f/2 Medium for growing diatoms: 2L Recipe

Modified (only quantities, not final concentrations, except in [2]) from Andersen, R. A., Berges, J. A., Harrison, P. J. and Watanabe, M. M. 2005. Recipes for freshwater and seawater media. In: Algal Culturing Techniques (R. A. Andersen, eds), pp. 429-538. Elsevier, Amsterdam.

This is a common and widely used general enriched seawater medium designed for growing coastal marine algae, especially diatoms. The concentration of the original formulation, termed "f Medium" (Guillard, 1962) has been reduced by half (Guillard 1975). The original medium (Guillard, 1962) used ferric sequestrene; we have substituted $Na_2EDTA{\cdot}2H_2O$ and $FeCl_3{\cdot}6H_2O$.

Into 1950 mL of ASW (artificial sea water), add the following components. Bring the final volume to **2 litres** with ASW. Autoclave. If silicate is not required, omit to reduce precipitation.

component	mass (g/mol)	stock (g/L dH_2O)	g in 100 mL	add	final conc. (M)	final conc. (g/L ASW)
$NaNO_3$	84.98	150 g/L	15 g	1 mL	8.82×10^{-4}	0.075 g/L
$NaH_2PO_4{\cdot}H_2O$	137.97	10 g/L	1 g	1 mL	3.62×10^{-5}	0.005 g/L
$Na_2SiO_3{\cdot}9H_2O$	284.04	60 g/L[1] 30 g/L[2]	6 g[1] 3 g[2]	1 mL	1.06×10^{-4} 0.58×10^{-4}	0.030 g/L[1] 0.015 g/L[2]
Trace metals stock	–	see recipe	–	1 mL	–	–
Vitamins stock	–	see recipe	–	0.5 mL	–	–

[1]Andersen & al., [2]Vizoso's Silicium poor medium. Stocks will yield 100 × 2L f/2

f/2 Trace Metals Stock (will yield 100 × 2L f/2)

Into 80 mL of dH_2O, dissolve the EDTA **entirely**, then add the other components. Bring the final volume to **100 mL** with dH_2O. Primary stocks are prepared in 20 mL and stored at room temperature.

component	mass (g/mol)	1° stock (g/L dH_2O)	g in 10 mL	add	final conc. (M)	final conc. (g/L ASW)
$Na_2EDTA{\cdot}2H_2O$	374.24	–	–	0.88 g	1.17×10^{-5}	0.0044
$FeCl_3{\cdot}6H_2O$	270.30	–	–	0.63 g	1.17×10^{-5}	0.0032
$MnCl_2{\cdot}4H_2O$	197.01	179 g/L	1.79 g	0.2 mL	9.10×10^{-7}	1.79×10^{-4}
$ZnSO_4{\cdot}7H_2O$	286.00	21.9 g/L	0.219 g	0.2 mL	7.65×10^{-8}	2.19×10^{-5}
$CoCl_2{\cdot}6H_2O$	237.00	9.9 g/L	0.099 g	0.2 mL	4.20×10^{-8}	9.95×10^{-6}
$CuSO_4{\cdot}5H_2O$	249.00	9.8 g/L	0.098 g	0.2 mL	3.93×10^{-8}	9.79×10^{-6}
$Na_2MoO_4{\cdot}2H_2O$	237.88	6.2 g/L	0.062 g	0.2 mL	2.60×10^{-8}	6.18×10^{-6}

1° stocks will yield 50 × stocks

f/2 Vitamins Stock (will yield 200 × 2L f/2)

Into 80 mL of dH_2O, dissolve the thiamine · HCl, and add 1 mL of the primary stocks. Bring the final volume to **100 mL** with dH_2O. Primary stocks are prepared in a large volume and discarded. Filter-sterilize and store frozen.

component	mass (g/mol)	1° stock (g/L dH_2O)	g in x mL	add	final conc. (M)	final conc. (g/L ASW)
Thiamine · HCl (vitamin B_1)	333.27	–	–	0.04 g	2.96×10^{-7}	1.00×10^{-4}
Biotin (vitamin H)[a]	242.45	0.2 g/L	0.02 in 100	1 mL	2.05×10^{-9}	5.00×10^{-7}
Cyanocobalamin (vitamin B_{12})	1355.4	1.0 g/L	0.01 in 10	0.2 mL	3.69×10^{-10}	5.00×10^{-7}

1° stocks will yield 100 × stocks. [a] Biotin has a maximum solubility in H_2O of 0.2 g/L

Guillard, R. R. and Ryther, J. H. 1962. Studies on marine planktonic diatoms. I. Cyclotella nana Hustedt and Detonula confervacaea (Cleve) Gran. Canadian Journal of Microbiology 8: 229-239.