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Innovations in Sustainable Textile Engineering: Eco-Friendly Fibers, Processes, and Practices

Dr. Sunil K. Agrawal
Training and Placement Officer
College of Engineering and Technology, Akola, Maharashtra, India

Abstract: *The textile industry is one of the largest contributors to global pollution, resource depletion, and waste generation. Sustainable textile engineering aims to mitigate these impacts through innovative use of eco-friendly fibers, green processing technologies, and circular economy models. This paper explores the development and use of biodegradable and regenerated fibers, low-impact dyeing and finishing processes, and waste-reducing manufacturing techniques. It reviews recent literature, industry trends, and case studies of sustainable practices adopted globally. The study concludes with recommendations for future research and industrial transformation toward a greener and more responsible textile ecosystem.*

Keywords: Sustainable textiles, eco-friendly fibers, green chemistry, circular economy, low-impact dyeing, textile engineering