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BIO-BASED NANOCOMPOSITES AND ITS POTENTIAL APPLICATION AREAS

Zeki Candan[1] and Atanur Satir[2]

[1]Istanbul University, Turkey
[2]Directorate of Central Anatolia Forestry Research Institute, Turkey

The forest products industry has enormous natural resources that can be used in the production of a wide range of products that have found use in every part of modern society and become indispensable for a long time. In the past 20 years, many industries have benefited from the advantages that nanoscience and nanotechnology bring together to life. However, the forest products industry has recently embraced the studies in this area and has begun to develop its research in this regard. The facts that wood and wood-based products are sustainable, renewable and recyclable and have a great potential to reduce the demand of societies for petroleum-based resources, have led the nanotechnology studies to concentrate on this area over time. The studies on nanotechnology in the forest products field is mostly on the production of nanomaterials (nanocellulose and nanolignin) from wood-based lignocellulosic materials and the development of new green materials based on these nanomaterials. Nanotechnology, however, has a great potential in lignocellulosic material and can be used for production and deposition of energy; for measurement of moisture levels, temperature, pressure and loads and for detection of biological and chemical attacks by installing nanosensors to the material. On the other hand, nanomaterials obtained from wood can be utilized to produce high value-added products in pharmaceutical applications as a new approach for drug delivery systems, in environmental remediation activities as new adsorbent media, in biomedical area as new wound healing, tissue recovering material, in cosmetic as emulsifier, rheology modifier and in electronics as flexible and transparent displays, electronic circuits, electrodes and supercapacitors.

zekic@istanbul.edu.tr