

Peer Review

# Review of: "Polyethylene Terephthalate (PET) Primary Degradation Products Affect c-di-GMP-, cAMP-Signaling, and Quorum Sensing (QS) in *Vibrio gazogenes* DSM 21264"

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## General Assessment

The article presents an important study investigating how primary degradation products of polyethylene terephthalate (PET) impact bacterial signaling mechanisms in *Vibrio gazogenes* DSM 21264. This research is particularly relevant given the growing environmental concerns surrounding plastic pollution and its microbial interactions. The manuscript is well-structured and provides valuable insights into the interplay between PET-derived compounds and bacterial regulatory networks.

While the study contributes to our understanding of microbial responses to plastic degradation products, certain aspects of the manuscript require clarification and improvement to enhance its overall rigor and impact. Below, I provide detailed feedback and recommendations for refinement.

## Strengths

**Relevance and Novelty:** The study explores a novel intersection of environmental microbiology and bacterial signaling, providing insights into how PET degradation products may influence microbial physiology.

**Experimental Design:** The manuscript presents a well-structured experimental approach to assessing the effects of PET degradation products on key bacterial signaling pathways.

**Data Presentation:** Figures and tables are generally clear and effectively illustrate the experimental results.

## ***Areas for Improvement***

### ***1. Clarity and Argumentation***

The introduction provides comprehensive background information but could benefit from a clearer research question and hypothesis. A direct statement outlining the study's objectives would help guide the reader.

Some sections, particularly in the discussion, contain long and complex sentences. Simplifying the language and structuring arguments more concisely would improve readability.

### ***2. Methodological Details***

The manuscript lacks a detailed description of the chemical characterization of PET degradation products. It is essential to specify the analytical methods used to confirm the presence and concentration of these compounds.

The experimental conditions for bacterial growth and exposure to PET degradation products should be more explicitly detailed, including incubation times, concentrations, and controls.

Were the c-di-GMP and cAMP levels measured using specific biosensors or enzyme-linked assays? Clarifying the methodology used to quantify these signaling molecules would strengthen the study's reproducibility.

### ***3. Statistical Analysis***

The statistical methods applied to compare control and treated groups should be explicitly stated in the methods section.

Indicate whether normality tests were conducted before applying statistical comparisons.

Include p-values or confidence intervals in figures and tables where appropriate to provide a clearer understanding of statistical significance.

#### **4. Interpretation of Results**

The discussion should further explore the ecological and environmental implications of altered c-di-GMP and cAMP signaling in *Vibrio gazogenes*. How might this affect biofilm formation, motility, or other bacterial behaviors in natural environments?

The potential molecular mechanisms linking PET degradation products to quorum sensing (QS) alterations are discussed, but more references to similar studies in other bacteria would strengthen the argument.

Some speculative statements could be toned down unless supported by direct experimental evidence.

#### **5. Figures and Tables**

Figure legends should be more detailed, explaining all elements within the figures so that they are interpretable without referring to the main text.

If possible, provide representative microscopic images or biochemical evidence showing direct bacterial responses to PET degradation products.

#### **6. Conclusion and Future Directions**

The conclusion effectively summarizes the findings but would benefit from a brief discussion on future research directions. For instance, could metabolomic or transcriptomic approaches further elucidate the bacterial response mechanisms?

The potential for biotechnological applications, such as engineered bacteria for PET bioremediation, could be briefly mentioned as an avenue for future studies.

#### **Final Recommendation**

The study presents valuable insights into microbial responses to PET degradation products and contributes to the growing field of environmental microbiology. However, addressing the points raised above will significantly enhance the manuscript's clarity, methodological rigor, and impact.

With appropriate revisions, I believe the article will make a strong contribution to the field and recommend it for publication after major revisions.

I appreciate the authors' efforts in conducting this important research and encourage them to refine their manuscript accordingly. I look forward to seeing an improved version of this work.

**Suggested Decision: Major Revisions Required**

## **Declarations**

**Potential competing interests:** No potential competing interests to declare.