



PHARMACOLOGICAL ASSESSMENT OF THE ANTI-PANCREATITIS ACTIVITY OF CASSIA AURICULATA FLOWER EXTRACT

Mohamed Shiek Arabath S. A.^{1*}, Venkateshan N.², Pethanasamy P.³, Mohana Priya B.³,
Sreemathi Lakshmi S.³

¹Professor and HOD, Department of Pharmacognosy, Arulmigu Kalasalingam College of
Pharmacy, Krishnankoil, Tamilnadu, India.

²Professor and Principal, Arulmigu Kalasalingam College of Pharmacy, Krishnankoil,
Tamilnadu, India.

³Department of Pharmacognosy, Arulmigu Kalasalingam College of Pharmacy, Krishnankoil,
Tamilnadu, India.

Article Received on 18 Feb. 2026,
Article Revised on 11 March 2026,
Article Published on 01 April 2026,

<https://doi.org/10.5281/zenodo.19327930>

*Corresponding Author

Mohamed Shiek Arabath S. A.

Professor and HOD, Department of
Pharmacognosy, Arulmigu
Kalasalingam College of Pharmacy,
Krishnankoil, Tamilnadu, India.



How To Cite This Article: Mohamed Shiek Arabath S. A.^{1*}, Venkateshan N.², Pethanasamy P.³, Mohana Priya B.³, Sreemathi Lakshmi S.³. (2026). Pharmacological Assessment of The Anti-Pancreatitis Activity of Cassia Auriculata Flower Extract. World Journal of Pharmacy and Pharmaceutical Sciences, 15(4), 460–470.

This work is licensed under Creative Commons Attribution 4.0 International license.

ABSTRACT

Pancreatitis is an inflammatory disorder of the pancreas that can lead to severe metabolic complications and pancreatic dysfunction. Medicinal plants have long been explored as potential therapeutic agents due to their rich phytochemical constituents and pharmacological properties. The present study aimed to evaluate the anti-pancreatic activity of the ethanolic extract of *Cassia auriculata* flowers using an in-vitro AR42J rat pancreatic acinar cell model. The dried flowers were extracted using the Soxhlet extraction method with ethanol, and preliminary phytochemical screening was performed. The protective effect of the extract against ethanol-induced pancreatic toxicity was assessed using the MTT assay, which measures cell viability based on mitochondrial metabolic activity. AR42J cells were exposed to ethanol and treated with different concentrations of the extract (6.25–100 µg/mL). The results demonstrated a dose-dependent increase in cell viability,

indicating protective activity against ethanol-induced cellular damage. Maximum protection was observed around 50–100 µg/mL, suggesting cytoprotective potential of the extract. The observed activity may be attributed to the presence of flavonoids, phenolic compounds, and

other antioxidant phytoconstituents, which are known to reduce oxidative stress and protect pancreatic cells. These findings provide scientific support for the traditional use of *Cassia auriculata* in the management of pancreatic disorders and diabetes. However, further in-vivo studies and mechanistic investigations are required to validate its therapeutic potential and safety for clinical applications.

KEYWORDS: *Cassia auriculata*, Anti-pancreatitic activity, AR42J pancreatic cell line, MTT assay.

INTRODUCTION

Pharmacological treatment has its roots in the ancient use of herbs, which have been integral to traditional healing practices worldwide. These diverse cultural approaches highlight the longstanding reliance on herbal remedies for managing various ailments.^[1,2] Pancreatitis, characterized by inflammation of the pancreas, is a critical condition affecting this large gland situated behind the stomach near the duodenum.^[3] The pancreas serves two primary functions: producing insulin and secreting digestive enzymes essential for food digestion in the intestine. Pancreatitis arises when these digestive enzymes prematurely activate and damage the pancreatic tissue, leading to inflammation.^[4] This condition manifests in two forms—acute and chronic—both of which pose serious health risks and potential complications.^[5-7]

Acute pancreatitis is a sudden, short-term inflammation that typically resolves within days with appropriate treatment. However, severe cases may necessitate extended hospitalization.⁸ In contrast, chronic pancreatitis is a progressive, long-lasting disorder where the pancreas undergoes irreversible damage, resulting in a gradual decline in its function.^[8,9]

The pancreatic acinar cell, the functional unit of the exocrine pancreas, is responsible for synthesizing, storing, and secreting digestive enzymes. Under normal conditions, these enzymes are activated only upon reaching the duodenum. Premature activation within acinar cells triggers acute pancreatitis, making it a key focus in understanding the disease's pathogenesis. Despite significant advances in elucidating the mechanisms underlying pancreatitis, current therapeutic options remain largely nonspecific and palliative, underscoring the need for more targeted interventions.^[10]

