REEF ICP

Methodology: ICP-OES specific for seawater. Further methods possible via upgrades.

Recommended values are optimized for coral reef aquariums.

Sample ID: **01729078**
Analysis ID: **242866**
Booked upgrades: **non**

Sampling Point: Barça Reef
Volume in Liters: 130
Sampling Date: 09-08-2025
Sample Arrival: 09-10-2025

To the dosing and action recommendations

MACROELEMENTS, CALCIUM BALANCE ELEMENTS, AND HALOGENS in mg/Liter

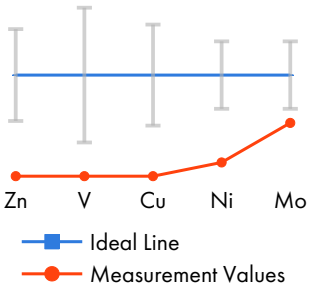
		measured	Reference Range
Sodium	Na	**9621**	9500 - **10700** - 11500
Sulfur	S	**801**	850 - **900** - 950
Sulfate	SO_4^{2-}	**2400**	2550 - **2700** - 2850
Potassium	K	**383**	380 - **395** - 420
Boron	B	**4,53**	3,8 - **4,5** - 5,5
Magnesium	Mg	**1361**	1200 - **1350** - 1450
Calcium	Ca	**443**	400 - **425** - 440
Strontium	Sr	**7,5**	6,5 - **8,0** - 9,0
Bromine (total bromine, ICP-OES)	Br	**74,2**	55 - **67** - 75
Iodine (Total Iodine, ICP-OES)	I	**0,033**	0,055 - **0,065** - 0,080

MACRO NUTRIENTS in mg/Liter

		measured	Reference Range
Phosphorus (ICP-OES)	P	**0,02**	0,006 - max. 0,060
Total Phosphate (calculated)	$PO_4^{3-}{}_{tot.}$	**0,061**	0,02 - 0,18
Silicon	Si	**0,11**	0,1 - 0,2
Silicate (calculated)	SiO_2	**0,24**	0,2 - 0,4

Dynamic Elements in µg/Liter

		measured	Reference Range		
Zinc	Zn	**n.d.**	3	- 5,5 -	8
Vanadium	V	**n.d.**	2	- 6 -	10
Copper	Cu	**n.d.**	2	- 4 -	6
Nickel	Ni	**0,61**	3	- 4,5 -	6
Molybdenum	Mo	**7,9**	10	- 15 -	20

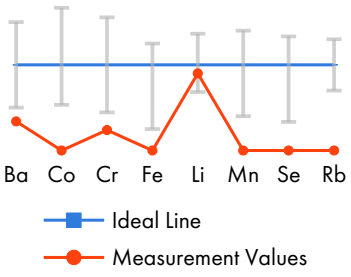


PHYSIOLOGICALLY RELEVANT TRACE ELEMENTS in µg/Liter

		measured	Reference Range		
Barium	Ba	**3,4**	5	- max.	50
Cobalt	Co	**n.d.**	n.d.	- max.	1,9
Chromium	Cr	**0,43**	n.d.	- max.	2,3
Iron	Fe	**n.d.**	n.d.	- max.	2,5
Lithium	Li	**198**	180	- max.	350
Manganese	Mn	**n.d.**	n.d.	- max.	0,25
Selenium	Se	**n.d.**	n.d.	- max.	2

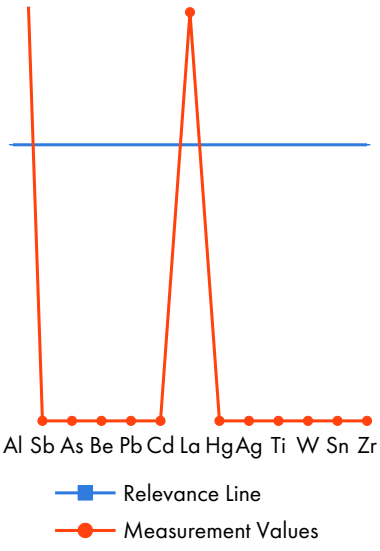
only with ICP-MS upgrade:

