Scientometric analysis of diesel pollutions in Antarctic Territories: a review of causes and potential bioremediation approaches

ABSTRACT

Despite the continuous enforcement of Antarctic Treaty System, ATS (1961), today Antarctica is constantly plagued by hydrocarbon pollution from both legacy and present-day wastes, especially near where anthropogenic activities are the most intense. The advances of science have led to multiple breakthroughs to bolster bioremediation techniques and revamp existing laws that prevent or limit the extent of hydrocarbon pollution in Antarctica. This review serves as the extension of collective efforts by the Antarctic communities through visual representation that summarizes decades of findings (circa 2000–2020) from various fields, pertinent to the application of microbe-mediated hydrocarbons remediation. A scientometric analysis was carried out based on indexed, scientific repositories (ScienceDirect and Scopus), encompassing various parameters, including but not limited to keywords co-occurrences, contributing countries, trends and current breakthroughs in polar research. The emergence of keywords such as bioremediation, biosurfactants, petroleum hydrocarbons, biodiesel, metagenomics and Antarctic treaty policy portrays the dynamic shifts in Antarctic affairs during the last decades, which initially focused on exploration and resources exploitation before switching to scientific research and the more recent ecotourism. This review also presents the hydrocarbonoclastic microbes studied in the past, known and proposed metabolic pathways and genes related to hydrocarbon biodegradation as well as bacterial adaptations to low-temperature condition.

Keyword: Hydrocarbon; Bioremediation; Genes; Sequencing