

Structural differences of humic acid isolated from estuarine sediments at several fields around Ariake Sea

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Material transfer and circulation of coastal areas, and the form and state of the organic matter in the estuary tidal flat area, is attracting attention at various angles from the biological importance of the river estuaries. Analysis and evaluation of the sediment material and coastal water has been carried out around the river basin. So far, we have analyzed the chemical structure of humic substance in the Chikugo River basin near or vary by region. The Ariake Sea, from the fact that environmental issues such as hypoxic water and red tide has occurred, environmental analysis have been made from various points of view in recent years. However, research of organic matter deposition simultaneous in a wide range of areas of the Ariake Sea coast is a few instances.

In this study, humic acid fraction were extracted from the surface sediment of the tidal flat areas, including rivers and estuaries tidal flats, tidal flats as well as less affected by other rivers a broad area of the northern half of the Ariake Sea. Then, the extracted humic acids were analyzed such as stable isotopic analysis and elemental composition, and regional differences were compared. And the use of humic acid as environmental indicator was evaluated from the point of some differences to the several conventional analyses of the environmental indicators at the coastal area.

Sediment samples were collected at a total of seven locations of tidal flat (estuaries at Hayatsue-gawa, Rokkaku-gawa, Hama-gawa, Kikuchi-gawa, Shira-kawa, and tidal flat at Arao and Tara) and two places of the downstream of Chikugo River from May 2011 to August 2013. Humic acid fraction were prepared according to the IHSS soil humic acid extraction method. Multiple analysis, such as the elemental analysis, stable isotope ratios, ultraviolet-visible absorption analysis (application of (A₂/A₄) ratio of 270nm/407nm that has been proposed by Fookan and Liebezeit (2000)) were applied to the humic acid of coastal areas.

Correlation derived from the source materials was observed between stable isotope ratio, and the atomic ratio calculated from elemental analysis, ultraviolet-visible absorption ratio and the regional differences of humic acid. Contribution of terrigenous organic matter is poor at Hama-gawa estuary Tara and Arao tidal flat. Further, trend in nitrogen isotope ratio is different from the other regions and the 2 points (Hama-gawa mouth and Tara tidal flat). Conditions such as denitrification and nitrogen sources is somewhat different in the Ariake Sea northwest side was suggested.

Keywords: Ariake Sea, estuarine, stable isotope ratio, UV, humic substance