

Title: Life Cycle Assessment of Jeans Production Using Organic and Conventional Cotton:
Analiza življenjskega cikla izdelave kavbojk iz organskega in konvencionalnega bombaža

Author: Mst. Murshida Khatun

Abstract: Because of concerns about environmental impacts and the growing demand for denim jeans, the textile sector must implement innovative strategies to improve sustainability. The present study investigated the advantages of using organic cotton rather than conventional cotton. A life cycle assessment approach was used to investigate the environmental effects of a pair of jeans in four distinct scenarios due to the excessive use of natural resources in the manufacturing of cotton, which is a necessary raw material for textiles. The other possibilities were selected based on a product's type of cotton, manufacturing technique and geographical location. The ReCiPe midpoint (H) approach was used to analyse the environmental impact categories of fossil resource scarcity (FRS), terrestrial ecotoxicity (TE), terrestrial acidification (TA) and global warming (GW). Considering only raw materials, organic cotton has achieved remarkable improvements in four impact categories –FRS (-24.34%), GW (-19.83%), TA (-11.31%) and TE (-36.45%) – relative to conventional cotton. When considering the entire life cycle of denim jeans, life cycle assessment results indicated that Scenario 2 had the lowest environmental impacts. Compared to conventional cotton, however, organic cotton has less of an environmental impact throughout the cotton-growing phase. Moreover, the use of an air-jet loom and ring spinning uses in Scenarios 3 and 4 results in the consumption of more energy. Thus, the best result for reducing environmental impacts derives from the use of organic cotton with conventional weaving and open-end spinning. Using organic cotton as a raw material during the production process greatly improves the life cycle of a pair of jeans.

Keywords: Conventional cotton, Organic cotton, Life cycle assessment, Environmental impact

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