METHODOLOGY

Chemical and equipment used

The chemicals used in the study included 99.9% ethanol (Zenthol), 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) from Sigma-Aldrich (Merck), dimethyl sulfoxide (DMSO) from Fisher Scientific, and isopropanol from Thermo Fisher Scientific. Experimental procedures were carried out using laboratory instruments such as an electronic balance (Labchem), Phase Contrast Fluorescence Microscope (TCM 400, LABOMED, USA), heating mantle (Labmatrix), laminar air flow unit (Beston Industries, BLV-0255), CO₂ incubator (New Brunswick), centrifuge (REMI ZDIN-25800), Multiskan SkyHigh spectrophotometer with SkanIt Software 6.1.1 (Thermo Scientific), moisture analyzer (Wensar), and a Labomed microscope.

Collection and Authentication of Flowers

The flowers of *Cassia auriculata* were collected from the rural side of the Theni district. The collected flowers of *Cassia auriculata* was authenticated by **Dr.R.Murugan, Ph.D.**, Assistant professor, Department of botany, Ayya Nadar Janaki Ammal College, Sivakasi. The fresh *Cassia auriculata* flowers were properly cleaned and shade dried and powdered.

DRYING OF FLOWERS

The fresh *Cassia auriculata* flowers were properly cleaned and shade dried and powdered.

Extraction process

The Cassia auriculata flowers were extracted by Soxhlet extraction process. The dry powder of Cassia auriculata were taken in a round bottom flask with ethanol as a solvent in the ratio of 1:4 for the continuous heat extraction (Soxhlet) process. The process is done for 24 hours maintain the 70°C with a heating Mandle. The Cassia auriculata were collected, washed, cut into small pieces and dried at room temperature (28±1°C) for two weeks and made into powder for further analysis. Extraction is a process, to separate or isolate the secondary metabolites from plant material. It is basically two types i.e. heat and cold extraction. Heat extraction has some advantage over cold extraction like time consistency and also no contamination by microbes. An apparatus called Soxhlet did heat extraction. 100g of the plant flower powder were packed into the thimble of a Soxhlet apparatus. The ratio of the plant powder and solvents were maintained at 1:4. Preliminary phytochemical screening of ethanol extract of Cassia auriculata was carried out to detect the Phyto-constituents using standard conventional protocols.^[2]

IN-VITRO ANTI-PANCREATITIC ACTIVITY

PRINCIPLE

The MTT assay is used to measure cellular metabolic activity as an indicator of cell viability, proliferation and cytotoxicity. This colorimetric assay is based on the reduction of a yellow tetrazolium salt (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide or MTT) to purple formazan crystals by metabolically active cells. The viable cells contain NAD (P)H-dependent oxido-reductase enzymes which reduce the MTT to formazan. The insoluble formazan crystals are dissolved using a solubilizing solution (100% DMSO) and the resulting purple colored solution is quantified by measuring absorbance at 570 nm using an ELISA plate reader.^[3]

Cell lines and maintenance

The cell line/cell lines were procured from the National Centre for Cell Sciences (NCCS), Pune, India.

Cell line used in this study

AR42J- Rat Pancreatic acinar cell line

Cell culture media and maintenance

The cells were cultured in Ham's F12K (Himedia), supplemented with 20% heat inactivated Fetal Bovine Serum (FBS) and 1% antibiotic cocktail containing Penicillin (100 U/mL), Streptomycin (0.1mg/mL), and Amphotericin B (0.25µg/mL). The cell containing TC flasks (25cm²) were Incubated at 37°C at 5% CO₂ environment with humidity in a cell culture incubator (Galaxy[®] 170, Eppendorf, Germany).^[4]

PROCEDURE

The cells (5,000cells/well) were seeded on 96 well plates and allowed to acclimatize to the culture conditions such as 37°C and 5% CO₂ environment in the incubator for 24hours. Ethanol (150mM) was added cells and incubated for 6h. The samples (10mg/mL) was prepared in DMSO and diluted in DMEM media and added to the wells containing cultured cells pre-treated with ethanol at final concentrations of 6.25, 12.5, 25, 50 and 100 µg/mL respectively. Untreated wells were kept as control for 24h. Ethanol alone treated cells were kept as positive control. All the experiments were done in triplicate and average values were taken in order to minimize errors. After incubation period, the media from the wells were aspirated and discarded. 100µL of 0.5mg/mL MTT solution in PBS was added to the wells.

