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(57) Abstract :
Abstract Herein, natural fiber (energy reeds and rice straw) reinforced with Polymeric Resins (PF) polymeric resin bio-composites are developed and reported in this study. The dimensions of energy reeds and rice straws used for this research were 0.5–1.66 mm and 0.1–3.55 mm, respectively. The hot-pressing technology was used for manufacturing the bio-composites. The proportions for mixing of rice straw/energy reed fibers in composite systems were 90/0, 54/36, 36/54, and 0/90 whereas remaining 10% were belong to PF resin. The nominal densities of the bio-composite panels were 680 kg/m3, however, the actual densities were 713.655, 725, 742.79, and 764.49 kg/m3. The main objective of this study is to develop hybrid bio-composites from different proportions of energy reeds and rice straw fibers using PF resin and to find the convenient ratio and materials for bio-composites production. The obtained results demonstrate that mechanical properties and stability against the moisture increase with the increase of energy reeds loading in the composite systems. The bio-composite developed from 100% energy reeds provided the higher mechanical properties compared to 100% rice straw. The thermal and morphological properties of the produced bio-composite materials were investigated and found significant. The thermomechanical properties of the composite materials increase with the increase in energy reed fiber loading in composite system. Furthermore, the coefficient of variation (R2) also demonstrates a positive attributions of energy reed fibers loading in composite systems. Moreover, the overall performances of the developed bio-composite panels demonstrate them as potential and novel candidates to the composite community in the coming times.

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