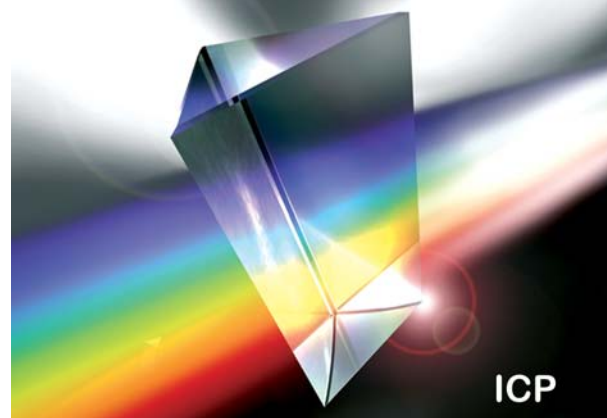


Application Note

Analysis of Aquatic Vegetation using ICP-OES Spectrometry (ICPE-9000)



ICP

Description

The ICPE-9000 was used to perform quantitative analysis of aquatic vegetation (chlorella, sargassum). Table 1 shows the quantitation results, and Fig. 1 and 2 show the spectral profiles. Nearly all of the elements agree with the certified values in the obtained results.

Sample

Powdered chlorella standard NIES No.3
Powdered sargassum standard NIES No. 9

Pretreatment

Perform heat-digestion after adding nitric acid, hydrochloric acid and a small amount of hydrofluoric acid to 1 g of each of the samples. After letting the sample cool, adjust

the volume to 25 mL, and use this as the analytical sample.

Analytical Conditions

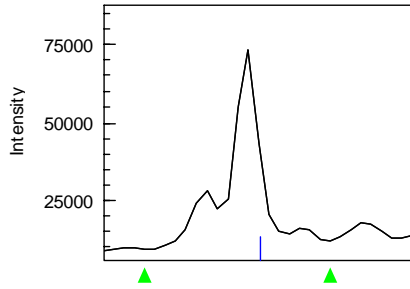
Instrument	: ICPE-9000
Radio Frequency	: 1.2 (kW)
Power	
Plasma Gas	: 10 (L/min)
Auxiliary Gas	: 0.6 (L/min)
Carrier Gas	: 0.8 (L/min)
Sample Introduction	: Coaxial Nebulizer
Sample Aspiration	: 1.0 (mL/min)
Misting Chamber	: Cyclone Chamber
Attached Instruments	: Mini Torch
View Direction	: Axial/Radial

Table 1 Quantitation Results of Aquatic Vegetation ($\mu\text{g/g}$)

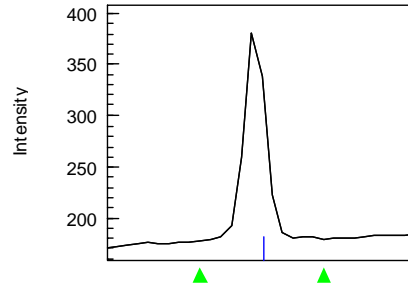
Sample Element	Chlorella		Sargassum	
	Quantitation Value	Certified Value	Quantitation Value	Certified Value
Al	129		210	(215)
As	1		121	128
Ba	14.0		19.7	
Ca	4740	4900 \pm 300	12900	13400 \pm 500
Cd	0.02		0.16	0.15
Cr	0.97		0.18	(0.2)
Cu	3.2	3.5 \pm 0.3	4.7	4.9 \pm 0.2
Fe	1855	1850 \pm 100	182	187 \pm 6
K	12200	12400 \pm 600	59500	60900 \pm 2000
Mg	3210	3300 \pm 200	6320	6500 \pm 300
Mn	65.5	69 \pm 5	20.5	21.2 \pm 1.0
Ni	0.85		1.15	
P	17700	(17000)	2540	(2600)
Pb	0.5	(0.6)	1.2	1.35 \pm 0.05
Sr	39.5	40	0.109	0.101
V	0.75		1.11	1
Zn	19.5	20.5 \pm 1.0	16.0	15.6 \pm 1.2