The plates were further incubated for 2 hours for the development of formazan crystals. The supernatant was removed and 100 μ L DMSO (100%) were added per well. The absorbance at 570 nm was measured with micro plate reader. Three wells per plate without cells served as blank.^[5]

Cell Morphology

Representative photomicrographs of cells belonging to each experimental group were taken using an inverted phase contrast microscope (LABOMED, TCM 400, USA). Magnification- 20x. Total magnification- 200x (20x Objective lens $\times$ 10x Ocular lens)

RESULTS AND DISCUSSION

Extraction yield

After completing extraction process, total extract yield was 12.4% w/w.

IN-VITRO ANTI-PANCREATITIS ACTIVITY

The anti-Pancreatitis effects of ethanolic extract of *Cassia auriculata* was evaluated by in-vitro AR42J cell lines.

Table 1: MTT assay results for varying concentration of Standard.

Concentration (μ g/mL)	Triplicate values			Average OD
	OD1	OD2	OD3	
Control	0.538	0.534	0.549	0.540
EtOH	0.200	0.205	0.214	0.206
6.25	0.328	0.322	0.330	0.327
12.5	0.362	0.369	0.364	0.365
25	0.382	0.379	0.372	0.378
50	0.337	0.330	0.314	0.327
100	0.271	0.279	0.275	0.275

Table 2: Percentage of viability for varying concentration of Standard.

Concentration(μ g/mL)	Percentage of viability
EtOH	38.19
6.25	60.46
12.5	67.55
25	69.90
50	60.52
100	50.89

Dose dependent improvement in cell viability was observed in AR42J cells administered with different concentrations of the Standard. A further decrease in cell viability was observed at

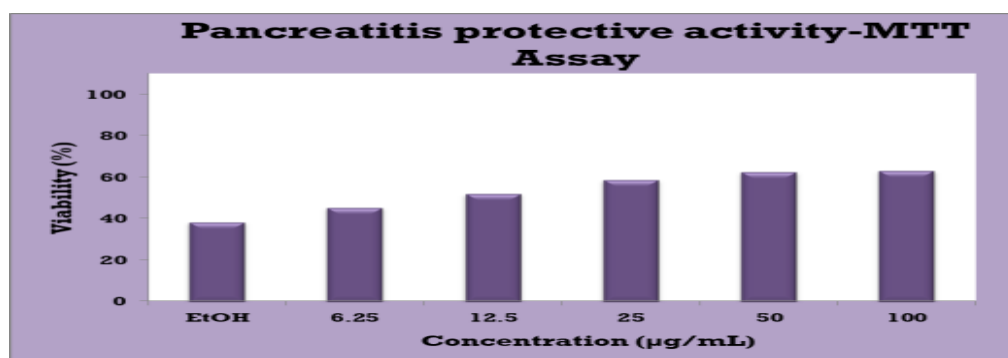
higher concentrations, this might be due to any potential anti-cancer properties possessed by the standard at higher concentrations since the cell line used in this experiment was rat cancer cell line. However, the std possess pancreatitis protective activity at lower concentrations.

Table 3: MTT assay results for varying concentration of test sample.

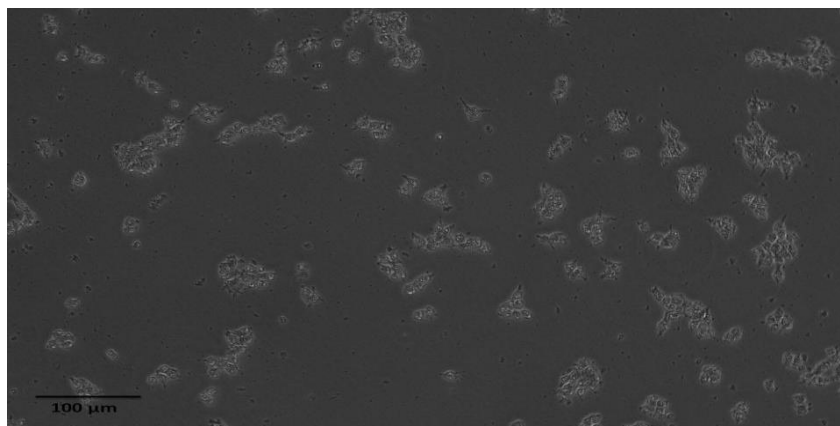
Concentration (µg/mL)	Triplicate values			Average OD
	OD1	OD2	OD3	
Control	0.538	0.534	0.549	0.540
EtOH	0.200	0.205	0.214	0.206
6.25	0.241	0.248	0.245	0.245
12.5	0.279	0.277	0.284	0.280
25	0.321	0.318	0.310	0.316
50	0.349	0.332	0.330	0.337
100	0.331	0.341	0.349	0.340

Table 4: Percentage of viability for varying concentration of test sample.

