

Marine Agar 2216 (Zobell Marine Agar) — Catalogue No. AS-1289

Date of issue: 27/09/2026 | Revision: 1.0

Product Information

Product name	Marine Agar 2216 (Zobell Marine Agar)
Catalogue number	AS-1289
Other names	Zobell Marine Agar 2216; Marine Agar
Product type	Dehydrated non-selective culture medium
Usage	52.4 g/L in purified water
Final pH	7.6 ± 0.2 at 25 °C
Liquid counterpart	Marine Broth 2216 (AS-1290)

Intended Use

Marine Agar 2216 is used for the isolation, enumeration, purification and maintenance of heterotrophic marine bacteria from seawater, sediments, marine organisms and aquaculture systems. For laboratory microbiological testing, quality control and research use only. Not intended for direct use in food, human or veterinary therapeutic applications, diagnosis, or consumption.

Summary and History

ZoBell (1941) developed medium 2216 to reproduce the mineral composition of seawater, so that marine bacteria which need sea salts can grow on a laboratory medium. It remains one of the most widely used media in marine microbiology and is the standard medium for many marine type strains in culture collections.

Mode of Action

The salts reproduce the major and trace ions of seawater, giving the osmotic conditions and specific ions (Na^+ , Mg^{2+} , Ca^{2+} , K^+) that marine bacteria require. Peptone and yeast extract supply nitrogen, vitamins and growth factors, and ferric citrate supplies iron. Agar solidifies the medium for colony isolation and counting.

Typical Formula

Ingredient	g/L	Function
Peptone	5.0	Nitrogen, amino acids and peptides
Yeast extract	1.0	Vitamins and growth factors
Ferric citrate	0.1	Iron source
Sodium chloride	19.45	Main seawater salt; osmotic balance
Magnesium chloride	5.9	Magnesium
Magnesium sulfate	3.24	Magnesium and sulfate
Calcium chloride	1.8	Calcium
Potassium chloride	0.55	Potassium
Sodium bicarbonate	0.16	Carbonate buffering
Potassium bromide	0.08	Seawater trace ion

Ingredient	g/L	Function
Strontium chloride	0.034	Seawater trace ion
Boric acid	0.022	Seawater trace ion
Disodium phosphate	0.008	Phosphorus
Sodium silicate	0.004	Seawater trace ion
Sodium fluoride	0.0024	Seawater trace ion
Ammonium nitrate	0.0016	Nitrogen
Agar	15.0	Solidifying agent
Total	52.4	Final pH 7.6 ± 0.2 at 25 °C

This formulation uses the salt composition of Marine Broth 2216 with 15 g/L agar. Formula may be adjusted to meet performance requirements.

Preparation

- Suspend 52.4 g of powder in 1 L of purified water. **Do not use seawater**; the powder already contains the sea salts.
- Heat with frequent agitation and boil for 1 minute to dissolve completely.
- Autoclave at 121 °C for 15 minutes. Do not overheat.
- Cool to 45–50 °C, swirl to resuspend any precipitate, and pour plates.

A fine precipitate is normal in this medium and does not affect performance.

Incubation

Organisms	Temperature	Time
General marine heterotrophs	20–25 °C	24–72 h
Psychrophilic marine bacteria	10–15 °C	3–7 days
Slow-growing isolates	15–25 °C	Up to 14 days

Quality Control

Recommended control strains. Incubate aerobically at 25 °C for 24–72 h.

Control strain	Inoculum (CFU)	Expected result
<i>Vibrio harveyi</i> ATCC 14126	50–100	Good growth
<i>Aliivibrio fischeri</i> ATCC 7744	50–100	Good growth

Limitations

- The medium is non-selective. Mixed samples need dilution to obtain isolated colonies.
- Some marine bacteria need special conditions, such as low nutrients or specific substrates, and may not grow.
- Potential pathogens such as *Vibrio parahaemolyticus* and *V. vulnificus* can grow. Use a selective medium such as TCBS Agar for their isolation.

Storage and Shelf Life

Dehydrated medium	Store at 15–25 °C in a dry place with the container tightly closed. Hygroscopic. Use before the expiry date on the label.
Prepared plates	Store at 2–8 °C in sealed bags, protected from light. Validate the use period in-house.
Signs of deterioration	Caking, discolouration or moisture absorption in the powder.

References

- ZoBell CE. Studies on marine bacteria. I. The cultural requirements of heterotrophic aerobes. J Mar Res. 1941;4(1):42–75.
- Zimbro MJ, Power DA, et al., eds. Difco & BBL Manual: Manual of Microbiological Culture Media. 2nd ed. BD Diagnostics; 2009. Marine Agar 2216 and Marine Broth 2216.
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- Gontang EA, Fenical W, Jensen PR. Phylogenetic diversity of gram-positive bacteria cultured from marine sediments. Appl Environ Microbiol. 2007;73(10):3272–3282.

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