



# Biochar based photocatalyst for degradation of organic aqueous waste: A review

Shubham Sutar<sup>a,1</sup>, Sachin Otari<sup>a,1</sup>, Jyoti Jadhav<sup>a,b,\*</sup>

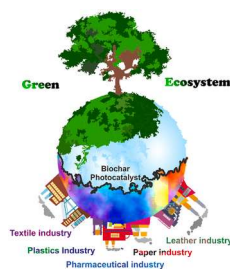
<sup>a</sup> Department of Biotechnology, Shivaji University, Vidyanagar, Kolhapur, 416004, India

<sup>b</sup> Department of Biochemistry, Shivaji University, Vidyanagar, Kolhapur, 416004, India

## HIGHLIGHTS

- The increased organic compound contamination to the ecosystem has raised concerned.
- Synchronous adsorption and degradation by BC-photocatalyst composite were discussed.
- The role of BC in enhanced photocatalytic performance was demonstrated.
- Challenges in contaminants removal by BC-photocatalyst composite were elucidated.

## GRAPHICAL ABSTRACT



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## ABSTRACT

The advancement in the treatment technology for wastewater containing recalcitrant pollutants to lower the overall cost and time of the treatment processes is the prime demand. Biochar (BC) based photocatalyst have proved their potential application in the photo-degradation of a wide range of organic pollutants. The structural and chemical properties of the BC enhance the efficacy of photocatalyst, improving its optical properties with increased stability. This review gives an overview of the progress that occurred during the last five years in BC-based photocatalyst for degradation of recalcitrant organic waste in the aqueous system, emphasizing the role of BC in the photocatalytic performance with a brief discussion regarding the various sources of BC and different strategies used to modify the BC. Further, the critical challenges are discussed, which would be confronted during the scaling up and real-time application in wastewater treatment.

## 1. Introduction

The recent surge of human civilization, industry and technology has resulted in several ecological concerns. The need for pure water is increasing, along with a slew of other issues, owing to the increased use of readily available freshwater, which has resulted in increased wastewater discharge. As a result, wastewater remediation has arisen as one of

the century's major challenge due to ignored pollution management initiatives and the large discharge of various industrial effluents in the aqueous environment (Alansi et al., 2018; Leichtweis et al., 2021a). Wastewater generated by different manufacturing companies comprises significant quantities of dyes, pharmaceutical wastes, heavy metals, pesticides and various phenolic chemicals. Advanced oxidation processes (AOPs) are potential mechanisms for causing significant chemical

\* Corresponding author. Department of Biotechnology, Department of Biochemistry, Shivaji University, Kolhapur, 416004, India.

E-mail address: [jjpbiochem@gmail.com](mailto:jjpbiochem@gmail.com) (J. Jadhav).

<sup>1</sup> Authors contributed equally to this work.