Chapter 10
Treating Textile Effluents for Sustainable Fashion and Green Marketing

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ABSTRACT

One of the main causes of water pollution is the textile industry, which involves dyeing and finishing processes. Aquatic life and human health can be threatened by the variety of chemicals and dyes contained in the effluent generated by these processes. The impact of these effluents on the environment has been minimized by the development of several effluent treatments. This presentation discloses the available solutions for liquid effluent treatment from textile dyeing and finishing providing a fast, clear, and deep understanding of methods such as the physicochemical and biological treatments as well as the recent advanced oxidation processes. Thus, utilizing a combination of these technologies in a treatment plant can frequently lead to more effective outcomes. Ultimately, this investigation will assist researchers and academic practitioners in enhancing and aligning green marketing models with sustainability trends in the textile, apparel, and fashion industries.

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1. INTRODUCTION

Water pollution is a major issue in the textile industry, and dyeing and finishing processes are the main culprits. Aquatic life may be harmed, and human health may be significantly threatened by the variety of chemicals and dyes contained in the effluent generated by these processes. To lessen the impact of these effluents on the environment, several effluent treatments have been developed over the years. This chapter discloses the available solutions for effluent treatment from textile dyeing and finishing methods. Furthermore, sustainable practices and technologies that minimize water usage in textile processes can contribute to environmental conservation efforts. Incorporating effluent treatment practices into green marketing enhances a brand's environmental credentials and aligns with the growing consumer demand for sustainable and ethically produced fashion. By emphasizing these efforts, brands can build a positive image and attract a broader base of conscious consumers. This research presents the data and findings collected from the relevant literature relating to sustainable fashion and textile production by further analyzing the impact of these eco-friendly methods on the consumption of textile products and the internal-organization marketing strategies.

2. EFFICIENT SOLUTIONS FOR TREATING TEXTILES

Water pollution is exacerbated by the textile industry, which is primarily responsible for dyeing and finishing processes. These processes generate effluent that has various chemicals and dyes that can harm aquatic life and pose a significant threat to human health. To reduce the environmental impact of these effluents, several treatments have been developed. This section discloses the available solutions for liquid effluent treatment from textile dyeing and finishing providing a fast, clear and deep understanding of methods such as the Physicochemical and Biological treatments as well as the recent Advanced Oxidation Processes.

The initial method utilizes chemical and physical processes to eliminate pollutants like suspended solids, color, and organic matter from wastewater. The addition of coagulation-flocculation to wastewater destabilizes the suspended particles, causing them to clump together. This can then be removed by settling or filtration. The addition of a flocculant (flocculation) helps the formed particles to aggregate and settle more efficiently removing color, suspended solids, and organic matter from textile effluent. Alternatively, the adsorption method involves the use of adsorbents such as activated carbon, zeolites, and clays which remove pollutants from wastewater by attracting and binding pollutants onto their surfaces which decolorizes and removes organic matter from dye house effluent. Similarly, membrane filtration uses membranes of different pore sizes such as microfiltration, ultrafiltration, nanofiltration, and reverse osmosis, to achieve the removal of the pollutant.

The Biological treatment uses microorganisms to remove pollutants from wastewater, such as the activated sludge process, biological aerated filter, and sequencing batch reactor. In the activated sludge process, wastewater is mixed with sludge and aerated to give oxygen to microorganisms that break down organic matter, then the sludge is separated and reused. In the biological aerated filter method, wastewater is passed through a bed of media that is populated with microorganisms that break down organic matter. Similarly, the sequencing batch reactor method also involves introducing wastewater in an aerating tank for a control time providing oxygen to the microorganisms which in stages decompose the organic matter, settle the suspended solids, and eventually decant the treated water.