

Turnip oil (*Raphanus sativus L.*) - non-edible resource for biodiesel production and their blending studies with ultra-low sulphur diesel (ULSD)

Shailesh N. Shah^{1,5}, Osvaldo K. Iha², Flávio CSC Alves², Brajendra K. Sharma³, Sevim Z. Erhan⁴ and Paulo A. Z. Suarez²

¹United States Department of Agriculture, USA

²Universidade de Brasília, Brazil

³University of Illinois-Urbana-Champaign, USA

⁴USDA, USA

⁵Maharaja Sayajirao University of Baroda, India

In present study, Turnip oil (TO; *Raphanus sativus L.*) found in central-west part of Brazil (Formosa, Goias) was investigated as non-edible resource for the biodiesel production. From Turnip oil seeds contain around 26 wt% oil. In an effort to assess important fuel properties of turnip oil-based biodiesel (TME), TO was subject to acid catalyzed pretreatment followed by transesterification. This TME was evaluated for low temperature properties such as, cloud point, pour point (PP), cold filter plugging point and fuel properties like kinematic viscosity acid value, oxidative stability and lubricity. As per biodiesel fuel standards such as ASTM D-6751 and EN-14214 a comparison of TME was made with soybean oil methyl esters (SME). HPLC, FTIR, and ¹H NMR analytical method were utilized to characterize TME. Except PP property, SME displays superior fuel properties compared to TME. TME was blended (20 and 5 %) with ultra-low sulphur diesel fuel (ULSD) and evaluated the abovementioned fuel properties. Same time it was also compared with similar set of blends of SME with ULSD as per ASTM D-975 and D-7467. In conclusion, B5 –TME showed better PP properties compared to neat ULSD as well as B5 – SME. Current studies also demonstrated that B5-TME and B-20 TME had acceptable fuel properties as per ASTM D-975 and ASTM D-7467. In summarization, Turnip oil has great potential as a non-edible feedstock for biodiesel production.

Biography

Shailesh N. Shah, Organic Chemist, graduated from the MS University of Baroda, India 1992. He pursued his postdoctoral from studies at Japan and received three Japanese Government Fellowships (Monbusho, ITIT and AIST). He also received two US Government fellowship (NSF and USDA) to pursue his post-doctoral fellowship at The university of Southern Mississippi (USM). He has published 32 Research Papers at the National and International peer reviewed journals and presented his work at the 37 National and International conferences. He has authored 1 US Patent and received numbers of awards for his contribution in the research field. He is editor for the International Journal of Materials Engineering and reviewer to High impact journals of RSC, UK and ACS, USA. He also worked at the world famous National Center for Agriculture Utilization Research (NCAUR), USDAARS, Peoria, IL, USA. His current research interest includes Bio-based materials for different application like Bio-Energy, Bi-Lubricant and Low VOC Coating.

shilshilp@hotmail.com