAINST EHRLICH ASCITES CARCINOMA (EAC) TUMOR MODEL IN SWISS ALBINO MICE

Ganesh N. Sharma, Nidhi Tyagi *, Birendra Shrivastava
I.T.S College of Pharmacy, Muradnagar, Ghaziabad, India
Jaipur National University, Jaipur- 302017, India

*Corresponding Author Email: nidhityagi029@gmail.com

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ABSTRACT

Object: To evaluate the anticancer activity of *Lagenaria siceraria*. **Materials and methods:** The different extracts of *Lagenaria siceraria* were studied for anticancer activity against Ehrlich Ascites Carcinoma (EAC) tumor model in Swiss Albino mice. The inhibitory properties of these concentrates are contrasted and standard 5-Fluoro Uracil for EAC tumor model in Swiss Albino mice. The different concentrates of *Lagenaria siceraria* treated creatures altogether hindered the tumor volume, Packed cell volume, tumor (practical) cell count. **Results:** The ethanolic extract of *Lagenaria siceraria* shows the better results as compared to other extracts. The Phytochemical investigation showed the presence of phenol, flavonoid, glycosides, alkaloids Saponins. **Conclusion:** The existence of phenolic and flavonoid compounds in the extract may be accountable for the anticancer activity. Thus this activity can be contributed to the phytochemicals present in it. The ethanolic extract of *Lagenaria siceraria* can be concluded to possess highest amounts of phenolic and flavonoid from the present studies.

Keywords: *Lagenaria siceraria*, Anticancer, EAC, Mice, Phytochemicals

INTRODUCTION

Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. If left untreated, tumours can grow and spread into the surrounding normal tissue, or to other parts of the body via the bloodstream and lymphatic systems, and can affect the digestive, nervous and circulatory systems¹.

Approximately 60% of anticancer agents are derived from medicinal plants and other natural resources; however, there are still a number of plants that have an anticancer potential but they have not yet been fully investigated. Thus, the alternate solution for the harmful effects of synthetic drugs is the use of complementary alternative medicines as very few studies have been reported on the use of herbal medicine in treatment of cancer².

Cucurbitaceae family is regularly known as gourd, melon and pumpkin family. This family is made out of 118 genera and 825 species, which are generally dispersed in the hotter area of world³. Among every one of the plants of *Cucurbitaceae* family *Lagenaria* species is the most well-known. The container gourd has a place with the class *Lagenaria* that is gotten from the word *lagena*, which means the jug. In the more seasoned writing, it is frequently alluded as *Lagenaria vulgaris* (normal) or *Lagenaria leucantha* (white bloomed gourd), however at this point it is known as *Lagenaria siceraria* (Mol.). *Lagenaria siceraria* (Molina) standley (family *Cucurbitaceae*) regularly known as lauki (Hindi) and container gourd (English) is a restorative plant⁴. The plant is generally accessible all through the India. It is a climbing or trailing herb, with jug or free weight molded natural products. The two its elevated parts and organic products are

usually devoured as vegetable. Generally, it is utilized as medication in India, China, European nations, Brazil, Hawaiian island, and so forth for its cardio tonic, general tonic and diuretic properties⁵. The developed type of *Lagenaria siceraria* (Mol.) is viewed as of African and Asian starting point. *Lagenaria siceraria* (Mol.) is a prominent vegetable, become practically all the all year, especially in ice free zones. It tends to be developed in a wide range of soil, yet flourishes best in intensely manured top soils. It requires warm moist atmosphere or a lot of water when developed amid dry climate. Seeds might be sown in nursery beds and seedlings transplanted when they have advanced 2-3 leaves. They might be additionally appeared, 4-5 seeds together in manured beds or pits 5-6ft. Separated; the most grounded among the seedlings is held, while others are evacuated and transplanted. Seedling transplantation is done where an early yield is wanted. By and large two harvests brought up in India; the late spring yield is sown from the center of October to the center of March and the later harvest, from the earliest starting point of March to the center of July. Round organic product types are typically sown for the early harvest and bottle- formed sorts for the second yield. Vines are permitted to trail on the ground or prepared over dividers. Trees or other help trailing over to give high return of organic product⁶. It is also known as alabu, tumbi ishavaaku, katutumbi, tiktaalaabu & alaabu in Sanskrit, laus & lokitumbi in Bengali, bottle gourd in English, dudi & tumbadi in Gujarati, lauki & ghia in Hindi, isugumbala & tumbi in Kannad, chorakka, churan, choraikka, piccura, tumburini & cura in Malayalam, phopla in Marathi, tumbi & dani in Punjabi, shorakkai, surai & suraikkai in Tamil, sorakaya & anapakaya in Telugu and ghiya & lauki in Urdu.

