

## Standard Operating Procedure

### Procedure for the production of artificial Seawater from commercially available Salt Mixtures

**Compiled by :**

**Name:** Lothar Schillak

**Title / Institution, Company :** Marine Biologist, PhD, SGS S.A. Environmental Services, Geneva, Switzerland, SGS Institut Fresenius GmbH, Taunusstein, Germany

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The approval of this Standard Operating Procedure is subject to the executing institution or company

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## 1 BACKGROUND

Regarding their physiological processes marine organism are adapted to the salinity of the ambient seawater. Changes in the salinity of the ambient seawater can only be compensated within a species specific range of concentrations

Changes in the salinity of the seawater, which exceed the ability of the marine organisms to compensate higher or lower salinities subsequently impact on the viability of the organisms and may lead to the disintegration of their morphological structures following the principle of osmosis.

## 2 INTRODUCTION

Ecological, chemical and biochemical analysis methods for marine organisms may require to use seawater, which does not contain any marine organism other than the targeted species or taxonomic groups.

Especially when seawater samples are filtered to concentrate smaller organisms or micro-plankton it is highly advisable to transfer the filter residue, containing the targeted organisms, by rinsing the filter material with seawater, which does not contain any other marine organism.

The filtration of natural seawater to obtain a seawater solution largely free of marine organism is a very time and energy consuming method.

An alternative method to produce a seawater solution largely free of marine organisms is the use of commercially available salt mixtures.

This procedure describes the single steps of the production of artificial seawater.

## 3 EQUIPMENT

- Conductivity meter
- Magnetic stirrer
- 5 liter glass bottle
- Electronic balance

## 4 SUPPLIES

- Laboratory spoon
- Commercially available sea salt
- Commercially available drinking water, still
- Tin foil

## 5 PROCEDURE

### Preparation

- (1) Measure the salinity in the natural seawater, which has to be sampled/filtered
- (2) Define the desired volume of artificial seawater (in partial volumes of 5 liters)
- (3) Calculate the amount of sea salt to obtain the measured salinity under step (1) for the volume defined in step (2) using this equation :

$SAL_{nat}$ (‰) :	salinity of the natural seawater, which has to be sampled/filtered
$CONC_{nat}$ (gr/l) :	total concentration of salts in the natural seawater, which has to be sampled/filtered
$V_{art}$ (l) :	desired volume of the artificial seawater
$S_{art}$ (gr) :	amount of salt mixture necessary for the production of artificial seawater of the desired volume and with the same salinity as the natural seawater, which has to be sampled/filtered

$$CONC_{nat} = SAL_{nat} \quad (1)$$

$$S_{art} = CONC_{nat} \times V_{art} \quad (2)$$

### Production

- (1) Use a piece of tin foil for the weighing of  $S_{art}$
- (2) Split the total amount of sea salt in portions for a 5,0 liter volume
- (3) Placed the 5,0 liter glass bottle on the magnetic stirrer
- (4) Pour 4,5 liter of still drinking water into the glass bottle (do not use potable water from the tap!)
- (5) Add magnet to the glass bottle
- (6) Stirr the water in the bottle
- (7) Add the amount of sea salt for 5,0 l artificial seawater to the glass bottle
- (8) Plunge the sensor of the conductivity meter into the glass bottle
- (9) Monitor the salinity until the value remains stable
- (10) Add 0,5 l of still drinking water to the glass bottle
- (11) Monitor the salinity until the value remains stable
- (12) Add sea salt or still drinking water to adjust the salinity to the desired value
- (13) Remove magnet and sensor from glass bottle and close glass bottle tightly

### Storage

- (1) Store the artificial seawater in a dark, cool place for at least 4 days prior to use.

## 6 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

1. Procedures outlined in this SOP should be followed to the letter. Any deviation should be documented.
2. Conduct all quality assurance and quality control procedures according to relevant QA/QC standards of the executing institution or company.

## 7 DATA STORAGE AND ARCHIVING

1. Storage and archival storage of data should be executed following relevant guidelines and SOPs of the executing institution or company.

## 8 REFERENCES AND RELATED DOCUMENTS

None

## 9 APPENDIX

### CONTACT

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Dr.Lothar Schillak  
Marine Biologist PhD; Senior Marine Expert

SGS S.A.  
SGS-Environmental Services  
1 Place des Alpes  
Box Postale 2155  
CH-1211 Geneva 1

SGS Institut Fresenius GmbH  
Auf dem kleinen Feld 15a  
D-65232 Taunusstein/Germany  
Phone : +49 (0)6128 748 73 809  
Mobile . +49 (0)152 226 186 56  
Fax : +49-(0)89 125 040 698 09  
Email : lothar.schillak@sgs.com

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Peter-Paul Stehouwer  
Marine Biologist MSc; Marine Expert

SGS Germany GmbH  
SGS-Environmental Services

Rödingsmarkt 16  
D-20459 Hamburg/Germany  
Phone : +49 (0)40 30101 316  
Mobile . +49 (0)152 226 873 14  
Email : peter.stehouwer@sgs.com

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