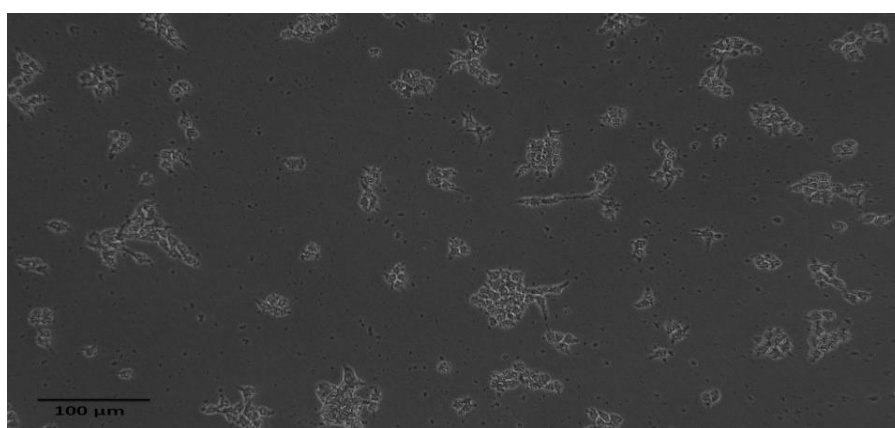
Concentration (µg/mL)	Percentage of viability
EtOH	38.19
6.25	45.28
12.5	51.82
25	58.54
50	62.37
100	62.99



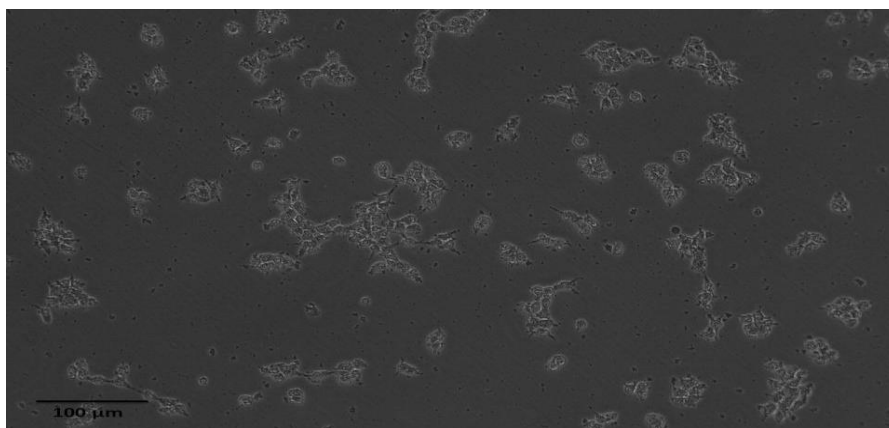
Dose dependent improvement in cell viability was observed in AR42J cells administered with different concentrations of the PES0910. However, an increase in concentration beyond 50 µg/mL showed no significant improvement in cell viability suggesting a potential inhibitory activity of the sample at higher concentrations.



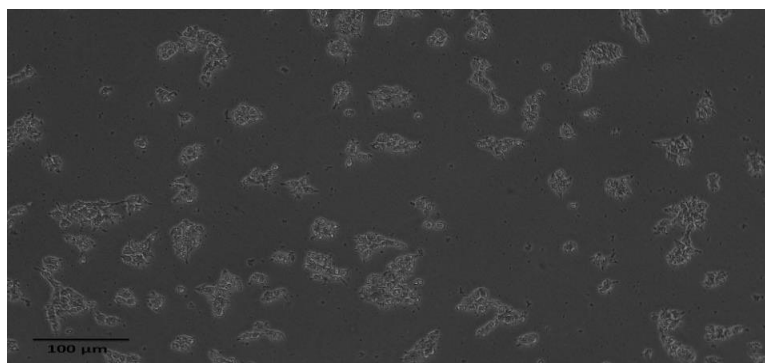
Ethanol induced (cell viability).



