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Editorial

Clean Technologies 2020 Best Paper Awards

***Clean Technologies* Editorial Office**

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Clean Technologies (*Clean Technol.*) is instituting the Best Paper Awards to recognize outstanding papers published in the journal. We are now pleased to announce the winners of the "*Clean Technol*. 2020 Best Paper Awards".

Papers published in 2020 were preselected by the *Clean Technol.* Editorial Office on the basis of the number of citations and downloads from the website. The winners from the nominations were determined by the Editor-in-Chief, the Editorial Board together with the Editorial Office. The following two top-voted papers, in no particular order, have won the *Clean Technol.* 2020 Best Paper Awards:

1. One Review:

Lignocellulosic Biomass Mild Alkaline Fractionation and Resulting Extract Purification Processes: Conditions, Yields, and Purities

By Vincent Oriez, Jérôme Peydecastaing and Pierre-Yves Pontalier (Figure 1)

Clean Technol. **2020**, *2*(1), 91–115; https://doi.org/10.3390/cleantechnol2010007

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Synopsis of the paper by the authors:

Lignocellulose is the major renewable material available on Earth that can be used to produce fuels, materials, and chemicals. The fractionation of lignocellulose is a fundamental step in the valorization of its different components: cellulose, hemicelluloses, and lignin. Among the different fractionation processes, strong alkaline fractionation is one of the most applied since the paper industry has been using it for more than a century, and the mineral acid fractionation process is currently the most applied for the production of cellulosic ethanol. However, in the last decade, mild alkaline fractionation has been becoming increasingly widespread in the frame of cellulosic ethanol biorefineries. It leads to the solubilization of hemicelluloses and lignin at various extent depending on the conditions of the extraction, whereas the cellulose remains insoluble. Some studies showed that the saccharification and fermentation of the obtained cellulose into ethanol gave higher yields than the classic mineral acid fractionation process. In addition, contrary to the acid fractionation process, the mild alkaline fractionation process does not hydrolyze the sugar polymers, which can be of interest for high added-value applications. Lignocellulosic mild alkaline extracts contain mainly hemicelluloses, lignin oligomers, phenolic monomers, acetic acid, and inorganic salts. In order to optimize the economic efficiency of the biorefineries using a mild alkaline fractionation process, the purification of the alkaline extract to valorize its different components is of major importance. This review details the conditions used for the mild alkaline fractionation process and the purification techniques that have been used on the obtained hydrolysates, with a focus on the yields and purities of the different compounds.

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Figure 1. Vincent Oriez and Pierre-Yves Pontalier (from **left** to **right**).

2. One Research Article:

Environmental and Economic Evaluation of Fuel Choices for Short Sea Shipping
By Kirsi Spoof-Tuomi and Seppo Niemi (Figure 2)
Clean Technol. **2020**, *2*(1), 34–52; https://doi.org/10.3390/cleantechnol2010004
Available online: https://doi.org/10.3390/cleantechnol2010004
Synopsis of the paper by the authors:

Climate change is one of the greatest environmental, economic, and humanitarian challenges facing our society, and there is a global consensus that significant reductions in greenhouse gas (GHG) emissions are needed to avoid the worst impacts of global warming.

Concerns about climate change and regulations tightening emissions are driving interest in alternative fuels also in the maritime sector. The primary purpose of the present study was to evaluate the emissions performance of fuel choices for short-sea shipping. The fuels investigated were liquefied natural gas (LNG), liquefied biogas (LBG), and conventional marine diesel oil (MDO) combined with selective catalytic reduction (SCR). The study used a Ro-Ro/passenger vessel equipped with a dual-fuel engine in the Baltic Sea ECA as a case ship.

To assess the global warming potential of the fuels, the life cycle approach was used. In addition, the study evaluated the local environmental impacts of combustion of these fuels, which is of particular importance for short sea shipping operations near coasts and populated areas. The two gaseous fuels had clear advantages over the MDO + SCR combination in terms of local environmental impacts. However, the use of LNG as marine fuel achieved no significant CO_2-equivalent reduction, thus making little progress toward the International Maritime Organization's vision of decarbonizing shipping. Major life cycle GHG emission benefits were identified only by replacing fossil fuels with LBG.

Furthermore, the study made an economic analysis for operating on LNG, LBG, and MDO + SCR, thus addressing the need for an economic evaluation of LBG as a marine fuel, so far lacking in the literature. It was found that without taxation or subsidies, LBG may find it difficult to compete with the prices of fossil fuels. Moreover, the study assessed current and future prospects of fuel availability, which is of particular relevance to LBG. It was concluded that the greatest challenge facing LBG, apart from the price, is fuel availability in the volumes needed for shipping. However, the adoption of LBG on the market is also possible by blending it with fossil LNG. LNG thus provides a bridge technology to lower carbon shipping.

By providing a holistic view of the environmental impacts from local to global impacts, economic aspects, and prospects of fuel availability, the study provides important information for ship-owners, policymakers, and local authorities to support and promote the transition to more sustainable energy sources in short-sea shipping.

Figure 2. Kirsi Spoof-Tuomi and Seppo Niemi (from **left** to **right**).

These two papers have surely been valuable contributions to *Clean Technol*. We warmly congratulate both teams on their accomplishments and wish them continued success.

Clean Technol. 2020 Best Paper Awards Committee,
Clean Technol. Editorial Board

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