

**ARAGONITE SATURATION AND NUTRIENT LEVELS ON CORAL REEFS
IN THE EASTERN AND SOUTHERN COASTS OF SRI LANKA**

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Corals rely on adequate aragonite saturation level (Ω_{ar}) in the ocean. Reduced Ω_{ar} makes corals more susceptible to dissolution. High concentrations of phosphate (PO_4^{3-}) lower the Ω_{ar} and nitrate (NO_3^-), intensifying coral bleaching during heat stress. Identifying how these parameters affect corals can guide effective interaction strategies to protect these ecosystems. This study evaluated the Ω_{ar} , NO_3^- , and PO_4^{3-} concentrations of coral reefs on the eastern coast (EC) and southern coast (SC) of Sri Lanka from March to May 2024 during the global coral bleaching event. Sampling was done in six sites on EC (Pasikudah, Kalkudah, Pigeon Island, Kayankerni, Adukkupar, and Salli Beach) and six sites on SC (Polhena, Mirissa, Talaramba, Weligama, Unawatuna, and Hikkaduwa). Three water samples were randomly collected from each coral reef from the sea surface, and salinity, pH, and temperature were recorded on-site. A set of samples was preserved at 4 °C and immediately transported to the laboratory to determine total alkalinity, NO_3^- , and PO_4^{3-} concentrations. Total alkalinity and PO_4^{3-} data were plotted using R 4.3.1 software for Ω_{ar} calculation. The mean values of the Ω_{ar} , NO_3^- and PO_4^{3-} on the SC were 4.21 ± 0.43 , $2.19 \pm 1.28 \mu\text{mol/L}$, and $0.74 \pm 0.22 \mu\text{mol/L}$, and the same on the EC were 4.44 ± 0.29 , $1.29 \pm 0.91 \mu\text{mol/L}$, and $0.35 \pm 0.07 \mu\text{mol/L}$, respectively. One-way ANOVA test confirmed no significant difference ($p > 0.05$) of Ω_{ar} in sampling areas. However, there was a significant difference ($p < 0.05$) in NO_3^- and PO_4^{3-} concentrations in sampling areas. Results showed Ω_{ar} was above the ecological threshold (3.5-3.6). Higher NO_3^- concentrations above $2 \mu\text{mol/L}$ in the SC were likely due to human activities, which may intensify coral bleaching during heat stress. The current result showed that Ω_{ar} in both coastal areas was ideal for coral formation and growth.

Keywords: Aragonite saturation level, Coral bleaching, Eastern coast, Nutrient, Southern coast