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Natural products chemistry and research

Commentary

The Application of Groundnut Shells as Adsorbants

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INTRODUCTION

Methylene Blue (MB) dye was removed from aqueous media using composites of various biopolymers (polypyrole, polyaniline, chitosan aniline, and chitosan pyrrole) and peanut wastes as an adsorbent. On the initial adsorption rate, capacity, and dye removal efficiency, the impacts of initial pH, adsorbent dosage rate, and first dye concentration were examined. To further understand the mechanism and nature of MB adsorption onto native and composite adsorbents, thermodynamic, equilibrium modelling, and kinetics models were fitted to the MB adsorption data. The highest MB adsorption of 160,7 mg/g (onto chitosan aniline composite) was reached using a 150 mg/L dye starting concentration at 50 C 7 pH.

The effect of surfactant pre-treatments on composites was also investigated. The highest MB adsorption efficiencies were obtained in the chitosan aniline composite. The Freundlich and Langmuir adsorption models were utilised to mathematically define the adsorption equilibrium of the dye-adsorbent system, and it was found that the Freundlich model was better suited to represent the system's adsorption equilibrium. The second order kinetic model was found to be more accurate in describing the adsorption data. Finally, the calculated adsorption thermodynamic parameters exhibit spontaneous and endothermic behaviour. Overall, our research suggests that biopolymer-peanut hull waste composites can be used as a low-cost adsorbent for removing MB dye from aqueous solutions.

The introduction of peanut (Arachis hypogaea L.) development coincides with the expansion of human advancements in the Mediterranean. Nut is a substantial yield that originated in South America and has since expanded around the world, including China, Africa, India, Japan, and the United States of America. The majority of peanuts grown on the world are used to make oil, nutty spreads, candies, broiled peanuts and nibble items, meat extenders, soups, and treats. The significant measurements of results are made during the period spent collecting nuts and extracting nut oil, both of which are expected contaminations.

However, only a small portion of these outputs are used as animal feed and rewarded as manure. Horticulture squanders include a large portion of nut meals, skins, frames, and plants. Currently, many experts are focused on the study of supplying consumable oil and bit. In this vein, the negative consequences of nuts are given almost little thought. There is no report on inspecting the possibility of nut plant usage, in particular. Natural tainting occurs as a result of these nut outcomes. As a result, if the healthy arrangements of nut results are recovered and utilised, it can represent a significant monetary and societal benefit.

The way that a healthy organisation uses nut outcomes with showcase requests has recently changed. In the last 20 years, fresh logical investigation has focused on the following topics. The estimation of nut results is improved right away. Furthermore, nut proteins, nut phenolic blends, and nut palatable fibre are described and analysed, as well as their potential effects on the eating regimen. Nut feast, nut skin, nut body, and nut plant are among the nut products supplied from pulverised nut forms and gathered nut. Some nut byproducts/waste materials could potentially be used in the food processing industry. Nut byproducts contain a variety of useful compounds, including as protein, fibre, and polyphenolics, which can be combined into prepared foods to serve as practical fixes.

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CONFLICT OF INTEREST

The author has declared that no competing interests exist.

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