

REVIEWER'S REPORT

Manuscript No.: IJAR-51967

Date: May 28 2025

Title: Investigation of the aerodynamic characteristic of solar powered lawn mower blades

Recommendation:

Accept as it is

Accept after minor revision.....

Accept after major revision

Do not accept (*Reasons below*)

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

Reviewer Name: Dr Lakhdar Guerine

Date: May 28 2025

Detailed Reviewer's Report

The article presents a numerical and experimental study focused on improving the aerodynamic performance of lawn mower blades powered by solar energy. It introduces a blade design based on the NACA 5616 airfoil, modeled in both 2D and 3D, and tested through Computational Fluid Dynamics (CFD) and static stress analysis. Performance parameters such as lift, drag, rotational speed, and mowing capacity are simulated, with partial validation through comparison with existing literature. Principal Component Analysis (PCA) is used to optimize mowing efficiency conditions.

Strengths

- Relevant topic: Solar-powered mowing and pollution reduction are highly relevant in today's environmental context.
- Diverse methodology: The study combines CFD, mechanical simulation (SolidWorks, ANSYS), and statistical analysis (PCA, regression).

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- Innovative blade profile (NACA 5616): The aerodynamic modeling is original and supported by graphical validation.
- Practical application: The findings have potential utility in the design of autonomous and eco-friendly lawn mowers.

Weaknesses

- Imprecise or awkward scientific language, particularly in the introduction and conclusion.
- Limited experimental validation: There is no practical data to support the numerical simulations.
- Structural issues: Figures are poorly integrated; many are referenced (e.g., "Fig.") but not properly presented in the text.
- Insufficient detail on experimental mowing conditions (e.g., types of grass, duration, test environment).
- Inconsistent technical English: Some sentences are unclear or hard for an international audience to follow.

Recommendation: Major Revisions

To be considered for publication, the manuscript should undergo significant revisions:

- a) Strengthen the experimental validation of simulation results.
- b) Improve the scientific writing for clarity, structure, and readability.
- c) Enhance the presentation of graphical results (figures, tables, captions).