INVESTIGATIONS ON THE EFFECT OF ALKALI AND PLASMA TREATMENT OF JUTE FABRIC ON COMPOSITE PROPERTIES

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In the present study, jute fabric with plain, twill and matt weave structures were developed and made into a composite with $[0^0]_4$, $[0^0/\pm45^0/0^0]$ and $[0^0/90^0/90^0/0^0]$ lay-up angles using compression moulding technique. It is observed that the matt structure composite shows higher tensile, flexural and impact strength and more water absorption followed by twill and then plain woven composites. With respect to the lay-up angle, $[0^0]_4$ composite shows increased tensile, flexural and impact strength and more water absorption. Thus, the plain woven composite with $[0^0]_4$ lay-up was optimized for further research to have optimised strength and water absorption.

The plain woven jute fabrics were treated with sodium hydroxide with the optimum conditions of 4 hrs, 30^0C and 5% NaOH concentration was used. The developed jute fabrics treated with 550V and 1 min as an optimum condition. The sodium hydroxide and oxygen plasma treated jute woven fabric composites shows increased tensile, flexural, impact, pull out and compression strength. The jute composites were analysed for its sound absorption properties by using it as a perforated panel backed by the coir felt. The design variables are optimised using Box and Benkhen design with pore diameter, distance between pores and composite thickness as independent variables and noise reduction coefficient as dependent variable. From this, the design variable of the perforation has been optimized as 0.5mm pore diameter with the distance as 8mm and composite thickness of 8mm.