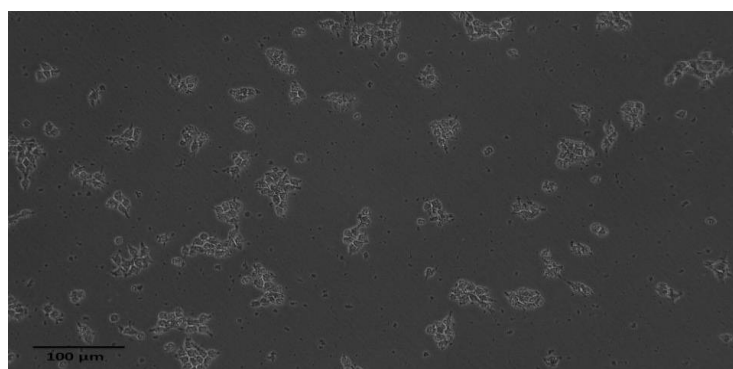
Standard 6.25μg/mL (cell viability).



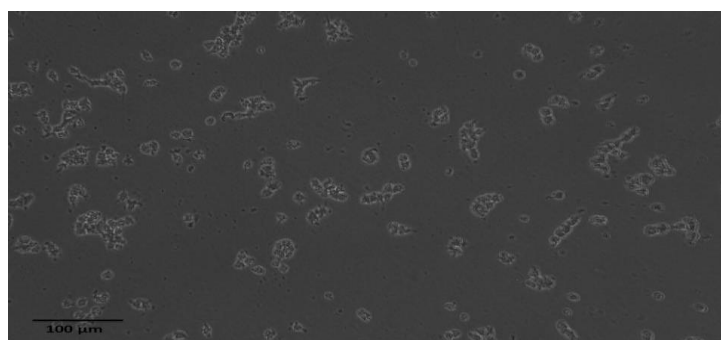
Standard 12.5μg/mL (cell viability).



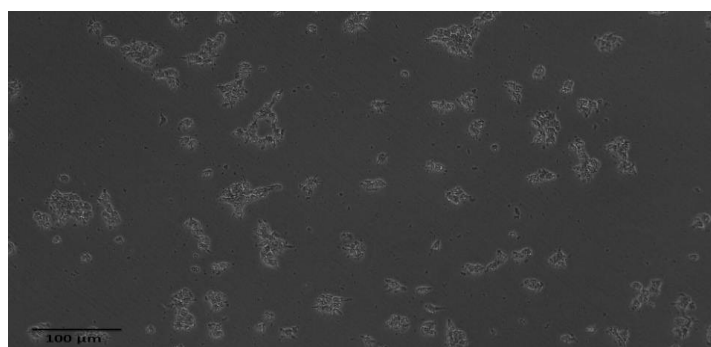
Standard 25µg/mL (cell viability).



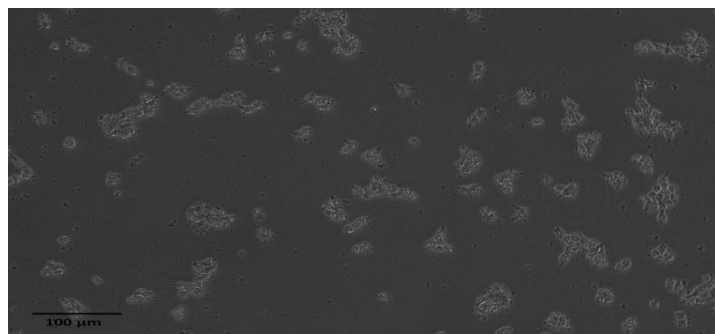
Standard 50µg/mL (cell viability).



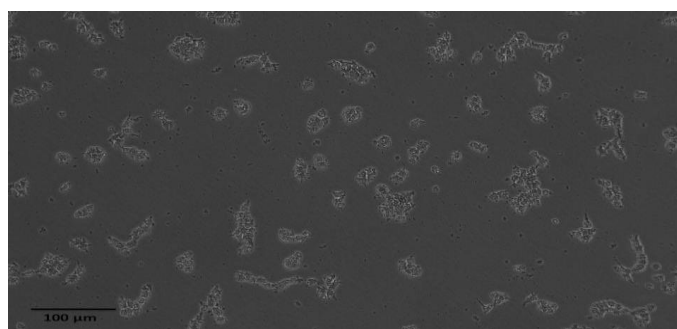
Standard 100µg/mL (cell viability).



