AuSaMicS™ Life Science

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AS-1137
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BG11 Broth w/ Minerals

Chemically Defined Medium for Axenic Cultivation of Freshwater Cyanobacteria | Catalogue No. AS-1137

1. Product Overview

BG11 Broth w/ Minerals is a single, chemically defined dehydrated culture medium — with trace metals pre-incorporated — for the axenic cultivation and maintenance of freshwater cyanobacteria (blue-green algae) and selected unicellular green algae. The formulation, with added trace metals, is cited by ATCC as Medium 616 for maintenance of Synechocystis species. It is widely used for cultivation of genera such as Synechococcus, Anabaena, Nostoc, Microcystis, and Spirulina, as well as for cyanobacterial genomics, physiology, and toxicity testing.

2. Principle & Interpretation

This medium supports growth of photoautotrophic blue-green algae. Synthetic nitrogen and carbon sources and other inorganic salts comprise the medium; nitrate is the sole nitrogen source and no organic carbon is included, so growth is strictly photoautotrophic (light-driven). A defined trace-metal system supports enzymatic and photosynthetic processes while maintaining clarity of the prepared medium for optical measurements.

3. Product Specifications

Format	Single dehydrated powder (macronutrients and trace metals pre-incorporated)
Final pH (25°C)	**7.1**
Suspension Rate	**1.6894 g/L (AuSaMicS itemised formula — see note below)**
Sterilisation	Autoclave at 121°C for 15 minutes (whole reconstituted medium, including trace metals)
Nitrogen Source	Sodium nitrate ($NaNO_3$) — sole nitrogen source
Carbon Source	None — strictly photoautotrophic growth
Appearance (powder)	Off-white to cream, homogeneous, free-flowing powder
Appearance (prepared)	Colourless, clear to slightly opalescent solution; slight precipitate may occur
Storage (prepared medium)	2–8°C, protected from light; use within 3 months

4. Composition — per litre

Ingredient	g/L	Role
Sodium nitrate ($NaNO_3$)	1.500	Sole nitrogen source
Dipotassium hydrogen phosphate (K_2HPO_4)	0.040	Phosphorus source; low level minimises precipitation
Magnesium sulphate, heptahydrate ($MgSO_4$)	0.075	Magnesium and sulfur source; enzyme cofactor
Calcium chloride dihydrate	0.036	Calcium source; membrane and enzyme function
Citric acid	0.006	Iron chelator
Ferric ammonium citrate	0.006	Iron source
EDTA, disodium salt	0.001	Metal chelator — prevents precipitation of trace metals
Sodium carbonate	0.020	Carbonate/pH buffering
Trace metal mix (dry-equivalent)	—	Micronutrient supplementation (see Section 5)

Total dehydrated powder: 1.6894 g/L | Final pH 7.1 at 25°C. This total is derived by summing the itemised formula above and is fully independently verifiable. It differs slightly from a commercial reference product's published suspend weight (1.642 g/L for a comparable BG11 formulation), which reflects an undisclosed proprietary adjustment and could not be independently reconciled — AuSaMicS uses its own fully itemised total.

5. Trace Metal Mix Composition (dry-equivalent, per litre of original liquid stock)

Ingredient	g/L (stock basis)
Boric acid (H_3BO_3)	2.860
Manganese chloride, tetrahydrate	1.810
Zinc sulphate, heptahydrate	0.222
Sodium molybdate, dihydrate	0.390
Copper sulphate, pentahydrate	0.079
Cobalt nitrate, hexahydrate	0.0494

Note: some trace metal components (notably cobalt nitrate hexahydrate and boric acid) carry significant hazard classifications as raw materials. See Safety Data Sheet for full handling guidance. These salts are heat-stable and are incorporated directly into the single dehydrated powder blend.

6. Directions for Use

- Suspend 1.6894 g of dehydrated medium per litre of purified or distilled water (AuSaMicS itemised formula target).
- Heat if necessary to fully dissolve the medium.
- Adjust pH with 1 M NaOH or HCl if it does not achieve 7.1.
- Dispense in flasks or as desired.
- Sterilise by autoclaving at 121°C for 15 minutes.

- Cool the medium to room temperature before use.

7. Marine Species Supplementation

For marine species, prepare a solution of 10 g/L sodium chloride and 1 g/L Vitamin B12. Add 20 mL of this solution (sterile filtered) to 1000 mL of the prepared BG11 medium.

8. Incubation Conditions

Light Intensity	2,000–3,000 lux (neon light source is sufficient)
Photoperiod	Continuous illumination (24 hours/day) optimal for maintenance
Temperature	20–25°C (room temperature)
Vessel Covering	Flasks may be covered with grease-proof paper during incubation

9. Typical Applications

Category	Typical Use
Phycology & algal research	Axenic culture and maintenance of freshwater blue-green algae (cyanobacteria); reference strains such as Synechocystis spp.
Biotechnology & applied research	Production of cyanobacterial biomass; pigment and bioactive compound studies
Environmental & ecotoxicology	Toxicity testing using cyanobacteria; ecophysiology and nutrient-limitation experiments
Soil sample analysis	Cultivation of cyanobacteria from soil samples using appropriate collection and processing techniques

10. Limitations

Due to nutritional variations, certain strains may show poor growth. Performance of the medium is expected when used as per the directions above, within the expiry period, when stored at the recommended temperature.

11. Intended Use

A universal medium for the cultivation and maintenance of blue-green algae (cyanobacteria). For laboratory research and environmental studies only. Not for diagnostic, therapeutic, food, or agricultural use.

12. Literature & References

1. Stanier RY, Kunisawa R, Mandel M, Cohen-Bazire G. Purification and properties of unicellular blue-green algae (order Chroococcales). Bacteriological Reviews. 1971;35(2):171–205.

2. ATCC Medium 616 — BG-11 Medium, for maintenance of Synechocystis species.

3. Rippka R, Deruelles J, Waterbury JB, Herdman M, Stanier RY. Generic assignments, strain histories and properties of pure cultures of cyanobacteria. Journal of General Microbiology. 1979;111:1–61.

4. ISO 10712:1995. Water quality — Pseudomonas putida growth inhibition test.

5. OECD Test No. 201: Freshwater Alga and Cyanobacteria, Growth Inhibition Test.

6. Standard guidelines for soil sample collection and processing for microbiological analysis.