



# Biodiesel Fuels' Half-Lives of Biodegradation in Terrestrial and Aquatic Systems: A Review

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## Abstract

It is essential to have knowledge of the biodegradation kinetics of biodiesel fuels while choosing the best remediation tactics and doing risk and impact assessments. However, there is a lack of consistency in this information, and we still don't fully understand what causes variation in biodegradation rates. In order to determine the 142 biodegradation and 56 mineralization half-lives of diesel and biodiesel fuels in diverse experimental setups, we thoroughly analysed HGAs and other related parameters. The study focused on the variation in half-lives among fuels and experimental settings. Biodegradation half-lives varied from 9 to 62 days across all data sites and were 2-5.5 times shorter than mineralization half-lives. In terrestrial environments, biodegradation and mineralization half-lives were 2.5-8.5 times longer for all fuels than in aquatic systems. A system of natural attenuation and other passive methods to degrade and disperse contaminants in their natural environments.

**Keywords:** Biodiesel; Biofuels; Bioremediation; FAME; Impact assessment; Risk assessment

## Introduction

Depending on the nation or location, biodiesel, a form of fuel made primarily from plants, is blended with petroleum diesel oil in amounts ranging from 2 to 20%. Cadillo Benalcazar Gupta, DeMello, and Schleicher. The Renewable Energy Directive for the time period in the European Union sought to replace 10% of fossil fuels with biofuel. The European Parliament. The production of biofuels has been increasing significantly, with the annual global production of biodiesel increasing more than ten times between 2000 and 2020, reaching 45 billion litres. This increase was accompanied by a rise in understanding of the possible drawbacks of producing biofuels from agricultural plants, which are mostly brought on by the conversion of natural land to cultivated land, which releases carbon stored in the soil and natural biomass as CO<sub>2</sub>. In addition to social effects, competition with food and feed may indirectly result in the loss of natural land somewhere else. Regulations limiting the production of biofuel from first-generation feedstock to 7% in 2015 and ultimately 3.8% in 2030 were created

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either provided by the authors or could be calculated from other data presented in the article typically, rate constants; the type of fuel; the type of system aquatic, terrestrial; and the aeration conditions [9,10]. Only if measured in the same experiment as for biodiesel fuels were the data on the mineralization or biodegradation kinetics of diesel fuels included. Studies measuring the biodegradation of particular fuel components were excluded because they could not be compared to data on overall biodegradation, such as chromatograms or mass fractions for components of biodiesel or composition assessments of FAMES. Data for blends that reflect degradation as a drop in purity or as a change in indicator colour were also excluded. Which burned crude oil, jet fuel, pure petroleum hydrocarbons, or other fuels besides petroleum As a result; data on mineralization and/or biodegradation kinetics were discovered in 32 papers, all of which passed the requirements for inclusion in the second stage of the review process. If available,