

Supplementary material

Pulsed Electric Field Processing as an Alternative to Warm Water Treatment of *Saccharina latissima*

in Journal of Applied Phycology

Randi Sund ^{a,b}, Susan Løvstad Holdt ^b, Claus Heiner Bang-Berthelsen ^b,
Pierrick Stévant ^c, Jens J. Sloth ^b, Dagbjørn Skipnes ^a

^a Nofima—Norwegian Institute of Food, Fisheries and Aquaculture Research, Department of Process Technology, Richard Johnsens Gate 4, 4021 Stavanger, Norway

^b National Food Institute, Technical University of Denmark, Henrik Dams Alle B202, 2800 Kgs. Lyngby, Denmark

^c Møreforskning AS, PO Box 5075, 6021, Ålesund, Norway

Corresponding author: Dagbjørn Skipnes - Dagbjorn.Skipnes@Nofima.no

Table S1 Total amino acid concentration (mg g⁻¹ DW) and essential amino acid concentration (% of total amino acids) of the unprocessed, pulsed electric field (PEF) processed and warm water treated (WWT) *Saccharina latissima*. Analysed on freeze-dried material. Values are listed with standard deviation, n=3. Letters in superscript indicate statistically significant differences within rows.

	Unprocessed	PEF 1	PEF 2	PEF 3	WWT
Essential amino acids					
Phe	0.74±0.05 ^c	1.1±0.1 ^a	0.97±0.03 ^{ab}	0.96±0.08 ^b	1.0±0.0 ^{ab}
Leu	1.3±0.1 ^b	2.2±0.2 ^a	1.9±0.1 ^a	1.8±0.2 ^a	1.8±0.1 ^a
Ile	1.2±0.1 ^b	1.7±0.2 ^a	1.5±0.1 ^a	1.5±0.1 ^a	1.5±0.1 ^a
Met	0.96±0.04 ^a	1.4±0.7 ^a	1.5±0.1 ^a	1.3±0.2 ^a	1.2±0.0 ^a
Val	3.9±0.2 ^c	6.5±0.5 ^a	5.5±0.5 ^{ab}	5.2±0.7 ^b	5.1±0.2 ^b
Thr	3.4±0.2 ^b	5.7±0.6 ^a	4.8±0.2 ^a	4.8±0.6 ^a	4.5±0.3 ^{ab}
His	1.7±0.1 ^b	2.8±0.3 ^a	2.6±0.2 ^a	2.4±0.3 ^{ab}	2.7±0.4 ^a
Lys	2.9±0.1 ^b	5.0±0.8 ^{ab}	4.2±0.2 ^{ab}	5.4±1.7 ^a	3.8±0.3 ^{ab}
Non-essential amino acids					
Pro	5.4±0.3 ^c	8.9±0.8 ^a	7.5±0.5 ^{ab}	7.2±1.0 ^b	7.2±0.2 ^b
Tyr	1.3±0.1 ^b	2.2±0.3 ^a	1.9±0.1 ^{ab}	1.7±0.3 ^{ab}	1.7±0.1 ^{ab}
Ala	8.5±0.3 ^c	12±1 ^a	11±1 ^{ab}	9.8±0.8 ^{bc}	9.2±0.4 ^{bc}
Ser	2.8±0.1 ^b	4.3±0.2 ^a	3.6±0.3 ^a	3.5±0.5 ^{ab}	3.5±0.1 ^{ab}
Gly	6.2±0.5 ^c	10±1 ^a	8.5±0.6 ^{ab}	7.9±1.1 ^{bc}	8.3±0.4 ^{ab}
Arg	3.1±0.3 ^b	5.3±1.4 ^a	4.4±0.3 ^{ab}	4.4±0.8 ^{ab}	4.2±0.1 ^{ab}
Glu	15±0 ^c	21±2 ^a	19±1 ^{ab}	17±2 ^{bc}	16±0 ^{bc}
C-C	2.5±2.2 ^a	3.2±2.8 ^a	4.9±1.8 ^a	3.9±0.1 ^a	4.6±0.9 ^a
Asp	8.7±0.8 ^b	14±1 ^a	12±1 ^a	12±2 ^{ab}	12±1 ^{ab}
EAA/TAA	23±1 ^b	24±1 ^{ab}	24±1 ^{ab}	26±2 ^a	25±1 ^{ab}

Table S2 Free amino acid content (mg g⁻¹ DW) of the unprocessed, pulsed electric field treated (PEF) and warm water treated (WWT) *Saccharina latissima*, as well as the water used for PEF processing and WWT. Analysed on freeze-dried material. Values are listed with standard deviation, n=3. Letters in superscript indicate statistically significant differences within rows.

