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## **Sustainability Assessment of Ethanol Production from Sugarcane**

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### **Abstract**

This work assesses the sustainability of ethanol produced from sugarcane. The environmental feasibility of a large-scale production is considered through a Life Cycle concept by using fossil fuel embodied energy analysis and emergy assessment. Results indicate that about 1.82 kg of topsoil is eroded, 18.4 liters of water is consumed and 1.52 m<sup>2</sup> of land are needed to produce 1 liter of ethanol from sugarcane. Also, 0.79 kg of CO<sub>2</sub> is released to atmosphere per liter of ethanol produced. The energy content of ethanol is 7.2 times greater than the fossil-based energy required to produce it. The transformity of ethanol is about the same of those calculated for fossil fuels existing in literature. The Renewability of ethanol is 31%, considered as a low performance; other emergy indices indicate high load on environmental. Sugarcane and ethanol production adopting large scale systems present low sustainability.

**Keywords:** *Emergy Analysis, Life Cycle Assessment, biofuels, ethanol.*

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