

BPO003-05

Room:201B

Time:May 26 09:30-09:45

Improvement of culturing experiment of planktic foraminifera using the fluorescent indicator calcein

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To reconstruct the paleoenvironmental variations using trace elements and stable isotopes of planktic foraminiferal calcite, it is necessary to determine the coefficient by vital effect based on culturing experiment. In the conventional culturing method, however, it was necessary to conduct the culturing experiment every one individual to distinguish the newly formed chambers. In that case, a lot of time was spent to obtain enough number of cultured specimens. Therefore, we attempted to construct a new culturing method of planktic foraminifera using the fluorescent indicator calcein.

Living planktic foraminifera were collected using a plankton net from the Tosa Bay, south of Kochi in Japan. Specimens of planktic foraminifera were cultured in calcein solution, which was adjusted at a concentration of 10 mg/L. We cultured individuals in calcein solution under two conditions for 48 hours and 72 hours temporarily to determine time necessary for the dye. Cultured individuals were moved to natural seawater condition after the culturing experiment in calcein solution.

We observed the calcein labeled chambers using a fluorescence microscope. As a result, fluorescence was observed in not only the newly formed final chamber but also the chamber that had been added before. Therefore, it is suggested that the surface of chambers, which were added before started culture, were also calcified in the experiment. On the other hand, it has been observed that a final chamber, which was added in natural seawater after culturing in calcein solution for 48 hours did not fluorescence. Based on our culturing experiment, the fluorescent indicator calcein is a good tool to distinguish the newly formed chamber. In addition, a temporarily culturing in the calcein solution is effective to culture more individuals of planktic foraminifera. Time necessary for temporary culturing in calcein solution is enough in 48 hours.

Keywords: planktic foraminifera, culture, fluorescent indicator calcein