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# Conversion of bio-solids (scum) from tannery effluent treatment plant into biodiesel

Balasubramanian R. <sup>a</sup>, Anirbid Sircar <sup>a</sup>, Sivakumar P. <sup>a</sup>, and Ashokkumar V.<sup>b</sup>

<sup>a</sup>School of Petroleum Technology, Pandit Deendayal Petroleum University, Gandhinagar, India; <sup>b</sup>Department of Aeronautics and Astronautics, National Cheng Kung University, Tainan, Taiwan

## ABSTRACT

The search for a suitable low cost feedstock for the production of biodiesel has resulted in biodiesel being produced from bio-solids (scum) taken from the tannery effluent treatment facility. The effectively extracted oil was subjected to combined esterification and transesterification using an acid catalyst. The process was optimized for parameters like catalyst concentration, temperature, time, oil to methanol molar ratio and stirring rate. The result was the yield of 0.55 kg of biodiesel from 1 kg wet scum. The physicochemical properties of the produced biodiesel are in the acceptable range of fuel used in diesel engines. The paper also addresses the quality issues regarding minor components like heavy metals and aromatic contents.

## KEYWORDS

Biodiesel; esterification; optimization; scum; transesterification

## Introduction

Fuels derived from petroleum have been used as the major source of world's energy requirements in the last few decades. However, it is estimated that fossil oil will deplete in the near future. Future projections indicate that economics and energy needs will increase the focus on the production of biodiesel derived from non petroleum sources including biological waste and others (Hussain, Samad, and Janajreh 2016). There is the need to search for new sources for long-term supply of conventional hydrocarbon based diesel fuels and for preserving the global environment.

Biodiesel, at present, is more expensive than petro-diesel because it is mostly made from vegetable oil and hence its high cost is the major obstacle for its commercialization (Wu et al. 2014). The demand for biodiesel production cannot be satisfied with the available sources and so new, economical and easily available sources are to be identified.

The present study focuses on biodiesel production from the scum obtained from tannery treatment plant and the effectiveness of the raw material was evaluated on the basis of yield. Scum is a semisolid floating material collected from grease traps installed in tannery treatment plants. It is a combination of biological fat and oil products contaminated with soaps, mineral oil, greases and other materials. They are generally disposed of either by incineration, burial, composting or other digestion methods. These attempts are not entirely eco-friendly and economically viable. It has relatively low market value but is a very good source of biodiesel feedstock. Biodiesel production using the feedstock obtained from tannery treatment plant involves the optimization of various process parameters resulting in a maximum yield of biodiesel. The selected properties and chemical composition of the scum and its potential applications in biodiesel were evaluated.

**CONTACT** Sivakumar P.  [sivakumar.p@spt.pdpu.ac.in](mailto:sivakumar.p@spt.pdpu.ac.in)

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