MATERIALS AND METHODS

Collection of Plant Material:

The fresh fruits of *Lagenaria siceraria* were procured from the local market of Agra in month of September–October (2017).

Identification and Authentication:

The collected plant parts were identified and authenticated from the department of botany, University of Rajasthan, Rajasthan. A voucher specimen [RUBL 21097] (*Lagenaria siceraria*)

Extraction of *Lagenaria siceraria*:

Powdering: The fresh and semi – ripped fruits were sliced using a home slicer and the obtained slices were shade dried, followed by powdering manually using mortar and pestle.

Sieving: The dried powdered plant material was passed through a 20 mesh sieve to remove excessive mucilaginous hair.

Soxhlet Extraction Method: The dried, powder plant material was extracted with different solvents at 60°C for 24 h using a Soxhlet apparatus. The collected mass was subject to drying to evaporate the excess of solvent. The collected material was termed as extract of *Lagenaria siceraria* fruit.

The extraction was carried out with following solvents successively.

- 1) Petroleum ether 2) Chloroform 3) Ethyl acetate 4) Acetone 5) Ethanol

PHYTOCHEMICAL INVESTIGATION

Chemical test was carried out on all extracts for the qualitative determination of phytochemical constituents⁷.

Anticancer Activity (*In Vivo*)⁸:

Tumor cell: The EAC (Ehrlich Ascites Carcinoma) cells were kept up in Swiss albino mice, by intraperitoneal (i.p.) transplantation on each ninth day. The ascetic liquid was gathered by syringe and the tumor cell include was performed in the Neubauer hemocytometer and 2×10^7 cells/ml was gotten by weakening with typical saline. Tumor cell suspension show over

90% practicality (checked by trypan blue color (0.4%) avoidance examine) was utilized for transplantation.

Treatment schedule: Healthy Swiss albino mice were weighted and isolated into eight gathering (n=6). EAC cells (2×10^6 cells/mouse) were infused i.p. to each mouse of each gathering with the exception of typical saline gathering. This was taken as day 0. Concentrate and reference medicate treatment were proceeded for ensuing ninth days beginning from day 1. On tenth day 24 hour after the last portion, mice were relinquished from each gathering. Subsequent to giving up the creature's blood was gathered to assess the hematological and biochemical parameter.

Swiss Albino Mice are divided into 8 groups and each group has 6 mice and their treatment is as follows-

- 1) **Group I** is treated with 2% Tween 80 [5 ml (0.9% w/v)/ kg b.wt.] via i.p. route.
- 2) **Group II** is treated with EAC (2×10^6 cells/mouse) + 2% Tween-80 (5ml/Kg b.wt.) via i.p. route.
- 3) **Group III** is treated with EAC (2×10^6 cells/mouse) + Petroleum ether extract of *Lagenaria siceraria* (400mg/Kg b.wt.) via i.p. route.
- 4) **Group IV** is treated with EAC (2×10^6 cells/mouse) + chloroform extract of *Lagenaria siceraria* (400mg/Kg b.wt.) via i.p. route.
- 5) **Group V** is treated with EAC (2×10^6 cells/mouse) + ethyl acetate extract of *Lagenaria siceraria* (400mg/Kg b.wt.) via i.p. route.
- 6) **Group VI** is treated with EAC (2×10^6 cells/mouse) + acetone extract of *Lagenaria siceraria* (400mg/Kg b.wt.) via i.p. route.
- 7) **Group VII** is treated with EAC (2×10^6 cells/mouse) + ethanol extract of *Lagenaria siceraria* (400mg/Kg b.wt.) via i.p. route.
- 8) **Group VIII** is treated with EAC (2×10^6 cells/mouse) + 5-fluorouracil (20 mg/Kg b.wt.) via i.p. route.

RESULT OF PHYTOCHEMICAL SCREENING OF *Lagenaria siceraria* FRUIT

The Preliminary phytochemical investigation revealed the presence of various phytoconstituents in various extracts of *Lagenaria siceraria* fruits. The results of phytochemical screening were found as given in table below.

