



Recent Developments in Bio Composites from Natural Fibers and Agricultural Wastes

Arpitha G R¹, Madhusudhan M¹

¹Department of Mechanical Engineering, Presidency University, Bangalore, India

World is looking for more ecological with high performance polymeric materials with the higher functionalities. With this concern, Bio-composites are considered as better option, especially those obtained from agro-industrial wastes and by-products. These are low-cost raw materials derived from renewable sources, which are mostly biodegradable and easy to discard. Increased use of natural fibers and natural fiber as reinforcement is a burgeoning field of research because of the ease of procuring raw materials, biodegradable and environment friendly nature along with mechanical properties of the resulting composites that are comparable to synthetic fiber-reinforced composites. The mechanical properties of fiber-reinforced composites are depending on the properties of the constituent materials like reinforcement and matrix material. Besides those properties, the nature of the interfacial bonds and the mechanisms of load transfer at the interphase also play an important role. Compared to studies on the other natural fiber reinforced composites, though, very less efforts and attention have been made toward the areca fiber and its reinforced composites. Environmental conditions and search of new materials are motivating researchers, scientists, and engineers to propose more modern and biodegradable materials for automotive, aerospace, construction, marine and packaging applications.

References

1. H. T. Sreenivas, N. Krishnamurthy and G. R. Arpitha. "Comprehensive review on light weight kenaf fiber for automobiles" International Journal of Lightweight Materials and Manufacture, vol. 3, no. 4, pp. 328-337, 2020.
2. F. Ortega, F. Versino, O. V. López, and M. A. García, "Biobased composites from agro-industrial wastes and by-products." Emergent Materials, vol. 5, pp. 873–921, 2022.
3. G. R. Arpitha, A. Verma, M. R. Sanjay, A. M. Alosaimi, A. Khan, M. A. Hussein,... & S. Siengchin. "Fabrication and experimental study of corn starch based vetiver cellulose reinforced bio-composite film for food packaging application." Journal of Materials Research and Technology, vol. 9, issue 1, pp. 773-778.
4. M. R. Sanjay G. R. Arpitha, P. Senthamarai Kannan, M. Kathiresan, M. A. Saibalaji and B. Yogesha. "The hybrid effect of jute/Kenaf/E-glass woven fabric epoxy composites for Medium load applications: impact, inter-laminar strength, and failure surface characterization." J. Nat. Fibers, vol. 16, no. 4, pp. 600-612, 2019.
5. K. Dinakaran, H. Ramesh, A. D. Joseph, R. Murugan and S. Jothi. "Development and characterization of areca fiber reinforced polymer composite." Materials Today: Proceedings, vol. 18, pp. 934–940, 2019.
6. S. M., Sapuan, F. L. Pua, Y. A. El-Shekeil and F. M. AL-Oqla, "Mechanical properties of soil buried kenaf fibre reinforced thermoplastic polyurethane composites" Materials & Design, vol 50, pp. 467-470, September 2013.

7. R. H. Desai, L. Krishnamurthy and T. N. Shridhar. "Effectiveness of Areca (Betel) Fiber as a Reinforcing Material in Eco-friendly Composites: A Review." Indian Journal of Advances in Chemical Science S1, pp. 27-33, 2016.

About Authors :



Dr. Arpitha G R is an Assistant Professor at the department of Mechanical Engineering in the Presidency University, Bangalore. She received her Bachelor of Engineering in the Presidency University, Bangalore. She received her Bachelor of Engineering in Production engineering in the year 2010 from VTU, Belgaum, India and Master of Technology in the year 2012 from VTU, Belgaum, India. Doctoral dissertation is entitled "Characterization of Sisal/Glass/Filler Epoxy Hybrid Composites". This dissertation is supported by All India Council for Technical Education (AICTE) and also Technical Education Quality Improvement Program (TEQIP-II), Government of India. Presently, acting as a reviewer for more than 10 prestigious Web of Science journals. In addition, published 30 articles in Scopus and SCI indexed journals and presented more than 15 research papers at international conferences, published one book and one patent and having citation of 1400+, h-index 14 and i10-index.



Dr. Madhusudhan M is an Assistant Professor at the department of Mechanical Engineering in the Presidency University, Bangalore. He received her Bachelor of Engineering in Mechanical engineering in the year 2008 from VTU, Belgaum, India and Master of Technology in the year 2011 from VTU, Belgaum, India. Doctoral dissertation is entitled “Development and Characterization of AA7068 with ZrO₂ reinforced Metal Matrix Composites”. In addition, published 3 articles in Scopus and SCI indexed journals and presented more than 5 research papers at international conferences, published one book “ Fundamentals of Automobile Engineering”.