

Review Summary:

In general, there is extensive discussion regarding different methods of processing biomass and waste such as pyrolysis, but limited discussion regarding the specifics of the bovine fat HTL decisions. For example, 330 deg Celsius temperature was utilized with only references that others had done so with success. At the narrative continues, there is mention of the miscibility of bovine fat and water requiring 320 deg C, but there is no mention as to the need for this in HTL. Further, the high level of solid byproduct is put into question due to these high temperatures. Additional discussion regarding decision criteria would be appropriate for understanding future researcher's next tasks.

The addition of economics of energy required for HTL and marine fuel application is beneficial. The moisture content of the base feedstock along with post HTL, 1st centrifuge, and second centrifuge attempt would greatly assist the author's claims. The claim that mechanical centrifuge vs solvent extraction along with economics of water extraction from the bio-oil and solid residual are critical to economic success.

Line 224

There seems to be too many references that are not applicable to the study of bovine fat HTL.

Line 260

Focus of this paper is on low-grade Marine fuel. Will denitrification be required for the paper's intended low grade marine fuel or biodiesel? There is little regulation regarding nitrogen content and especially not for residual fuels. As capital investment needs to be future proof for economic viability, the lack of nitrogen and especially sulfur is key.

Line 289

The addition of an initial economic analysis is beneficial but would need to be complete for it to be useful. Economic analysis regarding the amount of water and removal cost analysis. As the biochar will need to be dried for combustion the use of the solid residue/biochar moisture content will also be critical to the analysis.

Line 342

Elaboration on why it took one hour of 4000 rpm centrifugation is needed. Is this due to the non-polar dielectric solvent constant (over 300 deg Celsius) success in attaining thorough miscibility of tallow? Is there concern that HTL success due to such thorough miscibility will require solvent extraction after the HTL process? If this is the case, future research would benefit from this being stated. Have you conducted a literature review of water removal of miscible oil/water mixtures?

Stirring with high agitation levels, while remaining under 300 degrees Celsius, would initially seem to have been better. Further discussion regarding the advantages and disadvantages would be beneficial. What was the moisture content post HTL process, first centrifuge attempt, and final centrifuge attempt? In summary, how can it be proclaimed that solvent extraction is not required when the moisture is stated to be simply too high.

Line 433

Separated bovine fat was highlighted as a new feedstock. Is there a reason that lower temperatures were not a part of the study for that reason alone?

Line 452

It was stated that there was limited gasification, but with the high temperatures and amount of solid residue it would seem nearly impossible to not have significant gasification.

Line 477

Is the low 28% conversion to bio-oil expected? The increase of solid load to 75% is certainly beneficial and would be even more so if the oil yield content is high. The high solid residual content will require 2x amount of processing compared to ABP. Beneficial if biochar is a desired product. The high moisture content of a HTL processed biochar would also require drying prior to combustion to support the HTL input.

Line 508

No oil being extracted at 25% solid loading would seem to further support that the HTL processing temperature of 330 was too high or that the glycerol was too dispersed. Was the solid residual biochar?

Line 577

The determination that the process does not require additional energy, reduces waste costs, and fulfills the demand for carbon neutral marine fuel is noteworthy.

Line 653

It was stated that mechanical centrifuge was the lower cost method to remove moisture content. In contradiction, it is stated here that the resultant bio-oil is insufficient for even low-grade marine fuel. Will the moisture removal require solvents?