

Chapter 3

Biodegradation as a path to a sustainable future

¹Shiwangi Sinha, ^{2*}Rupa Verma

1. M.Sc. Biotechnology, University Department of Botany, Ranchi University, Ranchi, Jharkhand, India
2. Assistant Professor, M.Sc. Biotechnology University Department of Botany Ranchi University Ranchi, Jharkhand, India

***Corresponding Author:** drropav@gmail.com

Orcid ID: <https://orcid.org/0000-0001-9363-0623>

Abstract:

Biodegradation is the natural process by which microorganisms transform complex and potentially toxic compounds into environmentally acceptable products. This phenomenon plays a vital role in maintaining Earth's biogeochemical cycles, as microorganisms continually reduce biologically essential elements. The efficiency of biodegradation depends on environmental conditions, particularly the presence or absence of oxygen, which determines whether aerobic or anaerobic pathways are utilized. Harnessing this process is crucial for cleaning contaminated water without harming ecosystems, as microorganisms, fungi, plants, and their enzymes collectively contribute to pollutant removal.