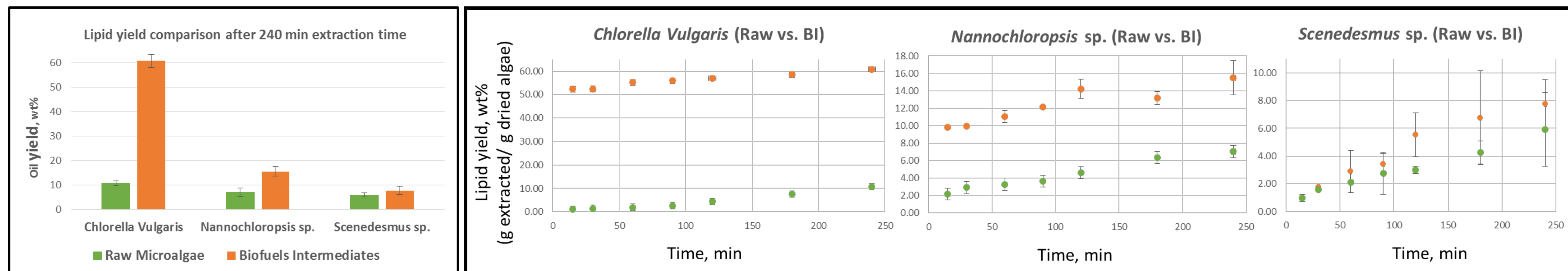
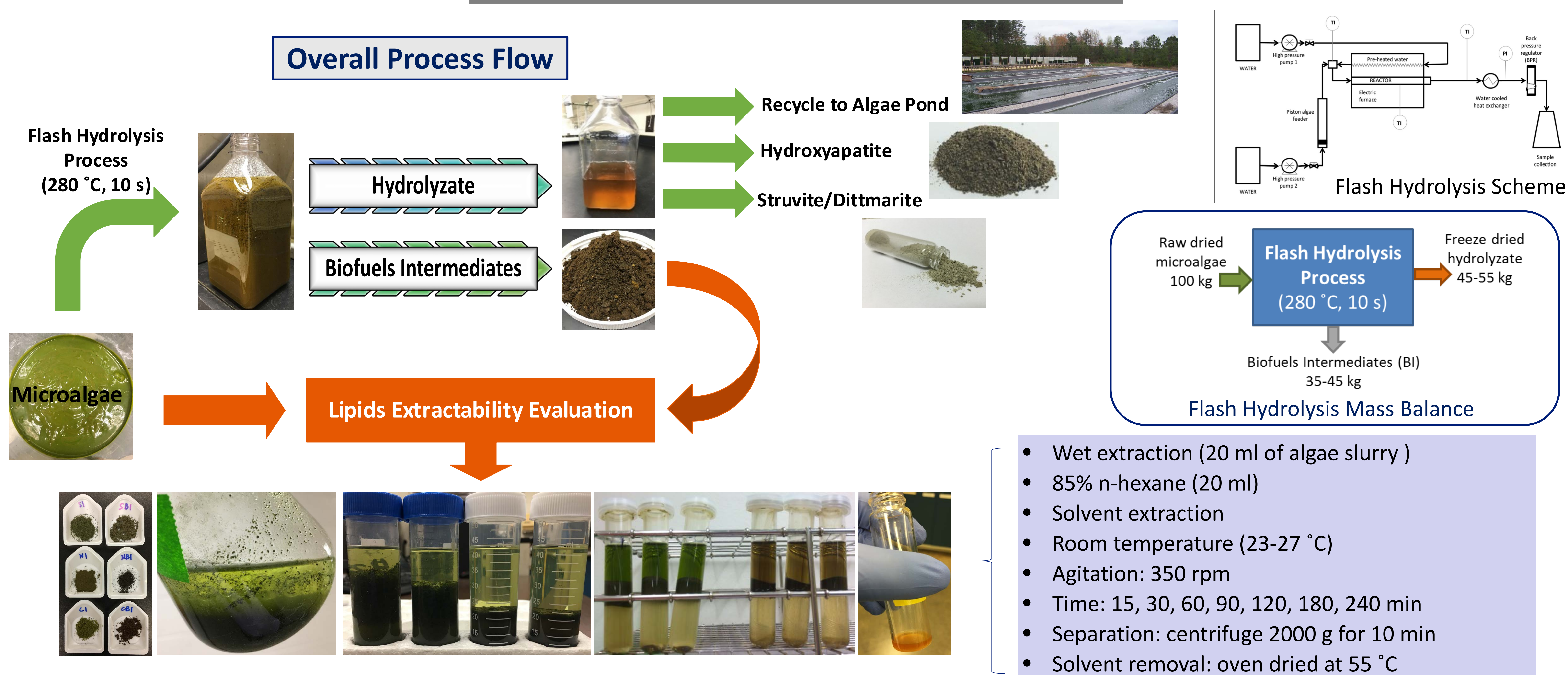


