



# 10<sup>th</sup> INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

“TEN YEARS WORKING TOGETHER FOR A SUSTAINABLE FUTURE”

## Comparative Analysis of the Tensile Properties of Polyester to Epoxy Matrixes Composites Reinforced with Hemp Fibers

MANTOVANI, D. P. <sup>a</sup>, ROHEN, L. A. <sup>a</sup>, NEVES, A. C. C. <sup>a</sup>, VIEIRA, J. S. <sup>a</sup>, PONTES, L. A. P. <sup>a</sup>,  
VIEIRA, C. M. F. <sup>a</sup>, MARGEM, F. M. <sup>b</sup>, MONTEIRO, S. N. <sup>c</sup>

*a. State University of the Northern Rio de Janeiro, UENF, Advanced Materials Laboratory, LAMAV; Av. Alberto Lamego, 2000, 28013-602, Campos dos Goytacazes, Brazil*

*b. Faculdade Redentor Rodovia BR 356. n° 25 Itaperuna RJ - 28.300-000*

*c. Instituto Militar de Engenharia, IME, Praça Gen. Tibúrcio, n°80 Urca, Rio de Janeiro - RJ, 22290-270*

### Abstract

This present work consists in comparing the tensile properties of polyester and epoxy matrix composites reinforced with hemp fibers. According to ASTM D-638-14 the matrix, polyester and epoxy reinforcing specimens reinforced with different volumes of hemp, 0%, 10%, 20% and 30% fibers were made and suitably tested by a universal machine INSTRON model 5582 of the LAMAV / UENF. The epoxy matrix composites reinforced with 30% of fibers presented tensile strength, of 53.08 MPa, while those of polyester matrix, 25.44 MPa. The elastic modulus, epoxy matrix composites, in a volume of 30%, was 1.75 GPa and the polyester matrix 4.05 GPa. The tests showed comparatively that the resistance of the epoxy reinforced with hemp fiber composites is superior to the composites of polyester matrix. However, the stiffness of these polyester / hemp fiber composites is higher than the epoxy / hemp fiber ones. The determination of the mechanical properties of these new composites materials contributed to the search for new sustainable materials, economically viable and technologically advanced.

**Keyword:** *tensile properties, composites, polyester, epoxy, hemp fibers.*