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REVIEWER'S REPORT

Manuscript No.: IJAR-58803

Title: STUDIES ON SKIN PROTECTION PROPERTIES OF CAULERPA PELTATA.

Recommendation:

Accept as it is .....

Accept after minor revision.....

Accept after major revision ...x.....

Do not accept (*Reasons below*) .....

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

Reviewer's ID: JPR-142

Detailed Reviewer's Report

1.The title **Studies on Skin Protection Properties of *Caulerpa peltata*** is broader than what was actually demonstrated.The study primarily evaluates:

- UV absorption by methanolic extract
- FTIR functional groups
- antibacterial activity
- DPPH radical-scavenging activity
- mushroom tyrosinase inhibition

There is **no direct human-skin, animal-skin, reconstructed-skin, cellular photoprotection, SPF, UVA-PF, or in-vivo/in-vitro skin-protection experiment**.Therefore, the authors should either:

- substantially strengthen the experimental evidence,
- moderate the title and conclusions.

The manuscript currently moves from UV absorbance to claims of anti-ageing and anti-wrinkling, which are not directly demonstrated.

2. UV-Vis absorption cannot by itself establish UVB photoprotection

This is one of the **most important scientific concerns**.

The authors measured the extract between 200–400 nm at 500 µg/mL and interpreted the spectrum as demonstrating UVB protection. However, simply showing absorption in the UV region does **not demonstrate sunscreen efficacy or skin photoprotection**.The authors should provide, where possible:

- wavelength-dependent absorbance data;

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- preferably transmission data;
- SPF determination using a validated method;
- UVA protection assessment;
- critical wavelength;
- photostability;
- comparison with an appropriate positive control/reference sunscreen.

At minimum, the conclusion should be changed from **"UVB inhibition activity"** to something such as **"UV-region absorption potential."**

3. Anti-ageing and anti-wrinkle claims are not experimentally demonstrated

The manuscript states that UVB absorption means the extract can act as an anti-ageing and anti-wrinkling agent. This is an **unsupported extrapolation**.No experiments were performed for:

- collagen protection;
- elastase inhibition;
- MMP inhibition;
- fibroblast protection;
- keratinocyte protection;
- UV-induced oxidative damage in skin cells;
- collagen/elastin expression;
- wrinkle-related endpoints.

Therefore, these claims should be removed or clearly described as **hypothesized potential applications**.

4. The DPPH experiment requires proper statistical reporting

The reported DPPH activity increases from **26.90% at 50 µg/mL to 62% at 800 µg/mL**, with an IC50 of 650 µg/mL. However, the manuscript does not adequately report:

- number of independent replicates;
- mean ± SD/SEM;
- statistical significance;
- regression equation;
- R^2;
- confidence interval for IC50;
- positive antioxidant control.

The authors should provide these details.Also, the manuscript inconsistently states that the scavenging ratio increased from **29.90% to 62%**, whereas the table gives **26.90% at 50 µg/mL**. This numerical inconsistency must be corrected.

5. Tyrosinase inhibition is relatively modest and needs proper comparison

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The maximum reported tyrosinase inhibition is **23.62% at 1 mg**, with values increasing from 5.96% to 23.62%. The authors mention kojic acid as the standard inhibitor but **do not provide the corresponding experimental kojic-acid results**.This is a major weakness.

- kojic acid concentration-response data;
- IC50 of kojic acid;
- IC50 of the extract;
- replicate number;
- mean ± SD;
- statistical analysis;
- dose-response curve.

Without a proper positive control, the claim that the extract is a promising tyrosinase inhibitor is weak.

6. The reported tyrosinase IC50 appears inadequately supported

The authors report an **IC50 of 2 mg**, although the tested extract concentrations appear to extend only to **1 mg**. If 50% inhibition was not experimentally reached within the tested concentration range, the IC50 should **not simply be reported as 2 mg without showing how it was calculated**.

The authors should either:

- perform additional concentrations above 1 mg and establish the dose-response curve, or
- clearly state that the IC50 was extrapolated and provide the regression model and uncertainty.

7. Antibacterial testing methodology is insufficiently described

The manuscript reports zones of inhibition against four organisms. For example, *E. coli* showed 28 mm and 32 mm at 500 µg/mL and 1 mg/mL, respectively. However, important details are missing:

- bacterial strain/ATCC numbers;
- inoculum standardization;
- McFarland standard;
- culture medium;
- disc diameter;
- extract volume loaded per disc;
- solvent control;
- positive antibiotic control;
- number of independent experiments;
- mean ± SD;
- statistical testing.

There is also a methodological inconsistency: one section mentions bacterial samples at **250 µg**, whereas the actual tested concentrations are reported as **500 µg/mL and 1 mg/mL**.

This must be clarified.

8. The antibacterial component is not clearly connected to the primary study objective

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The manuscript is presented as a study of **skin protection**, but substantial space is devoted to antibacterial activity.

The authors need to explain the biological rationale linking antimicrobial activity to potential skin-protective/cosmetic applications.

Otherwise, antibacterial testing should be presented as a **secondary exploratory property**, rather than evidence of photoprotection.

9. Taxonomic identification requires clarification

This is an important issue.

The manuscript uses:

- *Caulerpa peltata*
- *Caulerpa chemnitzia*
- *Caulerpa var. peltata*

and describes these as synonyms. Because the biological identity of the tested material is fundamental to reproducibility, the authors should provide:

- the currently accepted scientific name;
- the authority;
- voucher/specimen number;
- herbarium deposition details;
- exact identification certificate;
- clarification of synonymy.

The statement that identification was performed by the Botanical Survey of India is useful, but a **voucher/accession number should ideally be reported**.

10. Extraction procedure is not sufficiently reproducible

The extraction section states that the algae were washed, dried at room temperature, powdered and extracted with methanol, followed by centrifugation and drying. But critical information is absent, including:

- algae-to-solvent ratio;
- extraction duration;
- extraction temperature;
- number of extraction cycles;
- type/grade of methanol;
- extraction method;
- evaporation conditions;
- actual extraction recovery calculation.

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Since the reported yield is only **0.4%**, reproducibility is particularly important.

11. FTIR results should not be presented as identification of specific active compounds

The manuscript interprets individual FTIR peaks as specific functional groups. FTIR can provide information regarding **functional-group characteristics**, but it does not establish the identity of specific bioactive molecules.The authors should avoid statements suggesting that FTIR has identified the "active components."

12. Phytochemical screening is very limited

Only carbohydrate, protein and fat tests are reported, with carbohydrates positive and protein/fat negative. For a manuscript claiming antioxidant and tyrosinase-inhibitory properties, it would be much more informative to assess:

- total phenolic content;
- total flavonoid content;
- relevant algal polyphenols/phlorotannins;
- carotenoids;
- other relevant secondary metabolites.

The authors should at least discuss this limitation.