Development of a surrogate mixture for
Algal-based hydrotreated renewable diesel
Supporting Information

Dianne J. Luning Prak^{1,*}

Jim S. Cowart²

Leonald J. Hamilton²

David T. Hoang¹

Eva K. Brown¹

Paul C. Trulove¹

1) Chemistry Department
U.S. Naval Academy
572 M Holloway Road
Annapolis, MD, 21402

2) Mechanical Engineering Department
U.S. Naval Academy
590 Holloway Rd
Annapolis, MD, 21402

[*corresponding author](#)

prak@usna.edu

Tel: 410-293-6339

Fax: 410-293-2218

Given in Table S1 and S2 below are additional physical property data for the algal HRD and the surrogate mixtures. The original 4-component alkane mixture contained n-pentadecane, n-hexadecane, n-heptadecane, and n-octadecane.

Table S1. Density Measurements for the Fuels and fuel surrogates

Fuel	5 th component	Density (g/mL) ^a				
		20.00 °C	40.00 °C	60.00 °C	80.00 °C	100.00 °C
Original 4-alkane mixture		0.7768	0.7644	0.7506	0.7369	0.7226
Surrogate 1	Isooctane	0.7757	0.7618	0.7480	0.7341	0.7204
Surrogate 1A	Isooctane	0.7752	0.7607	0.7454	0.7274	0.7200
Surrogate 2	2-methyl octane	0.7714	0.7589	0.7451	0.7311	0.7166
Algal HRD		0.7715	0.7578	0.7435	0.7298	0.7152
Surrogate 4	Isododecane	0.7684	0.7546	0.7407	0.7266	0.7171
Surrogate 3	2-methyl nonane	0.7628	0.7500	0.7358	0.7218	0.7069

(a) The standard deviation on duplicate measurements of density is 0.0001 g/mL or less

Table S2. Kinematic Viscosity Measurements for the Fuels and fuel surrogates^a

Fuel	5 th component	Kinematic Viscosity (mm ² /s)				
		20.00 °C (293.15K)	40.00 °C (313.15K)	60.00 °C (333.15K)	80.00 °C (353.15K)	100.00 °C (373.15K)
Original 4-alkane mixture		5.08	3.23	2.11	1.66	1.28
Surrogate 1	isooctane	4.84	3.13	2.21	1.65	1.29
Surrogate 1A	Isooctane	4.82	3.12	2.21	1.66	1.27
Surrogate 2	2-methyl octane	4.18	2.76	1.96	1.48	1.15
Surrogate 4	Isododecane	3.57	2.37± 0.04	1.76	1.34	1.04
Algal HRD		3.44	2.30	1.65	1.26	0.99
Surrogate 3	2-methyl nonane	3.14	2.15	1.57	1.20	0.95

(a) The standard deviation on viscosity measurements is 0.01 mm²/s or less unless otherwise indicated.