

Enhanced Removal of Dye pollutants from water, through Flax Based Non-Woven Composite Mats

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Pollutant dyes such as Methylene Blue (MB) are toxic, non-biodegradable and are known to have a strong affinity with water. Common industrial use of this dye means that copious volumes of MB are discharged into surface water on a regular basis. Current methods of dye removal involve harsh chemical treatments and commercial adsorbents that are costly, leading to restricted usage. We present a facile and industrially scalable method for the preparation of non-woven mat-based adsorbents fabricated from the indigenously grown pristine (untreated) flax fiber. The novel composite mats have been coupled with biopolymers for improved strength and stability. Kinetic studies on the comparative analysis of flax fiber based bio-composites with the commercially available cotton fibers has revealed superior adsorbent capabilities of the flax based non-wovens, by approximately three-fold. The objective of using this approach centers around the idea of using a simple and scalable fabrication technique based on a locally and economically sustainable materials. The flax non-wovens have the key edge over their cotton fiber counterparts in their fabrication process is free from harsh and tedious chemical treatments, making the full scale of the adsorbent development cycle economically sustainable, environmentally friendly and technically efficient.