

Carbon Nanomaterials in Biomedicine and the Environment

edited by
Zulkhair A. Mansurov



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Preface

The problem concerning the creation and use of sorption materials is urgent for practice in modern biotechnology, medicine, and the environment. For sorbents of medical purpose that are directly in contact with biological fluids, there are special quality requirements: high degree of chemical purity; minimum percentage of impurities; nontoxicity; high mechanical strength; high sorption capacity in relation to strippant; high compatibility with blood and other biological fluids, a wide range of porous structure as well as physical and chemical surface properties. Application of a cheap sorption material obtained by high-temperature carbonization using secondary vegetable raw materials such as rice husk and apricot stones is particularly attractive. These vegetable raw materials are functionalized by cells of probiotic microorganisms, which allow combining synergistically the properties of adsorbent and active biological agent.

Agricultural wastes such as fruit seeds and rice husks can be used as raw materials for obtaining cheap carbonized samples—sorbents. At the same time, it is important that the production of carbonized samples is environmentally friendly, and the raw materials are annually renewable. Creation of nanostructured carbon-containing materials is one of the priority research areas is rapidly developing across the globe.

The interest in the development of obtaining methods and use of available adsorbents based on active carbon has increased significantly due to the aggravation of environmental problems, the solution of which requires the creation of new technologies for the detoxication of environmental objects. It has been revealed that carbonized samples have the ability to sorb various toxicants of organic and inorganic nature and therefore are promising for the use in various environmental technologies.

Carbon nanomaterials could be used in medicine both for creation of hemosorption systems that are capable of performing the specific purification of blood and other physiological fluids

from various exo- and endotoxins, and for the design of highly effective sorbed probiotics on their basis.

This book will appeal to anyone involved in biotechnology and medicine, including aspects from biology and various diagnostic methodologies, as it covers research on the creation and use of sorption materials for medical purposes, biotechnology, and environments.