Waste to biodiesel: a preliminary assessment for Saudi Arabia

ABSTRACT

This study presents a preliminary assessment of biodiesel production from waste sources available in the Kingdom of Saudi Arabia (KSA) for energy generation and solution for waste disposal issues. A case study was developed under three different scenarios: (S1) KSA population only in 2017, (S2) KSA population and pilgrims in 2017, and (S3) KSA population and pilgrims by 2030 using the fat fraction of the municipal solid waste. It was estimated that S1, S2, and S3 scenarios could produce around 1.08, 1.10 and 1.41 million tons of biodiesel with the energy potential of 43423, 43949 and 56493 TJ respectively. Furthermore, annual savings of US $55.89, 56.56 and 72.71 million can be generated from landfill diversion of food waste and added to the country's economy. However, there are challenges in commercialization of waste to biodiesel facilities in KSA, including waste collection and separation, impurities, reactor design and biodiesel quality.

Keyword: Biodiesel; Waste sources; Fuel; Energy; Transesterification