

SODIUM HYPOCHLORITE

STOP THE USE OF CHLORINE BLEACH IN MARINE ENVIRONMENTS

WHAT IS IT?

Sodium Hypochlorite is commonly known as chlorine bleach, used in common consumer cleaning and disinfectant products such as detergent, pool solution, and toilet cleaner.

HOW IS IT HARMFUL?

When combined with saltwater, chlorine mixes with organic compounds and bromide. This combination results in a potential biocide as well as the creation of chloramine, a long-term decaying result of the saltwater-chlorine mixture.² Chloramine has been found to be a stronger biocide for temperate lobster larvae than chlorine.²

MARINE EXPOSURE



A new trend has begun for fishers to use bleach as a tool to increase catch. Fishers in the Bahamian Archipelago inject the chemical irritant into the dens of spiny lobster (*Lobatus gigas*) dens so as to either startle and eject the lobster out of the den or subdue the lobster, both increasing the chance of catch by the fisher.¹ The use of bleach is **ILLEGAL** for the harvesting of lobster in the Archipelago but continues to happen due to ineffective enforcement of regulation.



1. Wilson, David T., Duncan Vaughan, Shaun K. Wilson, Carrie N. Simon, and Kathy Lockhart . 2006. "A Preliminary Assessment of the Efficacy of a Chlorine Bleach Detection Method for use in the Spiny Lobster (*Panulirus argus*) Fisheries." *Gulf and Caribbean Fisheries Institute* 57: 860-868.
2. Best, Bruce R., Richard D. Braley, James A. Marsh, Jr., Daniel B. Matlock. 1981. "Effect of Chlorine on some Coral Reef Phytoplankters and Invertebrate Larvae." *Proceedings of the Fourth International Coral Reef Symposium* 1:169-172.

CURRENT REGULATION

Regulation within the Bahamian Archipelago says that “no person shall use bleach or any other noxious substances for the harvest of lobster”.³ Fees are enforced if any fisher is found using bleach for the harvest of lobster.

SOLUTIONS/ ALTERNATIVES

Regulation is difficult to enforce within the Archipelago because of governmental understaffing, large scale ocean zones, and tricks fishers use to hide their use of bleach. Solutions include increasing the number of regulators and decreasing the amount of space enforcers must sanction. Working from the inside, fishers would be the best possible regulators. Creating an incentivized system where fishers are regulating each other would inspire action against the use of bleach.

ENVIRONMENTAL IMPACTS



Chlorine bleach has been found in seawater because of illegal fishing activities, the use of chlorine as disinfectant in island waste and water systems, and biocide runoff from power-generating plants. Chlorine adversely affects phytoplankton through physical damage to cells, expelling of materials, decrease in primary productivity, and decrease in overall photosynthetic efficiency.⁴ Researches have found that levels as low as 0.1 ppm of chlorine concentration have negative effects on the productivity of entrained marine phytoplankton.⁵ Phytoplankton are extremely important to marine environments, being the foundation of the aquatic food web. The “biological carbon pump” phytoplankton carry out transfers 10 gigatonnes of carbon from the atmosphere to the ocean globally each year. Global Climate Change will only increase with any minor disruption or harm to phytoplankton growth and health.⁶



3. Fisheries and Resources Monitoring System 2017. “Turks and Caicos Islands Lobster Fishery.” Retrieved November 29, 2017 (<http://firms.fao.org/firms/fishery/986/en>)

4. Ahamed, Shafiq M., K. Suresh, G. Durairaj, K.V.K. Nair. 1993. “Effect of cooling water chlorination on primary productivity of entrained phytoplankton at Kalpakkam, east coast of India.” *Hydrobiologia* 271:165-168.

5. Carpenter, E. J., B. B. Peck, S.J. Anderson 1972. “Cooling Water Chlorination and Productivity of Entrained Phytoplankton” *Marine Biology* 16, 37-40.

6. Earth Observatory 2017. “Importance of phytoplankton.” Retrieved November 29, 2017 (http://www.asanet.org/sites/default/files/quick_tips_for_asa_style.pdf)

