Evaluate the effect of Iraqi hibiscus tiliaceus on cerulein-induced acute pancreatitis in rats.

by:

dr.sena chatin

Supervised by:

Assistant Prof. Dr. Shihab Hattab Mutlag

(Pharmacology and Toxicology Department/ College of Pharmacy/ University of Baghdad)

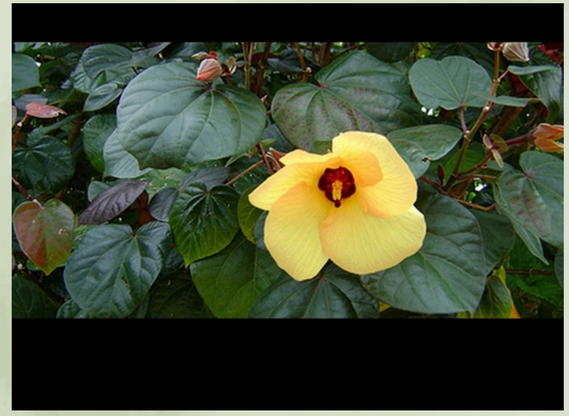
Background

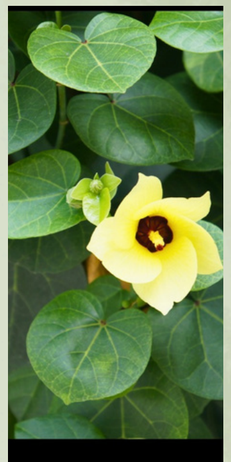
Acute pancreatitis (AP) is a sudden inflammatory condition of the pancreas characterized by autodigestion, acinar cell injury, and a complex cascade of local and systemic inflammatory responses (1,2,3). Globally, AP is one of the most common gastrointestinal causes of hospital admissions, with an incidence ranging from 13 to 45 cases per 100,000 people annually (4,5). While most cases are mild and self-limiting, approximately 20% progress to moderate or severe disease, potentially resulting in systemic inflammatory response syndrome (SIRS), multi-organ failure, and significant mortality (6).

The pathophysiology of AP involves premature activation of digestive enzymes within pancreatic acinar cells, leading to local inflammation, oxidative stress, and infiltration of immune cells(7). A critical feature in disease progression is the imbalance between pro-inflammatory mediators (e.g., TNF-α, IL-1β, IL-6) and the body's antioxidant defenses(8). Despite advances in supportive care, no specific pharmacological therapy exists for AP. Clinical management remains symptomatic, mainly focusing on fluid resuscitation, pain control, and nutritional support(9). Hence, there is an urgent need for novel therapeutic agents that can effectively target the inflammatory and oxidative pathways implicated in AP (10).

Project Goals

Plant-derived compounds have gained attention as potential alternatives or adjuncts to conventional therapies due to their antioxidant, anti-inflammatory, and cytoprotective properties, though their role in acute pancreatitis (AP) remains underexplored (11). Hibiscus tiliaceus L. (Malvaceae), commonly known as sea hibiscus or cotton tree, is a mangrove-associated species traditionally used in ethnomedicine to treat ailments such as typhoid, diarrhea, cough, and chest congestion (12–15). Phytochemical studies reveal that its leaves contain phenols, flavonoids, tannins, glycosides, terpenoids, steroids, and proteins (16), and pharmacological evaluations confirm anti-inflammatory, antibacterial, antioxidant, and anthelmintic activities (17). The extract, rich in alkaloids, flavonoids, and terpenoids, demonstrates antioxidant, anti-inflammatory (18), and anti-carcinogenic properties without notable toxicity, highlighting its potential as a therapeutic agent.





Methodology

Extraction Method of the Plant

Fresh Hibiscus tiliaceus leaves were shade-dried, ground into fine powder, and 60 g of the material was defatted with hexane for 72 h. The residue was then subjected to Soxhlet extraction with 80% ethanol for 20 h. The extract was concentrated under reduced pressure at 40 °C and dried to a solid form for subsequent animal ex

Methodology

Experimental Animals and Study Design

Forty female Wistar albino rats (6 weeks old, 200 ± 25 g) were housed under standard conditions with free access to food and water, following one week of acclimatization. All protocols were approved by the Ethics Committee, College of Pharmacy, University of Baghdad.

