

Hobbyists and Dealers:

SYNTHETIC SEAWATER vs. SYNTHETIC SEAWATER

Saltwater fish come from the ocean. When kept in captivity, the vast majority of ocean, tropical marine fish and reef invertebrates are kept in some type of synthetic seawater medium. If you are sold a marine salt that:

- exhibits periodic or consistent deficiencies,
- varies dramatically from sample to sample,
- is excessive in metals, silicon, phosphates, nitrates or other ions,
- does not mix to, or maintain the proper pH,

it is possible that many forms of marine life simply will not adjust to such unnatural conditions. As an aquarist, **chances are you have been sold failure!**

The majority of importers, dealers and hobbyists are not equipped to scientifically evaluate marine salts. They fall victim to colorful advertisements. This is why some manufacturers conduct ZERO RESEARCH and put research and development money directly into packaging and advertising that is sometimes misleading.

Misleading and/or inaccurate packaging has continually plagued and confused dealers and entry level marine aquarists. The result is usually failure to keep a successful marine aquarium. This contributes dramatically to the long recognized problem of animal mortality. Marine animals should live well in captivity for years (decades in some cases), not just a few months.

The use of supplements, additives, carbon, resins, expensive lighting systems and filters, skimmers, exotic foods, and continual water changes cannot compensate or correct for inadequacies, deficiencies or excesses in marine salts.

A **good** synthetic sea salt will at least approximate the major, minor and trace ions found in natural seawater (NSW), with lower amounts of nitrates, phosphates and silicon.

A **high efficiency** or species specific formula could contain higher amounts of sulfate, calcium, manganese, molybdate and lithium. A **superior** version could include a strong pH buffer, iodide, iron and select trace elements that are organically bound, and water conditioners.

The first, and only, extensive, in depth and scientifically validated assay of 15 different brands of marine salts has been completed and the results have been compiled in the S-15™ Report by Anresco, Inc., an independent testing laboratory in San Francisco, California.

Factory sealed samples of 15 brands of marine salts were sent to Anresco, Inc. All salts were mixed with de-ionized water and the pH was measured one hour after hydration. Most nonmetals were then determined. Split samples were sent to the Environmental Trace Substances Research Center for analysis of the remaining elements.

Consolidation of data, normalization to 3.5% solids for better comparison, and reporting were done by Anresco, Inc.

The S-15™ Report is based on these test results. The following is some information from the S-15™ Report.

Water Quality Starts With Your Water

MARINE ENVIRONMENT® Dual Phase Formula™

(USA) The only **two-part** salt submitted for testing. Two samples tested. Dry, uniform particle size that hydrates to an average pH of 8.21.

Variations from NSW:

Sulfate 3222 & 3410 ppm vs 2700 ppm in NSW
Calcium 459 & 459 ppm vs 400 ppm in NSW
Strontium 11.7 & 12.4 ppm vs 9 ppm in NSW

Phosphate <0.003 ppm vs 0.07 ppm in NSW

Comments: Enhanced levels of sulfate, calcium, and strontium. Other minor and trace ions were similar to NSW. Minimal variation from sample to sample.

Part 2, "The Little Bottle™", contains supplemental vitamins, molybdate, manganese, lithium, shock and stress reducers, and various water conditioners. Supplemental iodide, iron, and select trace elements are organically bound.

BIO-SEA® Marinemix (USA)

Two samples tested. Dry, uniform particle size that hydrates to an average pH of 8.40.

Variations from NSW:

Sulfate 3178 & 3357 ppm vs 2700 ppm in NSW
Calcium 416 & 444 ppm vs 400 ppm in NSW
Strontium 9.7 & 9.9 ppm vs 9 ppm in NSW

Phosphate <0.003 ppm vs 0.07 ppm in NSW

Comments: With the exception of enhanced levels of sulfate, BIO-SEA® Marinemix is closer in composition to NSW than any brand tested. Minimal variation from sample to sample.

NEW OCEAN (Japan)

One sample tested. Dry, uniform particle size that hydrates to a pH of 9.06.

Variations from NSW:

Potassium 295 ppm vs 390 ppm in NSW
Strontium 2.4 ppm vs 9 ppm in NSW

Phosphate <0.003 ppm vs 0.07 ppm in NSW

Comments: Low in potassium. Deficient in strontium.

INSTANT OCEAN® (USA/ France)

Two samples tested. Dry, uniform particle size that hydrates to an average pH of 9.00.

Variations from NSW:

Potassium 345 & 418 ppm vs 390 ppm in NSW
Bromide 5.4 ppm vs 66 ppm in NSW
Strontium 6.9 ppm vs 9 ppm in NSW

Phosphate <0.003 ppm vs 0.07 ppm in NSW

Comments: Potassium varies from sample to sample. Deficient in bromide. Low in strontium.

CORAL SEA™ (USA) One sample tested. Non-uniform, irregular particle size that hydrates to a pH of 9.40.

Variations from NSW:

Potassium 282 ppm vs 390 ppm in NSW
Bromide 10 ppm vs 66 ppm in NSW
Strontium 6.2 ppm vs 9 ppm in NSW
Molybdate 0.142 ppm vs 0.01 ppm in NSW

Phosphate 0.064 ppm vs 0.07 ppm in NSW

Comments: Low in potassium and strontium. Deficient in bromide. Excessive in molybdate. Non-uniform, irregular particle size allows for separation of ingredients resulting in a consumer package that can contain different parts of the formula in different parts of the package.

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MARINE ART (Japan) Two samples tested. Dry, uniform particle size that hydrates to an average pH of 8.36.

Variations from NSW:

Magnesium 1154 & 1253 ppm vs 1300 ppm in NSW
Calcium 288 & 406 ppm vs 400 ppm in NSW
Strontium 2.5 & 6.0 ppm vs 9 ppm in NSW

Phosphate 0.006 ppm vs 0.07 ppm in NSW

Comments: Calcium and strontium vary dramatically from sample to sample.

REEF CRYSTALS® (USA/France) Two samples tested. Dry, uniform particle size that hydrates to an average pH of 8.95.

Variations from NSW:

Magnesium 1209 & 1311 ppm vs 1300 ppm in NSW
Calcium 380 & 488 ppm vs 400 ppm in NSW
Potassium 359 & 425 ppm vs 390 ppm in NSW
Bromide 6.8 & 8.8 ppm vs 66 ppm in NSW
Strontium 6.8 & 8.8 ppm vs 9 ppm in NSW
Silicon 0.03 & 2.5 ppm vs 1.9 ppm in NSW

Phosphate <0.003 ppm vs 0.07 ppm in NSW

Comments: Magnesium and potassium vary. Calcium and silicon vary dramatically. Deficient in bromide. Salt was assayed for vitamins and no vitamins were detected vs claim of vitamins on package.