Utility of Life Cycle Assessment (LCA) for Sustainable Textile Industry

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The textile industry is one of the most influential industries in the world, but one of the most polluting owing to the significant amount of emissions and effluents resulting from the consumption of energy, water and chemicals in considerable amounts. Therefore, it is important to evaluate the environmental impacts of the products and processes in the textile industry. Life cycle assessment (LCA) is a comprehensive and globally standardized approach for evaluating the environmental implications throughout all phases of a life cycle of a product or a process, as outlined by the ISO 14040 family of standard. It was reviewed how applications of LCA have been used for sustainable environmental performance in the textile industry, a majority of studies representing the system boundaries of "cradle to gate" and "gate to gate". The review included globally available published articles from 1999 to 2020 on LCAs of textile products: natural and synthetic, and textile processes: weaving/knitting and dyeing. The findings showed that LCAs of fabrics enable useful comparison of alternative materials and processing methods, highlight trade-offs between production systems, helps as a decision-making tool and ecolabelling, as well as informed consumer choice. The significant environmental impacts of textile products differ according to the materials of fabric, the technology used, and the geography. Although textile industry worldwide has been progressively using LCA since the year 2000, limited data availability and lack of published literature hinder the true utilities of LCA. A Life cycle assessment study could accurately provide a rationale for sustainable choices of products and processes in the textile industry, in contrast to the myths and general conceptions in the industry, which may or may not be accurate. Environmental Management Systems, Eco innovation, Design for Sustainability, and Circular Economy are some of the present day concepts that have led the textile industry to adopt LCA as a viable technique.

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