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Alternative fuels for marine applications: Behaviour of biomethanol and biodiesel on properties of marine diesel oil

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In order to replace the higher part of fossil fuels in marine diesel fuel by components from renewable sources, it is necessary to develop complex multi-component blends. However, an increase in the amount of each component could be critical for the properties of the fuel. A comparative analysis of the physical-chemical properties of methanol-biodiesel-diesel blends were performed, as well as results were compared with ISO 8217:2012 standard "Petroleum products - Fuels (class F) - Specifications of marine fuels" according to the IMO requirements for marine fuels. Moreover, empirical relationships among physical-chemical properties and blends of biomethanol-biodiesel-diesel were assessed by direct gradient analysis. It was inspected how the physical-chemical properties change along an ordination axis of detrended correspondence analysis using "vegan" package in R. Physical-chemical properties from the multivariate model were predicted by using two types of blends' data. The first one was based on the simulated ranges from the used data in calibration of the redundancy analysis, whereas the second one consisted of simulated ranges extrapolated up to 99% of both blends. It has been found that the blend of marine diesel fuel with 10% (volume basis) of methanol and 20% (volume basis) biodiesel fuel is the closes to the ISO 8217: 2017 standard.

Biography

Tatjana Paulauskiene is Senior Researcher and Associated Professor in the Department of Engineering at Klaipeda University, Lithuania. She graduated from the Department of Technological Processes of Klaipeda University and earned BSc and MS degrees in Chemical Engineering at the same University in 2002 and 2004, respectively. Her PhD was awarded at the Vilnius Gediminas Technical University (Lithuania) in 2008. Her current research interests are alternative fuels for marine applications, oil spills clean up and LNG cold energy utilization.

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