*Values in parentheses are reference values

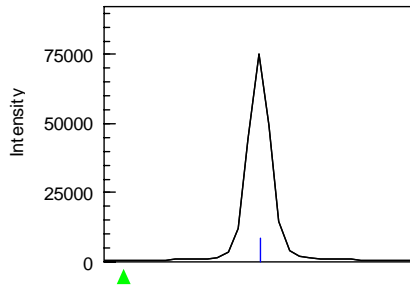
Al 396.153
Cond 1



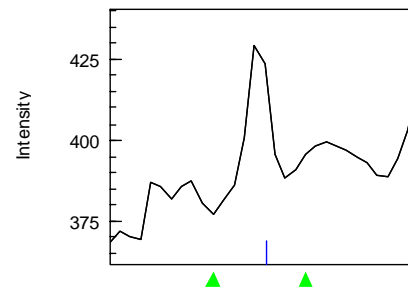
As 189.042
Cond 1



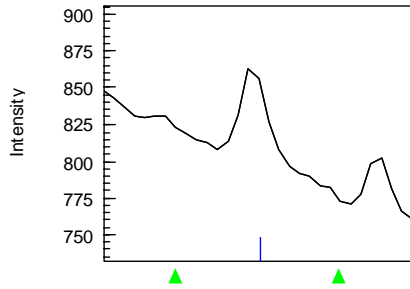
Ca 315.887 Best
Cond 2



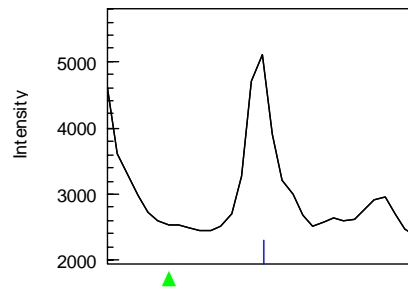
Cd 214.438 Best
Cond 1



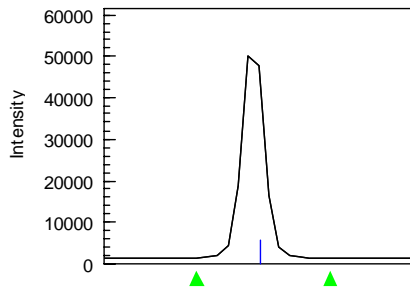
Cr 267.716 Best
Cond 1



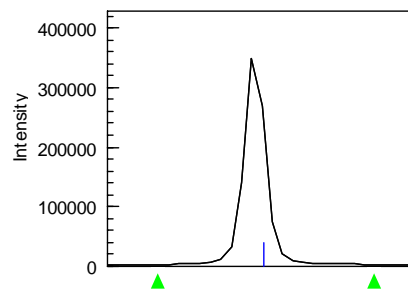
Cu 327.396 Best
Cond 1



Fe 259.940
Cond 1



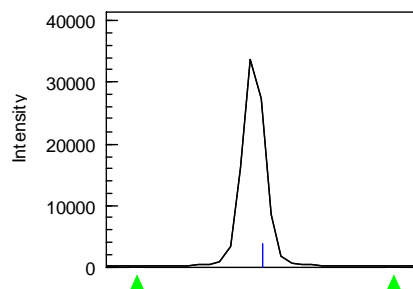
K 766.490
Cond 2



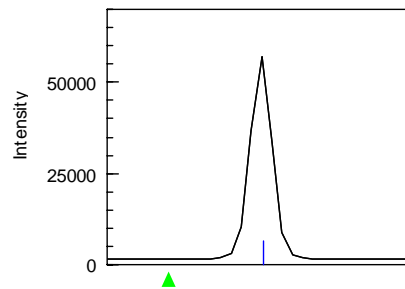
The given specifications serve purely as technical information for the user.
No guarantee is given on technical specification of the described product and/or procedures.

Fig. 1: Spectral Profiles of Aquatic Vegetation (Sargassum)

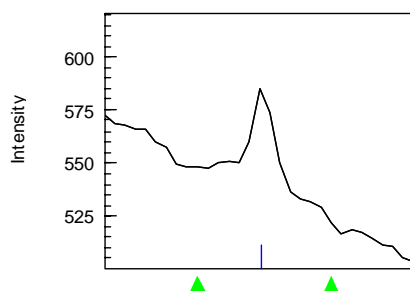
Mg 285.213 Best
Cond 2



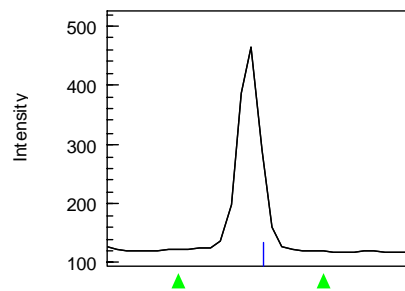
Mn 257.610 Best
Cond 1



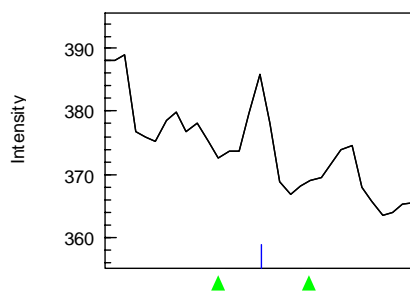
Ni 231.604 Best
Cond 1



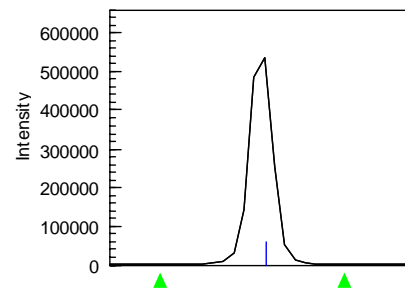
P 178.287
Cond 1



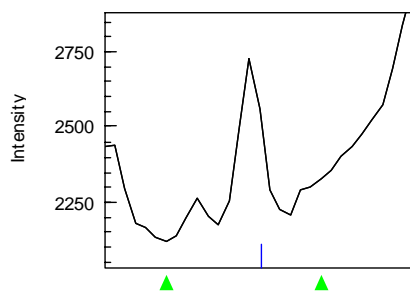
Pb 220.353 Best
Cond 1



Sr 421.552 Best
Cond 2



V 290.882
Cond 1



Zn 206.200
Cond 1

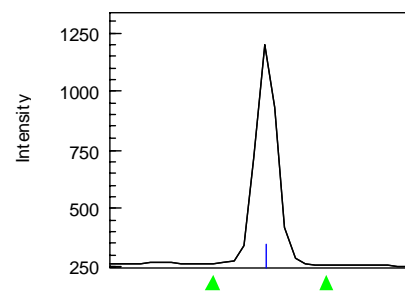


Fig. 2: Spectral Profiles of Aquatic Vegetation (Sargassum)

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