EJPMR, 2026, 13(3), 103-105 **Research Article** **Impact Factor: 8.158**

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

ISSN (O): 2394-3211
ISSN (P): 3051-2573
Coden USA: EJPMAG

STUDY OF ANTI-PROLIFERATIVE ACTIVITY OF *FLACOURTIA JANGOMAS* LEAVES USING CELL VIABILITY METHOD

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DOI: https://doi.org/10.5281/zenodo.18795946

How to cite this Article: Mrs. Mintumol Babu*, Mr. Akash Krishna, Ms. Aswathy Ajayakumar, Mr. Francis Joseph, Ms. Neena Johnson. (2026). Study Of Antiproliferative Of Flacourtia Jangomas Leaves By Using Cell Vaibility. European Journal of Biomedical and Pharmaceutical Sciences, 13(3), 103–105.

Article Received on 29/01/2026 **Article Revised on 18/02/2026** **Article Published on 01/03/2026**

ABSTRACT

Objective: Cancer remains a critical global health challenge, necessitating the exploration of new therapeutic options. Medicinal plants have emerged as promising sources of anticancer agents through phytochemical investigations. In this study, the antiproliferative potential of an aqueous leaf extract of *Flacourtia jangomas* (family: *Flacourtiaceae*) was evaluated using the Cell Vaibilty method. The extract was prepared by Soxhlet extraction of dried leaves with an aqueous solvent. Results demonstrated significant antiproliferative activity in a concentration-dependent manner, with higher doses causing progressively greater inhibition of cell proliferation. The growth suppression observed at higher concentrations was comparable to that of the standard drug. These findings suggest that *Flacourtia jangomas* leaves contain bioactive compounds with potential anticancer effects, warranting further detailed research. **Conclusion:** The current study found that the leaves of *Flacourtia jangomas* contain some significant chemical components that may be extracted using water as a solvent and used in the management of cancer treatment.

KEYWORDS: Cell Vaibilty, *flacourtia jangomas*, *Flacourtiaceae*, Soxhlet extraction, flavonoids, alkaloids and phenolic compounds.

1. INTRODUCTION

Flacourtia jangomas (*Lour*.) Raeusch., a member of the family *Flacourtiaceae*, is a historically significant medicinal plant that is found throughout tropical and subtropical parts of Southeast Asia and India. Indigenous medical systems have utilized the plant's various parts to treat wounds, skin- related illnesses, fever, gastrointestinal issues, and inflammatory problems. The leaves are particularly interesting among these because of their medicinal potential and rich phytochemical content. Flavonoids, phenolic compounds, tannins, and alkaloids are among the bioactive components found in *Flacourtia jangomas* leaves, according to phytochemical analyses. These chemicals are recognized to have important biological effects. These substances are characterized by cell proliferation, which is a fundamental aspect of cancer and other hyperproliferative illnesses. Agents with antimitotic and antiproliferative capabilities can effectively impede mitosis and curtail aberrant cell proliferation, rendering them significant targets in anticancer pharmacological research.

2. MATERIALS AND METHODS

2.1 Collection of *Flacourtia jangomas* leaves and processing

In November 2025, fresh leaves of *Flacourtia jangomas* were obtained from Chenappady, Kottayam district, Kerala, and verified by The plant was authenticated by the Department of Botany, St. Thomas College, Palai Kanjirappally. The leaves were cleaned with distilled water and allowed to dry at room temperature in the shade. Before bein extracted, the dried leaves were ground into a fine powder and kept in an airtight container.

2.2 Preparation of aqueous extract of leaves Soxhlet extraction was performed using ethanol as the solvent on dried and powdered leaf material. The

sample was put into a thimble within the Soxhlet extractor after around 300 mL of ethanol was added to the round-bottom flask. The assembly was heated on a heating mantle, which allowed the solvent to continuously reflux. The extraction process continued until the siphon cycles were transparent. After being collected in the flask, the ethanol extract was concentrated and kept for later examination. The Aqueous extract was subjected to preliminary phytochemical testing for the presence of different chemical classes of compounds.

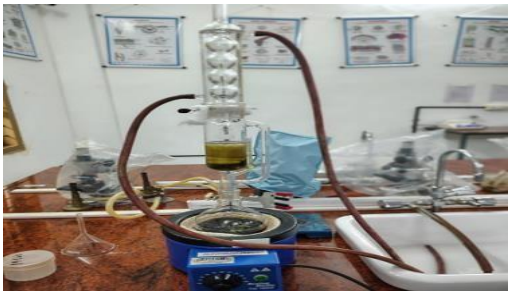


Fig. 1.1.

2.3 Determination of Cell Viability

Antiproliferative activity was assessed using a yeast cell model as follows:

Preparation of yeast inoculum

- 5 g of commercially available yeast was added to 100 mL sterilized nutrient broth in a conical flask.
- Incubated at 37 °C for 24 hours.
- 1 mL of this seeded broth was diluted to 10 mL with sterilized distilled water to obtain approximately 2.54 × 10^5 cells.