Methodology

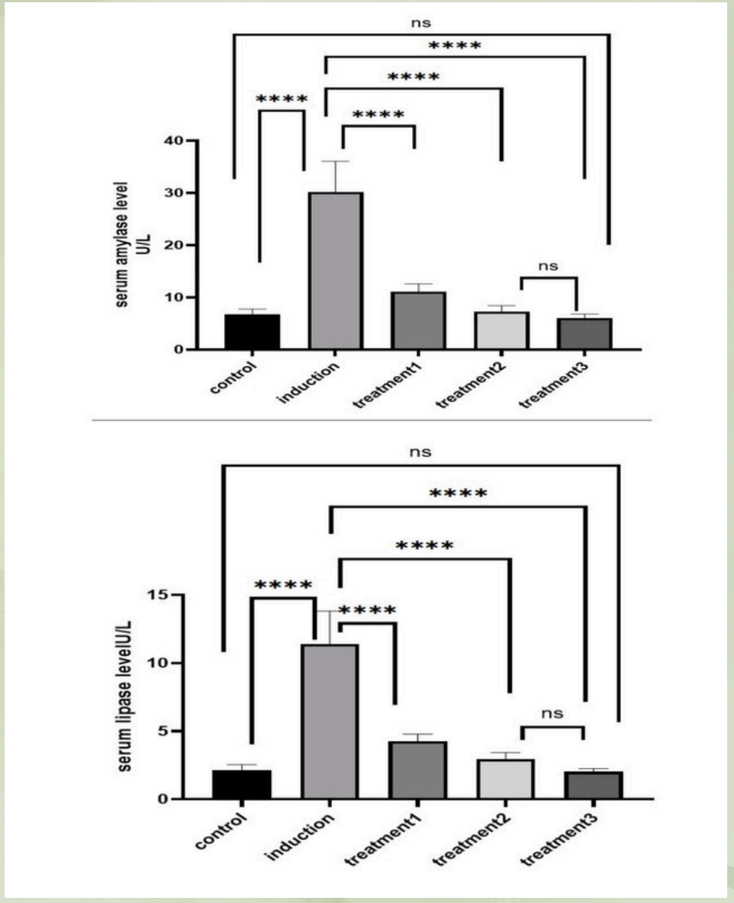
The rats were divided into five groups (n = 8):

- **Group I: negative control, distilled water (1 ml/kg/day, orally, 7 days).**
- **Group II: induction control, cerulein (50 µg/kg, i.p., twice at 1 h interval).**
- **Group III: cerulein + extract (125 mg/kg/day, orally, 7 days).**
- **Group IV: cerulein + extract (250 mg/kg/day, orally, 7 days).**
- **Group V: cerulein + extract (500 mg/kg/day, orally, 7 days).**

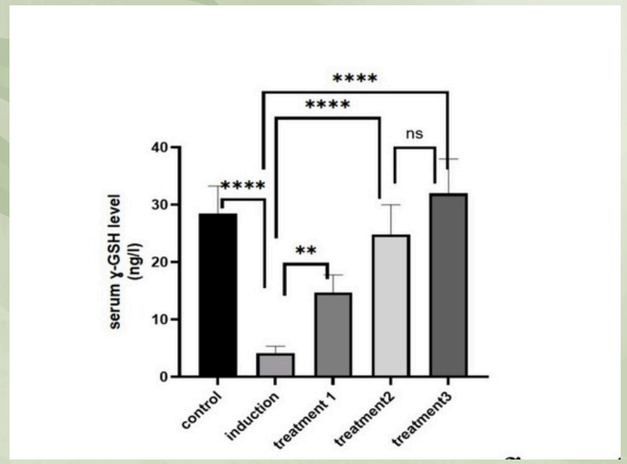
Rats were sacrificed 24 h after the last treatment; blood and pancreatic tissues were collected for biochemical and histological analysis.

