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REVIEWER'S REPORT

Manuscript No.: IJAR-55326

Title: Phytochemical study and anti-inflammatory activities of Citrus aurantifolia (Rutaceae) leaves collected in the region of Yamoussoukro, Ivory Coast.

Recommendation:

Accept as it is .....YES.....
Accept after minor revision.....
Accept after major revision .....
Do not accept (*Reasons below*) .....

Rating	Excel.	Good	Fair	Poor
Originality		√		
Techn. Quality		√		
Clarity		√		
Significance		√		

Reviewer Name: PROF. DR DILLIP KUMAR MOHAPATRA

Detailed Reviewer's Report

Title of the Manuscript

Phytochemical study and anti-inflammatory activities of *Citrus aurantifolia* (Rutaceae) leaves collected in the region of Yamoussoukro, Ivory Coast

1. Strengths of the Study

Ethnopharmacological Relevance

The study is grounded in traditional medicinal use of *Citrus aurantifolia*, providing scientific validation for its ethnomedicinal application in inflammatory and arthritic conditions.

Clear Objective and Experimental Design

The objectives—phytochemical characterization and evaluation of anti-inflammatory/anti-arthritic activity—are clearly stated and systematically addressed using established experimental methods.

Use of a Standard Chronic Inflammation Model

The Freund's Complete Adjuvant (CFA)-induced arthritis model is a well-accepted and

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widely used model that closely mimics human rheumatoid arthritis, strengthening translational relevance.

Dose-Dependent Evaluation

The assessment of three different doses (250, 500, and 1000 mg/kg bw) allows observation of dose-response relationships.

Comparison with Standard Drug

Inclusion of diclofenac sodium as a reference drug improves the credibility of the anti-arthritic findings and allows direct comparison with a conventional therapy.

Comprehensive Phytochemical Screening

The phytochemical analysis identifies multiple bioactive classes (polyphenols, flavonoids, tannins, alkaloids, sterols, terpenes, saponins), supporting the biological plausibility of the observed pharmacological effects.

Multiple Outcome Measures

Evaluation of paw edema, percentage inhibition, and body weight changes provides a multidimensional assessment of anti-inflammatory efficacy.

2. Weaknesses of the Study

Language and Editorial Issues

The manuscript contains numerous grammatical errors, typographical mistakes, inconsistent terminology, and formatting problems that affect clarity and readability. Substantial language editing is required.

Lack of Quantitative Phytochemical Analysis

The phytochemical screening is qualitative only. Quantification of major constituents (e.g., total phenolic or flavonoid content) would strengthen the correlation between chemistry and pharmacological activity.

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Limited Mechanistic Insight

The study does not explore molecular or biochemical mechanisms (e.g., cytokines, oxidative stress markers, histopathology) underlying the anti-inflammatory effects.

Sample Size Justification Missing

Although the study uses n = 5–6 animals per group, no justification or power calculation is provided.

Inconsistencies in Terminology

The manuscript inconsistently refers to *Citrus aurantifolia*, *Citrus lemon*, and "lemon," which may confuse readers and should be standardized.

Figures and Tables Not Clearly Presented

Some figures and tables lack clear labeling, captions, or proper statistical annotations, reducing interpretability.

Limited Discussion of Toxicity/Safety

No acute or sub-chronic toxicity evaluation is presented, which is important given the relatively high doses used.

3. Significance of the Study

Validation of Traditional Medicine

The study scientifically supports the traditional use of *Citrus aurantifolia* leaves in inflammatory conditions, particularly in West African ethnomedicine.

Potential Source of Natural Anti-Arthritic Agents

The findings suggest that *C. aurantifolia* leaves contain bioactive compounds capable of mitigating chronic inflammation, comparable to diclofenac in this model.

Contribution to Natural Product Research

The work contributes valuable preclinical data to the growing field of plant-based anti-inflammatory therapeutics.

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Regional Scientific Importance

By focusing on plant material collected from Yamoussoukro, Ivory Coast, the study adds region-specific data to global pharmacognosy literature.

4. Key Points / Key Findings

The aqueous extract of *Citrus aurantifolia* leaves yielded **16.36%** dry extract with characteristic brown coloration.

Phytochemical screening revealed the presence of **polyphenols, flavonoids, tannins, alkaloids, sterols, terpenes, and saponins**.

CFA-induced arthritis produced significant paw edema and weight loss in untreated rats.

Treatment with *C. aurantifolia* extract (especially at **500 and 1000 mg/kg bw**) significantly reduced paw edema.

Anti-inflammatory effects of the extract were **comparable to diclofenac sodium**.

Treated rats showed faster recovery of body weight compared to untreated arthritic controls.

The extract effectively inhibited the pathological progression of experimentally induced arthritis.