

Cannabis Sativa: A Multifunctional Resource for Environmental Sustainability

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Abstract

Hemp (*Cannabis sativa* L.), a versatile plant widely recognized for its medicinal and recreational uses, also offers considerable ecological potential. This review explores the environmental applications of cannabis including phytoremediation, sustainable agriculture, biofuel production, and the development of renewable eco-friendly materials. Hemp is highly effective in phytoremediation, capable of absorbing heavy metals and contaminants, thereby improving soil quality. Its fast growth, low water and pesticides requirements, and adaptability to various climates make it an ideal crop for sustainable agriculture, enhancing soil health and reducing chemical dependence. Hemp seed oil can be processed into biodiesel, offering a renewable energy source that reduces greenhouse gas emissions. Additionally, hemp fibers and biomass are being developed into paper, textiles, and bioplastics, providing renewable and biodegradable alternatives to petroleum-based products. Other hemp-based materials like hempcrete are gaining popularity in sustainable construction for their carbon-negative properties. Through these diverse ecological applications, hemp emerges as a valuable resource for addressing environmental challenges, promoting sustainability, and reducing the carbon footprint. This research emphasizes the untapped potential of cannabis as a multi-functional plant for environmental conservation.

Keywords

Cannabis sativa L., Ecological Applications, Sustainability, Phytoremediation, Renewable Materials