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# Linkage between Trace Element Distribution and Growth Ring Formation in Japanese Red Coral (Paracorallium japonicum)

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**Abstract :** This study investigated the distribution of magnesium (Mg), phosphorus (P), sulfur (S) and strontium (Sr) using micro X-ray fluorescence (μ-XRF) along the annual growth rings in the skeleton of Japanese red coral Paracorallium japonicum. The Mg, P and S distribution in μ-XRF mapping images correspond to the dark and light bands along the annual growth rings observed in microscopic images of the coral skeleton. The μ-XRF mapping data showed a positive correlation (r = 0.6) between P and S distribution in the coral skeleton. A contrasting distribution pattern of S and Mg along the axial skeleton of P. japonicum indicates a weak negative correlation (r = -0.2) between these two trace elements. The distribution pattern of S, P and Mg reveals linkage between their distributions and the formation of dark/light bands along the annual growth rings in the axial skeleton of P. japonicum. Sulfur and P were distributed in the organic matrix rich dark bands, while Mg was distributed in the light bands of the annual growth rings.

**Keywords :** μ-XRF, trace element, precious coral, Paracorallium japonicum
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