Rubidium	Rb	**not measured**



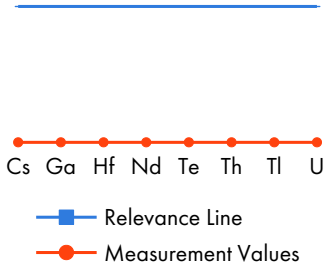
OTHER TRACE ELEMENTS AND POTENTIAL POLLUTANTS in µg/Liter

		measured	Reference Range		
Aluminum	Al	**95,2**	5	-	30
Antimony	Sb	**n.d.**	n.d.	- max.	10
Arsenic	As	**n.d.**		**n.d.**	
Beryllium	Be	**n.d.**		**n.d.**	
Lead	Pb	**n.d.**		**n.d.**	
Cadmium	Cd	**n.d.**		**n.d.**	
Lanthanum	La	**14,8**	2	-	10
Mercury	Hg	**n.d.**		**n.d.**	
Silver	Ag	**n.d.**	n.d.	- max.	10
Titanium	Ti	**n.d.**	n.d.	-	3,5
Tungsten	W	**n.d.**	n.d.	- max.	30
Tin	Sn	**n.d.**	n.d.	- max.	10
Zirconium	Zr	**n.d.**	n.d.	-	2,2



only with ICP-MS upgrade:

Cesium	Cs	**not measured**
Gallium	Ga	**not measured**
Hafnium	Hf	**not measured**
Neodymium	Nd	**not measured**
Tellurium	Te	**not measured**
Thorium	Th	**not measured**
Thallium	Tl	**not measured**
Uranium	U	**not measured**



ORGANIC FACTORS

		measured	Reference Range	
SAK254 (m^{-1})		**not measured**		only with SAK254 upgrade
NPOC (mg/l)	C	**not measured**		only with organic upgrade
TNb (mg/l)	N	**not measured**		only with organic upgrade

Overview of dosages

Product	Total quantity	spread over ...	corresponds	Priority	Checkbox
SALINITY	raise, do not make individual doses!			highest	
ELEMENTALS S	183,9 ml	5 days	36,8 ml/day	1	☐☐☐☐☐
ELEMENTALS K	No dosage				
ELEMENTALS B	No dosage				
ELEMENTALS MG	No dosage				
ELEMENTALS SR	No dosage				
ELEMENTALS BR	No dosage				
TRACE I	4,2 ml	2 days	2,1 ml/day	2	☐☐
ELEMENTALS P	No dosage				
TRACE ZN	0,7 ml	2 days	0,4 ml/day	3	☐☐
TRACE V	1,6 ml	3 days	0,5 ml/day	3	☐☐☐
TRACE CU	5,2 ml	2 days	2,6 ml/day	3	☐☐
TRACE NI	1,3 ml	1 day	1,3 ml/day	3	☐
TRACE MO	1,5 ml	2 days	0,8 ml/day	3	☐☐
TRACE BA	17,2 ml	2 days	8,6 ml/day	4	☐☐
TRACE CO	0,3 ml	1 day	0,3 ml/day	4	☐
TRACE CR	No dosage				
TRACE FE	0,5 ml	2 days	0,3 ml/day	4	☐☐
TRACE LI	No dosage				
TRACE MN	0,1 ml	1 day	0,1 ml/day	4	☐
TRACE SE	8,3 ml	4 days	2,1 ml/day	4	☐☐☐☐
TRACE RB	No dosage				

Upgrade options for a Reef ICP:

ICP-MS upgrade: Analysis of all trace elements (except aluminum and lithium) by ICP-MS with up to 1000x higher sensitivity compared to ICP-OES and analysis of exclusive elements. ICP-MS exclusive elements cannot be determined by ICP-OES, or not with sufficient sensitivity.

Organic upgrade: Determination of the concentrations of organic carbon (NPOC) and total nitrogen (TNb).

SAK254 upgrade: Determination of the indicator value for the concentration of unsaturated organic compounds.

Detection limits

Time-averaged detection limits for all relevant values are published regularly on lab.faunamarin.de.

Abbreviations:

ICP-OES (inductively coupled plasma with optical emission spectrometry), ICP-MS (inductively coupled plasma with mass spectrometry), SAK254 (spectral absorption coefficient at 254 nm), NPOC (not easily expelled organic carbon), TNb (total bound nitrogen), n.d. (not detectable).