BIM Ireland's Seafood Development Agency

CAL Ltd

Seaweed Processing Study

Tabulated Data

Report Number: W22911B

Ireland's European Structural and Investment Funds Programmes 2014-2020
Co-funded by the Irish Government and the European Union

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

www.cal.ie info@cal.ie

CAL Ltd

Hudson Road
Sandycove
Co. Dublin
Ireland

Tel: Dublin + 353 1 236 0755
Tel: Dublin + 353 1 236 0756
Fax: Dublin + 353 1 236 0761

VAT No IE 6324655L

Ms. Lucy Watson. MA., MBA., MSc.,
Aquaculture Technical Specialist,
Aquaculture Development Division,
Bord Iascaigh Mhara, (BIM),
Irish Sea Fisheries Board,
Crofton Road,
Dun Laoghaire, Co. Dublin.

Chemical Analysis Laboratories Ltd Draft Confidential Report No. W22911B

Report Number	W22911B
Invoice Number	22911
Laboratory Number(s)	55480
Your Order Number	3001305817
Number of Samples	
Sample Description	Japanese Seaweed Processing Study / Tabulated Data
Date Reported	29/05/17

Objectives

The Chemical Analysis Laboratories Ltd (CAL) was commissioned to undertake a study on Alaria esculenta, whereby the protocol required methods utilised by Japanese seaweed processors for preparation of post-harvest product for further use and consumption (Millard, D. Technical visit to Japan's Seaweed Industry – specifically focussed on kelp production and large scale processing techniques. BIM unpublished Report, 2014).

The protocol was designed by Ms Watson at BIM, in order that CAL could process laboratory batches of Alaria, after which tests were carried out to measure the total viable bacterial counts (TVC) and Group 1 nutritional parameters to include Fat, Protein and Carbohydrate (CHO). The objectives were to ascertain the levels of TVC present in each batch after processing and also to study the effects of processing on the Fat, Protein and CHO content, following processing by different methods.

Signed:
Dan Duff, M.Sc.
Laboratory Manager.

Signed:
F. J. Bloomfield, Ph.D.
Scientific Director.

Results

To summarise the results obtained in this study, the following tables show all the data for each processing method at 12% Moisture (Table 1) and on DMB (Table 2).

Table 1. Summary TVC and Nutritional Parameters of Alaria by M1-M18. Results at 12% Moisture.

	M1	M2	M3	M4	M5	M6	M7	M8	M9
Fat %	1.6	0.5	0.3	0.6	0.7	0.9	0.9	1	0.6
Ash %	58.7	61.4	63.8	51.9	47.9	23.2	23.3	27.6	50.6
Protein %	8	7.3	8.1	10.3	10.5	21	20.8	18.3	10.6
E (kcal)	124.2	107.6	98.8	144.1	163.3	263.7	263.9	246.8	150.9
E (kJ)	528	462.9	419.1	614.9	696.2	1121.4	1119.1	1047.5	641.8
CHO %	19.7	19.1	16	25.3	28.9	43	43	41.3	26
TVC cfu/ml	730	<10	3,600	90	210	>300,000	<10	<10	80

	M10	M11	M12	M13	M14	M15	M16	M17	M18
Fat %	0.6	0.8	0.6	0.6	1.1	0.9	0.6	0.6	0.7
Ash %	50.4	40	50.7	23.4	57.6	28	33.5	29.6	28.4
Protein %	11.5	12.7	12.3	24.6	9.9	18.2	17.5	15.7	18.5
E (kcal)	154.2	196.2	152.5	102.9	124.9	244.1	237.4	236.9	241.2
E (kJ)	652.4	830.7	642.3	434.3	533.7	1037	1007.8	1004.7	1025.7
CHO %	25.4	34.4	24.3	40	19.3	41	36.4	42	40.4
TVC cfu/ml	50	130	5,100	120	67,000	7,800	<10	230,000	110

Key:
M1 - Blanch, Wash, Light Press, Salt, Press.
M2 - Wash, Light Press, Press, Salt
M3 – Blanch, Wash, Light Press, Salt, Press, Desalt, Chop, Dry at 40°C
M4 – Blanch, Wash, Light Press, Salt, Press, Desalt, Chop, Dry at 70°C
M5 – Blanch, Wash, Light Press, Salt, Press, Desalt, Chop, Dry at 90°C
M6 – Blanch, Wash, Press Lightly, Press, Chop and Dry at 40°C
M7 – Blanch, Wash, Press Lightly, Press, Chop and Dry at 70°C
M8 – Blanch, Wash, Press Lightly, Press, Chop and Dry at 90°C
M9 - Wash, Press Lightly, Press, Chop and Dry at 40°C
M10 - Wash, Press Lightly, Press, Chop and Dry at 70°C
M11 - Wash, Press Lightly, Press, Chop and Dry at 90°C
M12 - Blanch, Wash, Light Press, Salt, Press, Freeze.
M13 - Blanch, Wash, Light Press, Press, Freeze
M14 - Wash, Light Press, Press, Salt, Freeze
M15 – Blanch, Wash, Light Press, Dry at 40°C
M16 – Blanch, Wash, Light Press, Dry at 90°C
M17 – Dry at 40°C.
M18 – Dry at 90°C.

Table 2. Summary Nutritional Parameters of Alaria by M1-M18. Results calculated on DMB.

	M1	M2	M3	M4	M5	M6	M7	M8	M9
Fat %	1.8	0.6	0.3	0.6	0.8	1	1.1	1.1	0.7
Ash %	66.8	69.7	72.5	59	54.4	26.4	26.4	31.3	57.5
Protein %	9.1	8.3	9.2	11.8	11.9	23.9	23.6	20.8	12
E (kcal)	141.2	122.3	112.3	163.8	185.5	299.7	299.8	280.4	171.5
E (kJ)	600	526	476.3	698.8	790.7	1274.4	1271.5	1190.2	729.2
CHO %	22.4	21.7	18.2	28.8	32.9	48.9	48.8	46.9	29.5

	M10	M11	M12	M13	M14	M15	M16	M17	M18
Fat %	0.7	0.9	0.7	0.6	1.3	1	0.7	0.7	0.7
Ash %	57.3	45.5	57.7	26.6	65.5	31.8	38.1	33.6	32.3
Protein %	13.1	14.4	14	27.9	11.3	20.7	19.9	17.9	21
E (kcal)	175.2	223	173.3	116.9	141.9	277.4	269.7	269.1	274.3
E (kJ)	741.2	944	729.9	493.5	606.5	1179	1145	1141.4	1166.1
CHO %	28.9	39.1	27.7	45.5	21.9	46.6	41.4	47.7	45.9

Key: See Table 1

Comment

Table 1 – 2 show the compiled data at 12% Moisture and DMB respectively, using each processing method (M1-M18). It was demonstrated that drying the seaweed samples at 40°C caused a significant increase in TVC levels. It was also evident that when salting was employed, Ash values were higher, Protein values were lower, Energy was lower (except when the samples were frozen) and CHO levels were also lower compared to those samples that had not been salted.

29th May 2017

F. J. Bloomfield, Ph.D.

Scientific Director.