## Introduction

Microalgae have been in the forefront of feedstock for liquid transportation fuels. However, there are several economic challenges that decelerate the commercialization of the algal fuels production. One such economic and environmental challenge is the lipid extraction stage. In this study, Flash Hydrolysis (FH) was performed on three algal species (*Scenedesmus* sp., *Nannochloropsis* sp., and *Chlorella vulgaris*) at 280 °C and 10 s of residence time. More than 90 wt% of the total lipid content of the initial microalgae was recovered as energy rich macro-molecules (biofuels intermediates, BI). Lipid extractability as well as lipid profile analyses were conducted and compared on both untreated microalgae and its biofuels intermediates.

## Methods, Materials, and Results



	Total FAME (w/w)	SD	C16:0*	C16:1 n11	C16:1 n9	C16:1 n7*	C16 (unknown)	C16:2	C16:3	C16:4	C18:0*	C18:1 n9*	C18:1 n7*	C18:2 n6*	C18:3 n3*	C20:0*	C20:3 n6*	C20:4 n6*	C20:5 n3*	Sat.	Unsat.	Total
Nannochloropsis sp. - raw	10.9	0.2	15.8	2	0.1	22.6	2.5	0.5	0.3	0	0.2	3.2	0.4	2.3	0.1	0	1.4	6.1	38.1	16	79.6	95.6
Nannochloropsis sp. - BI	12.9	0.5	29.9	2	0.2	36.3	3.6	0.4	0.7	0	0.5	5.2	0.7	1.8	0.1	0	0.7	1.9	9.1	30.4	62.7	93.1
Scenedesmus sp. - raw	5.4	0.1	24.4	3.6	1.8	1.3	6.4	3	10.2	1.5	2.2	9.4	1.2	7.9	22	0.6	0	0	0	27.2	68.3	95.5
Scenedesmus sp. - BI	7.6	0.1	38.3	3.5	2.5	1.6	7.4	1.9	5.4	0.6	3.6	12.6	1.6	3.9	6.8	1.1	0	0	0	43	47.8	90.8
Chlorella Vulgaris - raw	28.3	0.1	24.4	0.7	2.3	0	1.4	2.4	6	2	1.4	22.8	0.8	20	14	0	0	0	0	25.8	72.4	98.2
Chlorella Vulgaris - BI	62.8	0	25.7	0.6	2.4	0	1.5	2.3	5.4	1.7	1.5	23.8	0.8	19.8	12.4	0	0	0	0	27.2	70.7	97.9

## Conclusions

The results of this study demonstrated that flash hydrolysis process has increased lipid extractability. For all 3 algae species, lipid yields are much higher in the BI than the raw/untreated algae. FH had tremendous effect on the lipids extractability of *Chlorella vulgaris* by approximately, 600 wt% increase in the lipid yields. In addition, more than 86 wt% of the lipids are extracted only after 15 min of the extraction process. This amount was 5 times higher than the lipids yield of untreated algae after 4 h extraction time. Comparison of FAME profiles also showed the FH process has almost doubled the saturated fatty acids in the FAME composition.

## Acknowledgements

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## References

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