Ensiling kelps for downstream biochemical extraction.

Priya Pollard [1,2*], Julie Maguire [1] and Joseph Sweeney [2]

[1] Bantry Marine Research Station, Gearhies, Bantry, Co. Cork, Ireland
[2] University College Dublin, School of Biosystems Engineering, UCD Belfield, Dublin 4, Ireland

Why Make Silage From Seaweed?

In conventional seaweed production, seaweed is preserved by drying which is costly and is the largest GHG emitter within the process. In this study, ensiling is being proposed as an alternative preservation technique that could reduce costs and GHG emissions, respectively.

Objectives

- Reduction of biomass pH via microbial production of lactic acid.
- Ensiling seaweed with minimum acetic acid and maximum lactic acid production, while preserving mannitol content.

Methodology

Two aquacultured kelp species

Laminaria digitata *Alaria esculenta*

Size reduction

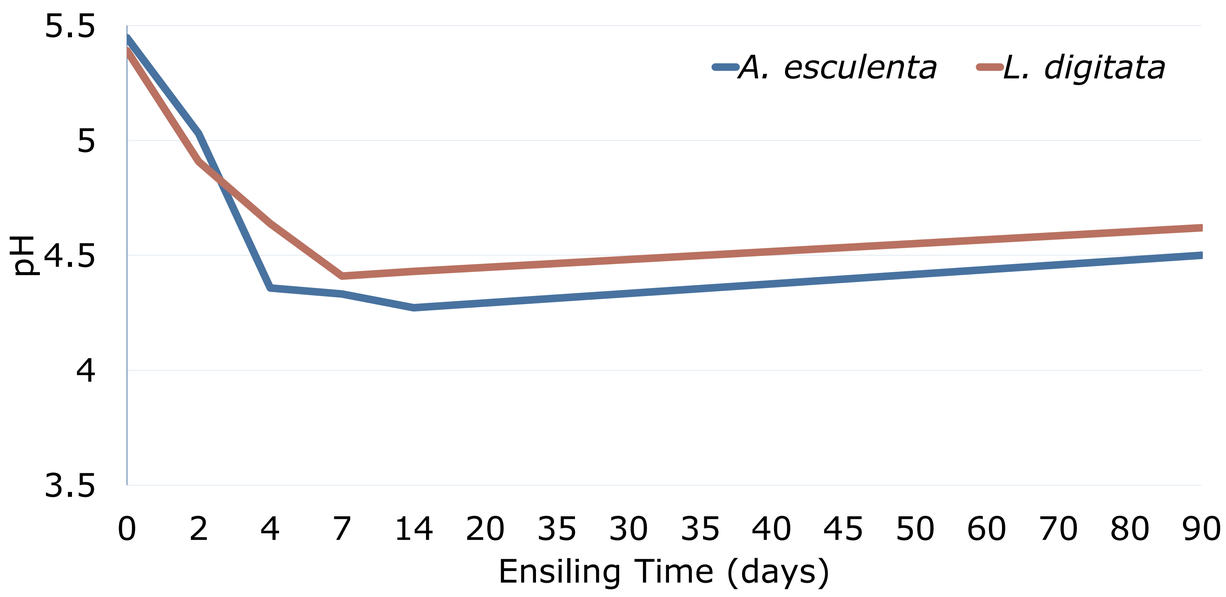
Homogenisation with stimulatory inoculant and inhibitory acid

Liquid Fraction - Leachate

Compression and storage

Solid fraction - Silage

Results



pH changes of A. *esculenta* and L. *digitata* over 90 days of ensiling.

Table 1: Mannitol, Lactic acid and Acetic values of *L. digitata* and *A. esculenta* silage after 90 days of ensiling.

	Previous experiment (Herrmann et al., 2015)	My Experimental Results	
g/Kg	*L. digitata*	*L. digitata*	*A. esculenta*
Mannitol	1.236±0.895	6.846±2.295	0.100±0.056
Total Lactic Acid	0.306±6.000	14.172±0.502	0.233±0.332
Acetic Acid	0.072±1.71	0.936±0.253	8.761±7.259

Conclusions

L. digitata was successfully ensiled with higher mannitol and lactic acid values than has previously been reported (Herrmann et al., 2015).

No previous results are available for ensiling *A. esculenta,* however these results show that it is possible.

Mannitol and Total lactic acid of *A. esculenta* were lower than *L.* digitata

References

Herrmann, C., FitzGerald, J., O'Shea, R., Xia, A., O'Kiely, P., & Murphy, J. (2015). Ensiling of seaweed for a seaweed biofuel industry. *Bioresource Technology*, *196*, 301-313. doi: 10.1016/j.biortech.2015.07.098

Acknowledgement

The authors gratefully acknowledge funding from European Union's Horizon 2020 Research and Innovation programme under the Marie Skłodowska- Curie grant agreement No. 860477 'AgRefine'.

*Corresponding author
@PriyaPollard
email: ppollard@bmrs.ie