

Supplementary Information

Biodiesel via in-situ Wet Microalgae Biotransformation: Zwitter-Type Ionic Liquid supported Extraction and Transesterification

Gerald Bauer, Serena Lima, Jean Chenevard, Marc Sugnaux, Fabian Fischer*

The Supplementary Information file contains the following:

Figures: 1

Tables: 3

Total pages: 5

Including:

Raw data corresponding to Table 1,2 and 3 (main manuscript).

Photos of *C. zoofingiensis* after cultivation in the flat panel photobioreactor, LED shaker, after biotransformation (blank reaction), and after biotransformation with Oct-PrSO₃.

Institute of Life Technologies, HES-SO Valais, University of Applied Sciences Western Switzerland, Route du Rawyl 64, CH-1950 Sion, Switzerland.

*Corresponding author:

fabian.fischer@hevs.ch; Tel:+41(0)27 606 86 58, Fax: +41(0)27 606 86 15.

General Remarks to Tables S1-S2:

The obtained yields after biotransformation and work-up are depicted in the column “uncorrected”. In order to eliminate the manipulation error during the work-up and isolation of the products, the obtained conversions were corrected to a 100% conversion (values are depicted in the column “corrected”)

Table S1: Raw data corresponding to Table 1 (main manuscript).

Entry	Biodiesel uncorrected [%]	Biodiesel corrected [%]	Biodiesel average [%]	Rest Oil uncorrected [%]	Rest Oil corrected [%]	Rest Oil average [%]	free FA uncorrected [%]	free FA corrected [%]	free FA average [%]
1	21%	21%	25±3%	63%	64%	61 ±3%	14%	15%	14±1%
	26%	28%		54%	58%		13%	14%	
2	14%	14%	18±4%	83%	86%	83±4%	0%	0%	0%
	6%	21%		23%	79%		0%	0%	
3	6%	6%	8±2%	92%	94%	92±2%	0%	0%	0%
	9%	10%		83%	90%		0%	0%	
4	60%	61%	62±1%	38%	39%	38±1%	0%	0%	0%
	59%	63%		35%	37%		0%	0%	

Table S2: Raw data corresponding to Table 2 (main manuscript).

Entry	Biodiesel uncorrected [%]	Biodiesel corrected [%]	Biodiesel average [%]	Rest Oil uncorrected [%]	Rest Oil corrected [%]	Rest Oil average [%]	free FA uncorrected [%]	free FA corrected [%]	free FA average [%]
1	21%	21%	25±3%	63%	64%	61±2%	14%	15%	14±1%
	26%	28%		54%	58%		13%	14%	
2	13%	20%	20%	51%	80%	80%	0%	0%	0%
3	64%	65%	62±5%	34%	35%	39±5%	0%	0%	0%
	58%	58%		42%	42%		0%	0%	
4	68%	70%	64±6%	30%	30%	36±6%	0%	0%	0%
	60%	58%		44%	42%		0%	0%	
5	60%	61%	62±1%	38%	39%	38±1%	0%	0%	0%
	58%	63%		35%	37%		0%	0%	
6	57%	58%	55±3%	42%	42%	45±3%	0%	0%	0%
	56%	53%		49%	47%		0%	0%	

Table S3: Raw data corresponding to Table 3 (main manuscript).

Entry	Extracted Oil [%]		Yield Biodiesel (based on total Oil) [%]		Yield Biodiesel (based on extracted Oil) [%]		free FA (based on extracted Oil) [%]	
1	69%	75±6%	11%	8±37%	15%	10±5%	20%	17±3%
	75%		6%		9%		14.4%	
	81%		6%		7%		18%	
2	69%	70±2%	5%	5±1%	7%	8±1%	0%	0%
	68%		5%		8%		0%	
	71%		6%		8%		0%	
3	78%	68±11%	6%	4±1%	7%	6±1%	0%	0%
	52%		3%		6%		0%	
	71%		4%		6%		0%	
	71%		4%		6%		0%	
4	55%	60±10%	10%	10±1%	18%	16±2%	0%	0%
	55%		9%		17%		0%	
	72%		10%		14%		0%	

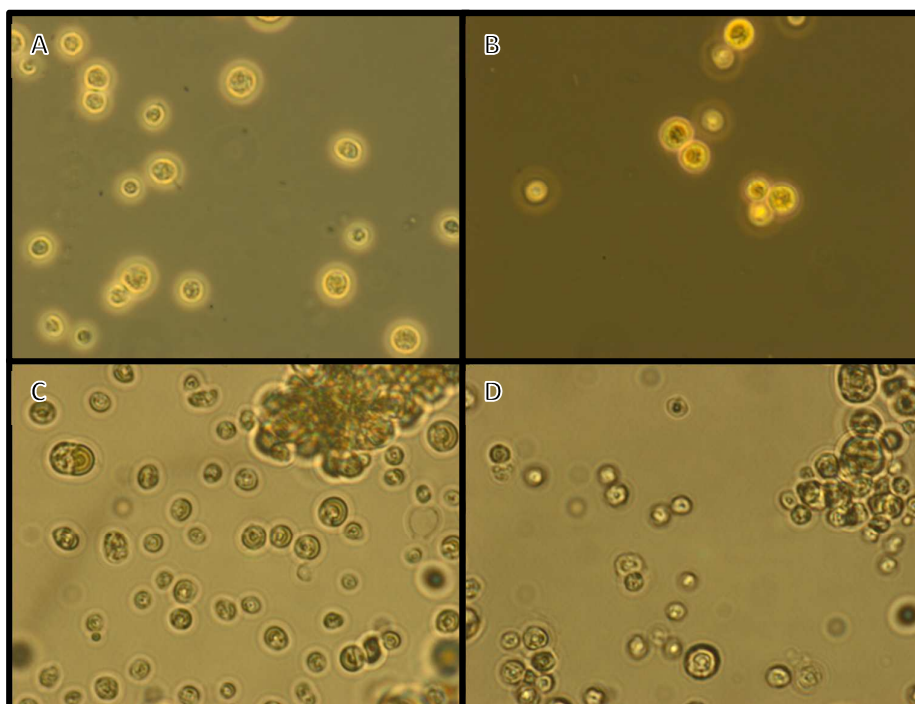


Figure S1: Microscopic images of microalgae from autotroph cultivations before and after lipase catalysis. (A) *C. zofingiensis* after cultivation in the flat panel photobioreactor (Labfors 5 Lux, Infors), (B) *C. zofingiensis* after cultivation in the LED shaker (Lab-Therm LT-XC, Kuhner), (C) *C. zofingiensis* after biotransformation (blank reaction; Table 3, Entry 1), (D) *C. zofingiensis* after biotransformation with Oct-PrSO₃ (Table 3, Entry 4)