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Research on Eco-Friendly and Long-Lasting Textiles from the Ocean and Sea

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ABSTRACT

Oceans are home to a wide variety of plant and animal life, which in turn produces an abundance of chemicals not found on land.The chemical and biological resources extracted from the sea are utilized as inputs in several sectors, including the pharmaceutical and textile industries. These components have several applications in the textile industry, both as fiber and as auxiliary products. Large amounts of pigments including chlorophyll, carotenoids, phycobili, beta-carotene, and lutein may be found in certain types of marine algae. It is not biodegradable and is not biocompatible with the skin, yet seaweed is full of bioactive chemicals and has antioxidant and antibacterial qualities. Researchers were able to extract a hue from green seaweed that showed promise for use in textiles.ChitinIn addition, both chitin and chitosan have found uses in the field of surface modification. Some kinds of mussel may be used to produce natural colors and textile fabric. In addition, marine sources like hagfish slime may be mined for unique high-performance fibers with outstanding characteristics. Numerous research projects are under underway to better understand the marine sources for various uses. This article is a review of ocean and sea-sourced textiles.

INTRODUCTION

Not only is seaweed biodegradable and incompatible with human skin, but it also has a wealth of beneficial bioactive chemicals, including antibacterial and antioxidant qualities. Green algae belonging to the ulvaceae family are edible. Green algae belonging to the ulvaceae family are edible. Large amounts of pigments including chlorophyll, carotenoids, phycobili, beta-carotene, and lutein are found in certain types of marine algae. Seaweed is nonbiodegradable and skin-compatible, and it contains several beneficial bioactive chemicals as well as antioxidant and antibacterial qualities. Polysaccharides, polysaccharides, lipids, proteins, carotenes, vitamins, sterols, enzymes, and antibiotics are all involved in the seaweed process. Particularly abundant are the antioxidants polyphones, fucoidans, and carotenoids. Seaweeds have been shown to contain a variety of antimicrobial chemicals, including alkaloids, terpenes, terpenoids, agar agar, algin, and phloro tannin.There are a total of 250 known plant species, including 32 cholrophyta, 64 phaeophyta, and 125 rhodophyta. Depending on the seaweed, it may be used to remove hazardous metals including

copper, zinc, cadmium ions, nickel, lead, and even in the dyeing process. Green seaweed's ulvans and oligo ulvans are used to create natural colors that are then used as pigments. Green color has been absorbed by ulvans, which are water soluble pigments, and transported to the fiber's surface. The most common kind of Ulvans pigment found in seaweed. Seaweed is the source of the colors. The primary ulvan pigment found in seaweed. Seaweed is abundant in carbs, minerals, vitamins, and iodine, according to nutritional assessments. Dye effluent

Methodology

Chitin and Chitosan : Exoskeletons of arthropods like insects, crabs, shrimp, and lobsters, and the cell walls of some fungi and yeast, may include the polysaccharide chitin. The carbohydrate polymer chitosani, generated from chitin, is altered chemically. Products made from chitin and chitosan are byproducts of the seafood industry. There is a lot of structural similarity between chitin, chitosan, and cellulose.

Chitin and chitosan may be produced either chemically or biologically. All of their production entails four main processes: deproteinization, demineralization, decolorization, and deacetylation.

Characteristics of Chitin and Chitosan

Chitin and chitosan are natural, renewable polymers with a linear structure like cellulose. Films, fibers, and gels may be formed, and their semi-crystalline shapes and ability to form complexes with metals are all notable features. The biodegradability, biocompatibility, nontoxicity, and adsorption of these polymers are only a few of their many impressive features.

Because of its high hygroscopicity, chitin is insoluble in water and in the vast majority of organic solvents. Chitosan is insoluble in water but may be broken down in an acidic aqueous solution or by selective Nalkylidinations. Films and fibers may be made from chitin by processing.Since the high thermal breakdown temperatures of chitin and chitosan prevent the use of the melt spinning method, wet spinning is often employed for their production. Due to their high boiling temperatures, the dry spinning method is impractical as well. First, the polymer is dissolved in a 14% NaOH solution to provide polymer solution for the wet spinning process. After the solution has been filtered and degassed, it is extruded into a solvent-coagulant system via a spinneret. By adjusting the coagulation bath temperature and adding an appropriate plasticizer to the spinning solution, the chitin solutions may have their spin ability altered.Chitosan fibers are regenerated by a chitin xanthate viscose process. At first, chitin is treated with 40% NaOH at room temperature, resulting in chitin xanthate. Chitin xanthate and broken ice are combined once the caustic has been drained from

the solution. When the solution was finally ready to be spun,Filtering, degassing, and spinning the solution into a coagulation bath of 8-10% sulphuric acid, 25% sodium sulfate, and 1-3% zinc sulfate are all steps in the process. For their bio-function, regenerated Chitosan fibers may be combined with other fibers made from natural and/or synthetic polymers.

Textile Applications of Chitin andChitosan

Chitin and chitosan are widely used in various industries ranging from health and beauty aids to water purification, biomedical applications, agriculture, biotechnology, nutrition,

Conclusions

Various chemical and biological compounds derived from marine organisms now provide enormous resources for a wide range of enterprises. These materials have several applications outside the textile sector due to their exceptional qualities. Their value in creating sustainable materials for environmentally conscious lifestyles is growing by the day. Although only chitin and chitosan are now manufactured commercially, it is thought that other compounds with higher qualities may be extracted from marine organisms.

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textile fibers and treatments in the finishing process of textile production. Textile chemicals widely used in pretreatment and finishing processes of textiles are an inseparable part of textile industry. However, textile industry and these chemicals mostly cause environmental pollution. Therefore, the use of biodegradable, non-toxic, sustainable, ecofriendly materials become very important. Also, chitosan is able to remove dyes from the effluents. Furthermore, both chitin and chitosan are suitable to utilize in medical textiles such as textile sutures, wound dressings, artificial skin and medical diaphragms.

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