Table 1: Result of Preliminary phytochemical screening of various extracts of *Lagenaria siceraria* fruits

Phytochemicals		Petroleum Ether	Chloroform	Ethyl Acetate	Acetone	Ethanol
Alkaloids	Mayer's Reagent test	+	+	+	+	+
Carbohydrates (Monosaccharides, Oligosaccharides and Polysaccharides)	General Test	+	+	+	+	+
	Monosaccharides	+	+	+	+	+
	Disaccharides	+	+	+	+	+
	Non Reducing Polysaccharides					
	Gums					
Proteins and Amino acids	Mucilage	+	+	+	+	+
	Proteins					
Glycosides	Amino Acids					
	General Test	+	+	+	+	+
	Cardiac Glycosides	+	+	+	+	+
	Anthraquinone Glycosides					
	Saponins Glycosides	+	+	+	+	+
Flavonoids	Cyanogenetic Glycosides					
	Alkaline reagent test	+	+	+	+	+
Tannins and Phenolic Compounds	Ferric Chloride Test	+	+	+	+	+
Steroids		+	+	+	+	+
Volatile Oils						
Fats and Oils						

Note: + sign indicate the presence; - sign indicate the absence

Table 2: Effect of various extracts of *Lagenaria siceraria* on Tumor growth response of EAC in Swiss Albino mice

Group	Ascites tumor volume (ml)	Packed cell volume (ml)	Tumor cell count ($\times 10^7 \text{ ml}^{-1}$)	
			Viable (% cell count)	Non Viable (% cell count)
EAC control	5.87 $\pm$ 0.13	3.89 $\pm$ 0.19	15.76 $\pm$ 0.13	0.43 $\pm$ 0.17*
LS 1	2.98 $\pm$ 0.23*	2.54 $\pm$ 0.26*	8.75 $\pm$ 0.32*	1.83 $\pm$ 0.15*
LS 2	2.64 $\pm$ 0.433*	2.12 $\pm$ 0.17*	8.12 $\pm$ 0.27*	2.12 $\pm$ 0.19*
LS 3	2.01 $\pm$ 0.15*	1.98 $\pm$ 0.54*	7.94 $\pm$ 0.34*	2.87 $\pm$ 0.43*
LS 4	1.88 $\pm$ 0.28*	1.42 $\pm$ 0.28*	7.24 $\pm$ 0.55*	3.44 $\pm$ 0.28*
LS 5	1.23 $\pm$ 0.19**	0.74 $\pm$ 0.38**	6.91 $\pm$ 0.28**	3.95 $\pm$ 0.26**
5-florourcil (20mg/kg)	0.95 $\pm$ 0.19**	0.54 $\pm$ 0.17**	5.12 $\pm$ 0.42**	3.71 $\pm$ 0.42**

Anticancer Activity (In Vivo)⁷:

Antitumor movement of concentrates against EAC tumor bearing Swiss Albino mice was evaluated by the parameters, for example, tumor volume, packed cell volume, feasible and non-reasonable cell. If there should arise an occurrence of tumor development reaction think about, Extracts treatment altogether ($p < 0.01$) decreased tumor volume, pressed cell volume and reasonable cell count contrasted with those of EAC control mice while nonviable cell count was observed to be expanded fundamentally in the treated gatherings.

The present examination was done to assess the antitumor action of different concentrates of *Lagenaria siceraria* in EAC tumor model in Swiss albino mice. The different concentrates of *Lagenaria siceraria* treated creatures essentially repressed the tumor volume, Packed cell volume, tumor (reasonable) cell check. In EAC tumor model in Swiss albino mice, a standard fast increment in ascetic tumor volume was watched. Ascetic liquid is the direct nourishing hotspot for tumor cells and a fast increment in austere liquid with tumor development would be the way to meet the dietary necessity of tumor cells. Treatment with different concentrate of *Lagenaria siceraria* hindered the tumor volume, pressed cell volume and reasonable tumor cell check, expanding the non suitable cell count.

Experimental result revealed that ethanolic extract of *Lagenaria siceraria* posses highest anticancer activity which may be due to its cytotoxicity.

CONCLUSION

The present examination therefore investigates the powerful anticancer action of different concentrates of *Lagenaria siceraria* which might be either a direct result of a direct cytotoxic impact of the concentrate on tumor cells or because of its aberrant neighborhood impact which may include macrophage enactment and vascular porousness hindrance. Alongside this, the critical cancer prevention agent property of the concentrate most likely potentiates its anticancer movement further. This pertinent pharmacological movement might be ascribed to the nearness of polyphenolics, flavonoids or the protein in the concentrate.

Flavonoids, for example, quercetin, kaempferol and their glycosides has appeared to have antimutagenic and antimalignant impact. The anticancer action is likely because of its flavonoids content.

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