Result

Biochemical assessment
The serum was tested for amylase, lipase levels, and oxidative stress parameters (MDA, GSH) via an enzyme-linked immunosorbent assay—pro-inflammatory parameters (IL-6, TNFα) via quantitative reverse transcription polymerase chain reaction RT- qpcr.



Analysis


serum γ-GSH level (ng/l)
40
30
20
10
0
****
****
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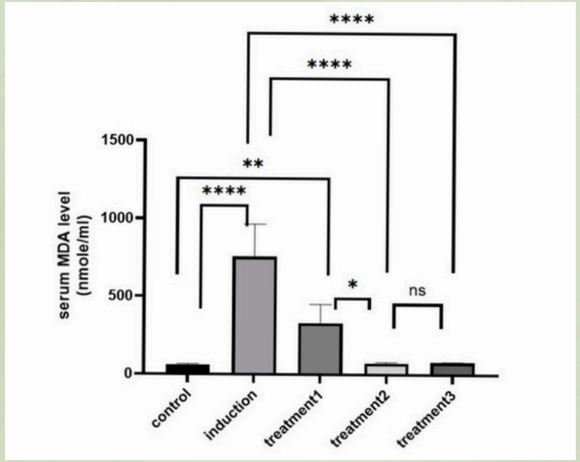
**
ns
control
induction
treatment 1
treatment2
treatment3


serum MDA level (nmole/ml)
1500
1000
500
0
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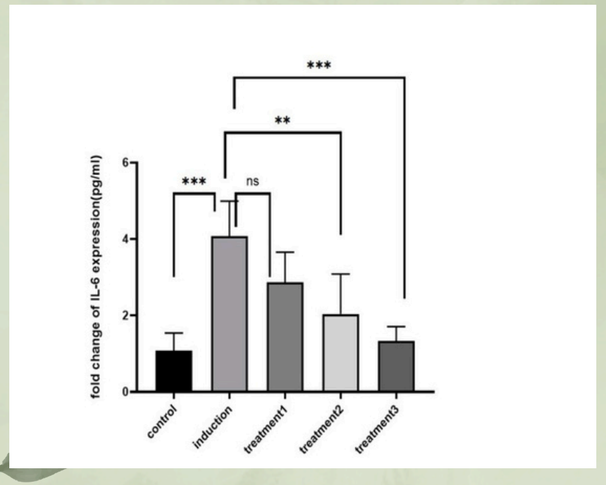
ns
control
induction
treatment1
treatment2
treatment3


fold change of IL-6 expression(pg/ml)
6
4
2
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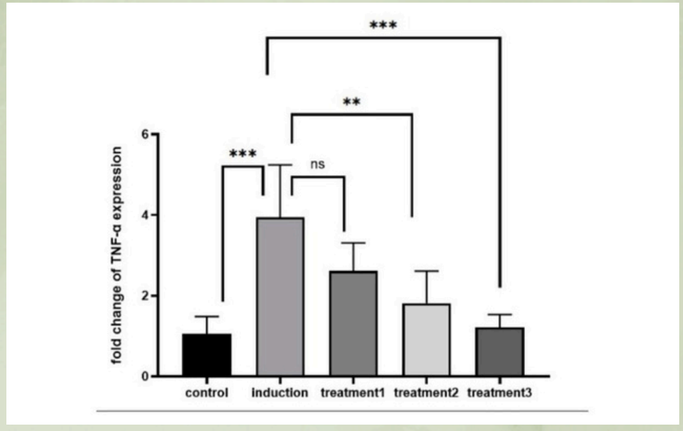
ns
control
induction
treatment1
treatment2
treatment3


fold change of TNF-α expression
6
4
2
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ns
control
induction
treatment1
treatment2
treatment3

Conclusion

Treatment with Hibiscus tiliaceus extract significantly improved both biochemical and histopathological parameters in a cerulein-induced acute pancreatitis (AP) rat model. These findings support the potential therapeutic value of H. tiliaceus in managing acute pancreatitis and may serve as a foundation for future experimental and clinical investigations, particularly in the context of severe necrotizing forms of the disease.

Thank You