

ASP-M Medium

(McLachlan *et al.* 1964, Goldman and McCarthy 1978)

This is an artificial enriched seawater medium devised as a general medium for marine macro- and microalgae. It is derived from the earlier ASP Medium series (see Provasoli *et al.* 1957). The TMS-II trace metals solutions are derived from the S1 metals solution of Provasoli and Pintner (1953).

First prepare the stock solutions. To prepare, dissolve the anhydrous salts in 500 mL dH₂O and the hydrous salts in 300 mL dH₂O, and then combine the solutions. Dissolve the Tris base and the glycylglycine, add the indicated quantity of stock solutions and bring the final volume to 1 liter. Autoclave or sterile filter. The pH should be 7.5 at room temperature.

Component	Stock Solution	Quantity	Molar Concentration in Final Medium
<i>anhydrous salts</i>			
NaCl	---	23.38 g	4.0 x 10 ⁻¹ M
KCl	---	0.75 g	1.0 x 10 ⁻² M
CaCl ₂	---	1.120 g	1.0 x 10 ⁻² M
NaHCO ₃	---	0.168 g	2.0 x 10 ⁻³ M
<i>hydrous salts</i>			
MgSO ₄ 7H ₂ O	---	4.930 g	2.0 x 10 ⁻² M
MgCl ₂ 4H ₂ O	---	4.060 g	2.0 x 10 ⁻² M
<i>macronutrients</i>			
NaNO ₃	85.0 g L ⁻¹ dH ₂ O	1 mL	1.0 x 10 ⁻³ M
NaH ₂ PO ₄ H ₂ O	13.8 g L ⁻¹ dH ₂ O	1 mL	1.0 x 10 ⁻⁴ M
Na ₂ SiO ₃ 9H ₂ O	56.8 g L ⁻¹ dH ₂ O	1 mL	1.0 x 10 ⁻⁴ M
<i>other components</i>			
Fe-EDTA	84.2 g L ⁻¹ dH ₂ O	100 µL	2.0 x 10 ⁻⁶ M

Tris base	---	0.606 g	5.0×10^{-3} M
glycylglycine	---	0.660 g	5.0×10^{-3} M
TSM-I solution	(see recipe below)	1 mL	---
TSM-II solution	(see recipe below)	1 mL	---
S3 vitamin solution	(see recipe below)	1 mL	---

Trace Metal Solution - TMS I

McLachlin 1964

Into 900 mL of dH₂O, first dissolve the EDTA and then individually dissolve the metals. Bring the final volume to 1 liter. Refrigerate.

Component	Primary Stock Solution	Quantity	Molar Concentration in Final Medium
EDTA	---	14.026 g	4.8×10^{-5} M
FeCl ₃	---	0.324 g	2.0×10^{-6} M
H ₃ BO ₃	---	24.732 g	4.0×10^{-4} M
MnCl ₂ 4H ₂ O	---	1.979 g	1.0×10^{-5} M
ZnSO ₄ 7H ₂ O	---	10.064 g	3.5×10^{-5} M
NaMoO ₄ 2H ₂ O	---	1.210 g	5.0×10^{-6} M
CuSO ₄ 5H ₂ O	---	0.075 g	3.0×10^{-7} M
CoCl ₂ 6H ₂ O	---	0.071 g	3.0×10^{-7} M

Trace Metal Solution - TMS-II

McLachlin 1964

These are necessary only for certain marine macrophytes. Into 900 mL of dH₂O, dissolve individually components and bring the final volume to 1 liter. Refrigerate.

Component	Primary Stock Solution	Quantity	Molar Concentration in Final Medium
KBr	---	51.450 g	5.0×10^{-4} M
SrCl ₂	---	26.662 g	1.0×10^{-4} M
Ru	---	0.242 g	2.0×10^{-6} M
Li	---	0.424 g	1.0×10^{-5} M
I	---	0.030 g	2.0×10^{-7} M

S3 Vitamin Solution

Provasoli 1963

This is a very complex vitamin solution, and most of the vitamins are unnecessary for the growth of algae. Into 900 mL of dH₂O, dissolve the first four components and then add 1 mL of each primary stock solution. Bring the final volume to 1 liter, filter sterilize and freeze.

Component	Primary Stock Solution	Quantity	Molar Concentration in Final Medium
i-inositol	---	900.000 mg	5.0×10^{-6} M
thiamine HCl (vit. B ₁)	---	168.635 mg	5.0×10^{-7} M
Ca pantethenoate (vit. B ₅)	---	23.830 mg	1.0×10^{-7} M
Nicotinic acid (niacin)	---	12.310 mg	1.0×10^{-7} M
<i>p</i> -aminobenzoic acid	1.371 g L ⁻¹ dH ₂ O	1 mL	1.0×10^{-8} M
biotin (vit. H)	0.244 g L ⁻¹ dH ₂ O	1 mL	1.0×10^{-9} M
folic acid	0.883 g L ⁻¹ dH ₂ O	1 mL	2.0×10^{-9} M
cyanocobalamin (vit. B ₁₂)	1.355 g L ⁻¹ dH ₂ O	1 mL	1.0×10^{-9} M
thymine	0.378 g L ⁻¹ dH ₂ O	1 mL	3.0×10^{-6} M

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