Waste to biodiesel refinery a case study of Saudi Arabia.pdf

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Scope

The Renewable Energy Sources - Research and Business (RESRB) 2017 conference is designed as a platform for reporting, discussing, improving and disseminating recent developments in renewable energy science, technology and business. Participants from various organisations such as universities, institutes, NGOs, associations, industries etc. are invited. It is an international event with ambitions to share leading research expertise and facilitate business development and thus to be one of the most influential renewable energy knowledge transfer channels. The conference is a must for research groups at the cutting edge of renewable energy science, technology, policy and business development. Commercial business participants seeking innovations and expanding to new markets will be hosted. The conference will facilitate synergies between academia and commercial sectors. Delegates from enterprises may benefit from sponsoring, exhibiting and networking thus improve their business environment. RESRB 2017 is particularly focused on developed and developing countries applying green growth policies and plays the role in informing policymaking processes. The participation mode can be either in-person or virtual. Digital Proceedings will be made available to all participants including abstracts and contact details of all accepted contributions. Submitted manuscripts will be internally reviewed by RESRB international referees and review outcomes communicated to authors for facilitated publication in leading international journals and edited books.
Themes

The RESRB 2017 conference focuses on five key areas: (1) bioenergy, (2) wind, (3) solar, (4) hydro and their (5) business development. The themes include:

- Bioenergy
- Solar photovoltaics
- Wind
- Hydro
- Solar thermal
- Concentrated solar power
- Geothermal energy
- Wave, tide and other marine energies
- Biofuels
- Renewable heating and cooling
- Renewables in transport
- Renewables in buildings
- Agricultural and land use issues
- Biomass production
- Agronomy
- Biorefineries
- Renewables in industrial symbiosis
- Energy systems
- Road maps
- Hydrogen and fuel cells
- Desalination
- Software tools
- Environmental impact
- Life cycle assessment
- Decarbonisation and synergies with fossil fuels
- Sustainability
- Standards
- Infrastructure
- Materials
- Resources
- Power system, power electronics, smart grid
- Micro scale renewables
- Power grids, requirements, international connections
- Grid stability, power generation flexibility
- Electric vehicles
- Energy storage
- Renewables in developed, developing and underdeveloped countries
- Business models and strategies
- Planning
- Renewable energy policy
- Renewable energy economics
- Renewable energy business development
- Innovations, intellectual property rights
- Financing, project finance and management
- Accounting
- Venture capital, entrepreneurial finance, corporate finance
- Intellectual property, start-ups, licensing
- Merger and acquisitions, capital markets, outsourcing, consumer behaviour,
- Incentives, legislation
- Energy markets
- Risks and risk management
- Costs and revenues
• Legislative and ethical considerations for research, business and policy interactions
• Societal issues, consumer access, social benefits

• Organisations
• Other topics of critical importance for the development of renewable energy science, technology, policy and business
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Waste to biodiesel refinery: a case study of Saudi Arabia

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Abstract

Biodiesel is a promising liquid fuel that is mainly derived from triglycerides and is utilized in diesel engines directly or after blending with conventional gasoline. Triglycerides comprise fatty acid methyl esters (FAME), which are generated from plant or animal based sources. Biodiesel generated from vegetable oils is expensive than petroleum-based diesel and has concerns with food vs. fuels debate. Therefore, biodiesel from renewable sources such as non-food feedstocks has attained a considerable interest in last two decades. This paper aims to examine the biodiesel generation from the non-food feedstocks available in the Kingdom of Saudi Arabia (KSA) as a source of renewable energy and value-added products along with and a solution to current waste disposal problems. In KSA, non-food feedstocks such as animal fats, waste cooking oil (WCO), agricultural wastes, sewage sludge, and microalgae are promising sources for biodiesel production. These feedstocks are relatively cheap, easily available, portable, and renewable in nature. A case study of waste to biodiesel refinery is presented for KSA under three different scenarios, including (1) KSA population in 2017, (2) KSA population and pilgrims in 2017, and (3) KSA population and pilgrims by 2030. It was assessed that around 482, 488 and 627 MW of electricity on a continuous basis could be generated every year for scenarios 1, 2 and 3 respectively if using the fat fraction of municipal solid waste in waste to biodiesel refineries in KSA. Similarly, a total net savings of US$ 272, 275.2 and 353.9 million can be achieved from scenarios 1, 2 and 3 respectively. However, there are many challenges in commercializing the waste to biodiesel refinery in KSA such as collection of feedstocks, separation of lipids, products separation, soap formation, preserving products, and adequate regulations.

Keywords

biodiesel; waste to energy; non-food feedstocks; transesterification; catalyst