

Sustainable composite materials based on renewable resources

*G. Bogoeva-Gaceva¹, D. Dimeski², Z. Manov³, V. Srebrenkoska²
A. Grozdanov¹, A. Buzarovska¹, M. Avella⁴*

*¹Faculty of Technology & Meta. R. Boskovic 16, 1000 Skopje,
R. Macedonia, gordana@tmf.ukim.edu.mk,*

²Eurokompozit, Prilep, R. Macedonia,

³ZIMRANT, R. Koncar 16, 1000 Skopje, R. Macedonia,

⁴ICTP-CNR, Via Campi Flegrei 34, 80078 Pozzuoli (NA), Italy

Combining kenaf fiber with various eco-friendly polymer matrices provides a strategy for producing wide range of composites that take advantage of the properties of both type of materials, allowing design of final products in accordance to the end-use requirements within a framework of cost, availability, recyclability, energy use, and environmental considerations. Variety of polymers and resins which are derived from renewable raw materials, are readily available from commercial sources.

In this paper the research was focused on development of a lightweight, environmentally friendly, cost-effective composite materials based on kenaf fibers and biodegradable polymer matrix derived from renewable resources.

Composite performs consisting of different amount of kenaf fiber as reinforcement and polylactic acid (PLA) in a fiber form, were fabricated as nonwovens (produced by KEFI, Italy Fig.1). The possibility of using conventional manufacturing process is an important factor for industrial fabrication of composites based on renewable materials. Our investigation has shown that kenaf fiber/PLA performs can be processed in a way similar to polypropylene-based composites without any difficulties. Consolidation of these composite performs was performed by compression molding, at temperature of 180°C. Mechanical properties were characterized by bending and tensile test, as well by DMTA and other techniques. The results have shown that high fiber/low matrix composites can fulfill the end user requirements for partitioning boards in offices and dwelling houses. Recycling ability of the produced kenaf fiber/PLA composites was also investigated.



Fig. 1. Composite performs kenaf/PLA

($d=40\text{mm}$; $\rho=40\text{kg/m}^3$)