

# Paper and Composites from Agro-Based Resources

The Challenge of Bio-Adhesives for the Wood Composite Industries

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## Introduction

The last decades environmentally friendly materials are becoming more widely used as our society becomes aware of the consequences associated with the use of petrochemical derived products. By using 'green' materials, we moderate the intense exploitation of fossil resources, reduce the amount of carbon dioxide that enters the atmosphere and take upon the responsibility of using earth's resources in a sustainable manner, thus improving resource management, indoor air quality (IAQ), and generally the overall performance and efficiency of human kind on earth.

In order to serve and expedite the replacement of fossil products by others of natural origin, the governments instituted a more environmentally friendly legislation and released directives relative to products and processes that the industry has to comply with, within certain dates. In particular, the United States of America (USA) resolved that by 2012 quite 8 billions tons of fuel should be derived from biomass while the cost of bio-ethanol should be reduced to 1.07\$/kg. Likewise, the European Union, through the "Biomass Action Plan" [1] communicated its decision to increase biomass use to around 150 million ton by 2010, while the Kyoto protocol on global climate change [2], signed by the majority of the countries on earth, includes a shift of feedstock for energy and chemical industries from petrochemical to renewable resources.

Wood, as biomass, is a sustainable and dependable resource with many applications. It can be used in constructions as such or as a wood-based panel resulting in a more profitable exploitation, while it can also be used as raw material for the production of paper and chemicals.

One of the major challenges associated with the wood-based panels, in order to be eligible for qualification as totally natural products, is the replacement of the formaldehyde-based resins used for their production, by others of natural origin. Common formaldehyde-based resins are urea-formaldehyde, melamine-formaldehyde and phenol-formaldehyde while other phenolic compounds (e.g. resorcinol) can also react with formaldehyde to provide polymers of the same type with differences in adhesive cost and reactivity. Wood-based panels, like particleboards (PB), fibreboards (e.g. medium density fibreboard-MDF), oriented strand boards (OSB), plywood (PW) etc are produced by adhering together parts of wood in various sizes with these resins under heat and pressure.

Among the resins used for the production of these boards, the phenolic resins (PF) are the preferred adhesives for producing panels of exterior grade. This kind of resin represents the second important type of wood adhesives following amino resins in terms of consumption volume. Nevertheless, the cost of phenol-formaldehyde resins is high and follows the fluctuations of petroleum prices while the components of the resin are considered as a major indoor pollutant and harmful for the human health. Thus, it is not coincidental that the attempts for replacing the petrochemical raw materials of the resins for the wood-based panels by other of renewable or recyclable resources started from this type of resins.

The idea of using natural-derived materials as adhesives is not new. The first natural raw materials used in this purpose were blood from animals, casein and soy protein. Adhesives derived from animal and vegetable resources dominated the market till 1940 but their usage was gradually reduced after 1970 when the petrochemical materials entered the market enabling the synthesis of

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Paper and Composites from Agro-Based Resources explores the great number of options available for producing paper and composites. Using sound. Sustainable development is an important concept underlying many of today's renewable resource policies. Agro-based resources, such as wood, make up a., English, Book, Illustrated edition: Paper and composites from agro-based resources / edited by Roger M. Rowell, Raymond A. Young, Judith K. Rowell. Paper and composites from agro-based resources [ ]. Rowell, Roger M. Young, Raymond Allen Rowell, Judith K. Access the full text. Paper and composites from agro-based resources / . edited by Roger M. Rowell, Raymond A. Young, and Judith K. Rowell. imprint. Boca Raton: CRC/Lewis. All of the agro-based resources should be marketed to take advantage of the for the existing paper and composite industries will require new techniques for. Carbon Fibers from Sustainable Resources (Pages: ) Polylactic Acid Composites and Composite Foams Based on Bio Char from Discarded Agricultural Biomass (Pages: ) Nanomaterials: An Advanced and Versatile Nanoadditive for Kraft and Paper Industries (Pages: ). Paper and composites from agro-based resources. RM Rowell, J Rowell. CRC press, , Short jute fiber? reinforced polypropylene composites. Ebook Paper And Composites From Agro Based Resources currently available at buana-alkes.com for review only, if you need complete ebook Paper And. There is a wide variety of agri-based resources to including recycled wood, paper, and paper products. tainable agriculture and the promotion of healthy. Paper and composites from agro-based resources. CRC Lewis Publishers, Boca Raton, FL, pp. Rowell, R.M. ed. Handbook of Wood Chemistry and. Unpublished Paper of Thurinisches Institut fur Paper and Composites from Agro-Based Resources (R.M. Rowell, R.A. Young, J.K. Rowell ed.) chapter 7, pp. Biofibres, biodegradable polymers and biocomposites: An overview. In: Paper and Composites from Agro-based Resources, Eds. Rowell, R.M., Young, R.A. PAPER AND COMPOSITES FROM AGRO-BASED RESOURCES. Whether used as the main ingredient of the composite or used as a reinforcing filler, much of. Fred D. Iannazzi, A Decade of Progress in U.S. Paper Recovery, Resource eds., Paper and Composites from Agro-Based Resources (Boca Raton, FL: CRC .and efficient use of wood fibre resources, producing more fibre on a shrinking land base demand and competition for wood residues by the paper industry and the The most promising sources of agricultural biomass for composite products. Agro-based resources, also referred to as lignocellulosics, are resources that In order to produce lignocellulosic-based composite materials with a long .. paper, yard waste, industrial fiber residues, residential fiber waste, and many other. R.E.: Paper and Composites from Agro-based Resources, Lewis Publishers, OPEBF/Banana/Glass Fiber Reinforced Unsaturated Polyester Composites. The major lignocellulosic agricultural residues are wheat, rice, barley straw, corn stover, and is one of the potential agro-fibre resources for the composites industry. Straw papers are known to possess good printing qualities and are made. This paper is focused on the tensile properties of natural fiber reinforced polylactic Young RA, Rowell J.

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