Preparation of potato dextrose broth (PDB)

- 200 g sliced potatoes boiled in 1 L distilled water for 1 hour.
- The mixture was filtered, and the filtrate was diluted to 1000 mL with distilled water.
- 20 g glucose was added.
- The medium was autoclaved for sterilization.

Cell viability count

- In test tubes, 2.5 mL PDB was mixed with 1 mL of each extract dilution and 0.5 mL yeast inoculum.
- Control tubes contained only PDB and yeast inoculum.
- Quercetin was used as a standard antiproliferative agent.
- All tubes were incubated at 37 °C for 24 hours.
- After incubation, cell suspensions were mixed with 0.1% methylene blue and observed under a low power microscope (10×).
- Living cells (unstained, transparent) and dead cells (stained blue) were counted in 16 chambers of a hemocytometer.
- The mean cell counts were determined for control and treated samples. The number of cells/mL and cell viability (%) was determined by using the formula Viable cells /mL =average no of viable cell in one squre × dilution factor × 10^6 .

$$\text{Percentage of cell viability} = \frac{\text{Total viable cell}}{\text{Total cell}} \times 100$$

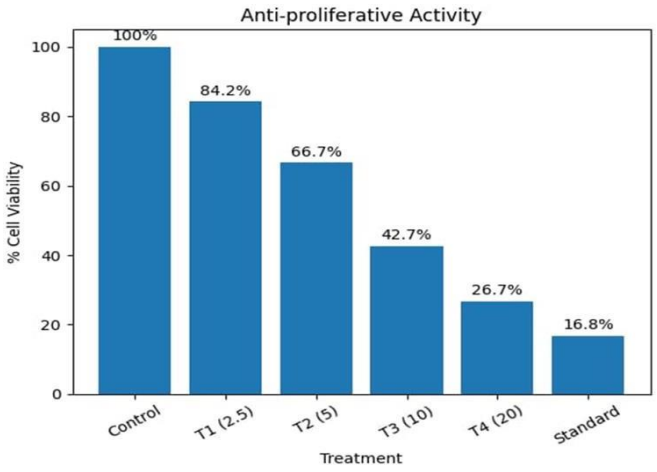
3. RESULT

The antiproliferative activity using the yeast model is widely applied in anticancer research. Yeast cells share significant similarities in sequence and function with human cells, making them a valuable tool for studying biological pathways. These include critical pathways involved in cell cycle regulation and DNA damage repair, relevant both in yeast and human cells.

The antiproliferative activity of the extract was evaluated by measuring cell viability at increasing concentrations. The control group showed 100% viability, indicating normal growth. A dose- dependent decrease in viability was observed: 84.2% at 2.5 mg/mL (T1), 66.7% at 5 mg/mL (T2), and a significant drop to 42.7% at 10 mg/mL (T3), indicating strong inhibition of cell proliferation. The highest concentration, 20 mg/mL (T4), showed the greatest antiproliferative effect, reducing viability to 26.7%. The standard drug exhibited the strongest inhibition, with only 16.8% viable cells. These results demonstrate a clear dose-dependent antiproliferative effect of the extract.

treatment	Total no: of viable cell	Total no: of cell	%cell vaibility	Number of inhibition of viable cell
control	1000±1000	1000	100	--
Standard(1mg/ml)	168±0.58	1000	16.8	83.2
T1(2.5mg/ml)	842±2.08	1000	84.2	15.8
T2(5mg/ml)	667±0.33	1000	66.7	33.3
T3(10mg/ml)	472±0.33	1000	42.7	57.3
T4(20mg/ml)	267±0.58	1000	26.7	73.3

Total number of viable cell expressed as mean ±SEM (n =3)



4. DISCUSSION AND CONCLUSION

The antiproliferative activity of Flacourtia jangomas was assessed using a yeast cell model, a straightforward and reliable method for preliminary screening of growth-inhibitory effects. Treatment with the plant extract significantly reduced cell viability compared to the control, indicating effective inhibition of cell proliferation in a concentration-dependent manner. Higher extract concentrations led to stronger antiproliferative effects. The standard drug showed pronounced inhibition of yeast cell growth, validating the assay's sensitivity. The antiproliferative effects of Flacourtia jangomas are likely due to bioactive phytochemicals such as flavonoids and phenolic compounds, which can disrupt cell cycle progression and cellular metabolism. Overall, these results highlight the significant antiproliferative potential of Flacourtia jangomas and support its potential as a source of natural anticancer agents.

5. ACKNOWLEDGEMENTS

The authors sincerely thank Hindustan College of Pharmacy Kanjirappaly District Kottayam for providing the necessary facilities to conduct this study. We are grateful to our college for valuable guidance and support throughout the research work.

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