	Unprocessed	PEF 1	PEF 2	PEF 3	WWT
Phe	0.12±0.00 ^a	0.12±0.01 ^a	0.12±0.00 ^a	0.12±0.01 ^a	0.10±0.00 ^b
Leu	0.031±0.004 ^a	0.028±0.001 ^{ab}	0.027±0.001 ^{ab}	0.032±0.002 ^a	0.025±0.002 ^b
Ile	0.032±0.002 ^a	0.028±0.002 ^{ab}	0.029±0.002 ^{ab}	0.030±0.003 ^{ab}	0.025±0.001 ^b
Met	0.24±0.00 ^a	0.094±0.14 ^a	0.25±0.00 ^a	0.25±0.00 ^a	0.25±0.01 ^a
Val	0.15±0.00 ^a	0.12±0.01 ^{ab}	0.12±0.00 ^{ab}	0.13±0.02 ^{ab}	0.10±0.01 ^b
Thr	0.32±0.07 ^a	0.35±0.18 ^a	0.29±0.00 ^a	0.48±0.05 ^a	0.40±0.04 ^a
His	0.13±0.01 ^a	0.13±0.01 ^a	0.13±0.01 ^a	0.13±0.00 ^a	0.12±0.00 ^a
Lys	0.40±0.01 ^a	0.34±0.10 ^a	0.42±0.03 ^a	0.41±0.02 ^a	0.41±0.01 ^a
Pro	0.44±0.02 ^a	0.40±0.04 ^{ab}	0.39±0.03 ^{ab}	0.31±0.05 ^b	0.31±0.02 ^b
Tyr	0.052±0.003 ^{ab}	0.050±0.001 ^{ab}	0.058±0.007 ^a	0.051±0.002 ^{ab}	0.046±0.002 ^b
Ala	3.4±0.1 ^a	3.2±0.2 ^a	3.4±0.1 ^a	3.0±0.5 ^{ab}	2.4±0.1 ^b
Ser	0.026±0.023 ^a	0.062±0.035 ^a	0.0082±0.0141 ^a	0.022±0.021 ^a	0.016±0.016 ^a
Gly	0.15±0.07 ^a	0.10±0.07 ^a	0.22±0.04 ^a	0.18±0.11 ^a	0.12±0.05 ^a
Arg	0.038±0.003 ^{ab}	0.044±0.001 ^a	0.040±0.001 ^a	0.043±0.005 ^a	0.033±0.000 ^b
Glu	0.95±0.03 ^a	0.93±0.11 ^a	0.83±0.05 ^{ab}	0.67±0.09 ^b	0.65±0.02 ^b
C-C	0.69±0.14 ^a	0.21±0.36 ^a	0.75±0.24 ^a	0.48±0.42 ^a	0.45±0.41 ^a
Asp	0.38±0.02 ^c	0.58±0.06 ^a	0.49±0.07 ^{ab}	0.20±0.01 ^d	0.38±0.01 ^{bc}
Processing water					
Phe		0.28±0.01 ^a	0.29±0.01 ^a	0.27±0.04 ^a	0.26±0.01 ^a
Leu		0.048±0.003 ^a	0.049±0.003 ^a	0.060±0.008 ^a	0.054±0.002 ^a
Ile		0.055±0.002 ^a	0.060±0.004 ^a	0.064±0.012 ^a	0.063±0.004 ^a
Met		0.48±0.01 ^a	0.52±0.04 ^a	0.51±0.05 ^a	0.48±0.01 ^a
Val		0.25±0.01 ^a	0.27±0.03 ^a	0.29±0.05 ^a	0.29±0.02 ^a
Thr		0.59±0.03 ^a	0.62±0.05 ^a	0.90±0.40 ^a	0.74±0.28 ^a
His		0.47±0.05 ^a	0.52±0.06 ^a	0.56±0.11 ^a	0.51±0.02 ^a
Lys		0.77±0.02 ^a	0.84±0.11 ^a	0.83±0.12 ^a	0.78±0.02 ^a
Pro		0.88±0.02 ^a	0.86±0.09 ^a	0.76±0.14 ^a	0.87±0.04 ^a
Tyr		0.10±0.01 ^a	0.11±0.00 ^a	0.10±0.01 ^a	0.10±0.01 ^a
Ala		7.7±0.3 ^a	7.7±0.5 ^a	7.5±1.3 ^a	7.6±0.9 ^a
Ser		0.041±0.036 ^a	0.067±0.037 ^a	0.025±0.032 ^a	0.063±0.039 ^a
Gly		0.40±0.13 ^a	0.36±0.23 ^a	0.33±0.16 ^a	0.28±0.18 ^a
Arg		0.060±0.003 ^a	0.064±0.003 ^a	0.073±0.011 ^a	0.067±0.003 ^a
Glu		0.83±0.12 ^b	0.70±0.16 ^b	1.2±0.3 ^{ab}	1.6±0.1 ^a
C-C		0.78±0.27 ^a	1.1±0.1 ^a	1.1±0.1 ^a	0.53±0.54 ^a
Asp		1.7±0.1 ^a	1.3±0.2 ^b	0.47±0.04 ^c	1.2±0.1 ^b