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A NOVEL HYBRID BIO-SYSTEM FOR WASTEWATER TREATMENT USING ALGERIAN AGRICULTURAL WASTES

NOWY HYBRYDOWY BIOSYSTEM DO OCZYSZCZANIA ŚCIEKÓW WYKORZYSTUJĄCY ALGIERSKIE ODPADY ROLNICZE

Abstract: The development of a new clean, easy to handle process with similar efficiency to that of the conventional process is one of the most important challenges in green chemistry investigation. In this study, a new hybrid process was investigated; coupling coagulation-flocculation with adsorption using abundant and natural bioproducts (Chitosan and *Ammi visnaga*). The Chitosan/*Ammi visnaga* (coagulation/adsorption) system was studied for its Brilliant Green dye removal capacity. This new technique seems to be a good alternative method for wastewater treatment, showing satisfactory results with high rates of elimination that range around 90 %.

Keywords: *Ammi visnaga*, chitosan, bio-coagulation, biosorption, bio-system

Introduction

Water, throughout history, has been an important factor in ensuring human well-being. Currently, one of the most serious environmental problems is the pollution of the hydrosphere, which is largely due to human activity. In both developed and developing countries, the quality of this vital element is deteriorating because of the chemical wastes that are dumped into the environment. Dyes are organic compounds used in many industries: paper, cosmetics, food processing, textiles, agriculture, pharmaceuticals, as well as medical diagnostics [1].

The world production of synthetic dyes is estimated at $800 \cdot 10^6$ kg/year. Some of these dyes (approximately $140 \cdot 10^6$ kg/year) are rejected during the fabric making and staining steps [2]. Their elimination is one of the main problems in the liquid waste treatment process. Several types are highly toxic, carcinogenic, mutagenic and difficult to biodegrade [3, 4]. In water treatment, coagulation and flocculation are treatments that aim to optimize the removal of particles in suspension by the decantation and filtration process. These treatments favor the aggregation of colloidal particles in large and dense aggregates, despite their great use; they still are a source of secondary pollution.

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