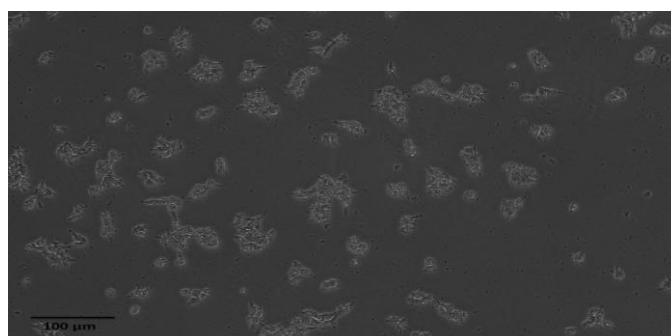
Test 6.25µg/mL (cell viability).



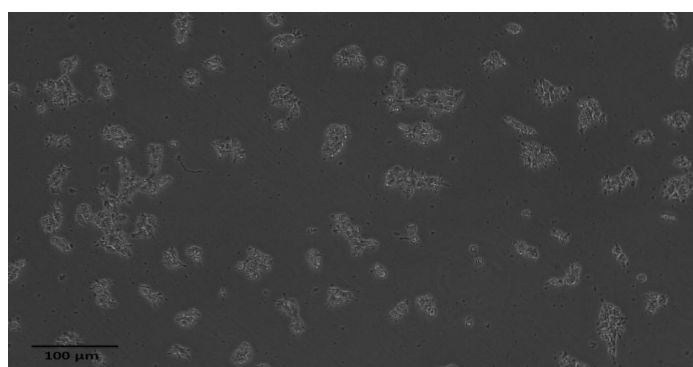
Test 12.5µg/mL(cell viability).



Test 25µg/mL(cell viability).



Test 50µg/mL(cell viability).



Test 100µg/mL(cell viability).

CONCLUSION

The present study demonstrated that the ethanolic extract of *Cassia auriculata* flowers exhibits significant protective activity against ethanol-induced pancreatic injury in an in-vitro model. The observed effect may be attributed to the presence of flavonoids, phenolic compounds, and other antioxidant phytoconstituents, which contribute to cytoprotective and free radical scavenging activities. These findings scientifically support the traditional use of *Cassia auriculata* in the management of diabetes mellitus. However, further in-vivo studies and clinical investigations are required to confirm its safety and therapeutic potential.

REFERENCES

1. Haiderr A, Ahmed Z, Das GK, Zameer S. Alternative medicine: Under-evaluated or ineffective. *I-manager's Journal on Life Sciences*, 2025; 4(1).
2. Durgadevi K, Gowri R, Mini ST, Ramamurthy V. A study of biosynthesis and characterization of silver nanoparticles from *Cassia auriculata*. *International Journal of Research and Analytical Reviews*, 2018; 5(4): 442–447.
3. Mosmann T. Rapid colorimetric assay for cellular growth and survival: Application to proliferation and cytotoxicity assays. *Journal of Immunological Methods*, 1983; 65: 55–63.
4. Joseph MM, Aravind SR, Varghese S, Mini S, Sreelekha TT. Evaluation of antioxidant, antitumor and immunomodulatory properties of polysaccharide isolated from fruit rind of *Punica granatum*. *Molecular Medicine Reports*, 2012; 5(2): 489–496.
5. Ku L, Lee J, Lim JW, Jin L, Seo JT, Kim H. Docosahexaenoic acid inhibits ethanol/palmitoleic acid-induced necroptosis in AR42J cells. *Journal of Physiology and Pharmacology*, 2020; 71(3).
6. El-Saadony MT, Saad AM, Mohammed DM, Korma SA, Alshahrani MY, Ahmed AE, et al. Medicinal plants: Bioactive compounds, biological activities, combating multidrug-resistant microorganisms, and human health benefits—A comprehensive review. *Frontiers in Immunology*, 2025; 16: 1491777.
7. Mitchell RM, Byrne MF, Baillie J. Pancreatitis. *The Lancet*, 2003; 361(9367): 1447–1455.
8. Mederos MA, Reber HA, Girgis MD. Acute pancreatitis: A review. *JAMA*, 2021; 325(4): 382–390.
9. Beyer G, Habtezion A, Werner J, Lerch MM, Mayerle J. Chronic pancreatitis. *The Lancet*, 2020; 396(10249): 499–512.

10. Leung PS, Ip SP. Pancreatic acinar cell: Its role in acute pancreatitis. *International Journal of Biochemistry and Cell Biology*, 2006; 38(7): 1024–1030.