

The Potential Use of Flavin Mononucleotide for Photoluminescent and Bioluminescent Textile

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Abstract : Flavin mononucleotide widely known as 'FMN' is a biobased resource derived from riboflavin. The isoalloxazine ring present in the FMN molecule attributes the photoluminescence phenomenon, whereas FMN molecule in the presence of bacterial luciferase enzyme and co-factors such as NADH, long chain aldehyde leads to bioluminescence reaction. In this study, the FMN molecule was treated on cellulosic textile using chromojet technique and the photoluminescence property was characterized using spectroscopy technique. Further, the FMN was used as a substrate along with enzymes and co-factors to treat the non-woven textile, and the bioluminescence property was explored using luminometer equipment. The investigation revealed photoluminescence property on cellulosic textile, and the emission peak was observed at a wavelength around 530 nm with an average corrected spectral intensity of 10×10^6 CPS/Microamps. In addition, the measurement of nonwoven textile using bioluminescence reaction system exhibited light intensity measured in the form of relative light units (RLU). The study enabled to explore the use of FMN as both photoluminescent and bioluminescent textile. Further investigation would require for stability study of the same to provide an eco-efficient approach to obtain luminescent textile.

Keywords : flavin mononucleotide, photoluminescence, bioluminescence, luminescent textile

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