

## Bioenvironmental Activity of Polyphenols in Brown Algae: Inhibitory effects of phlorotannins on Bacterial Growth and Glycosidases

Takashi Nakamura and Kuniko Yamaguti  
Graduate School of Bioresource and Bioenvironmental Science,  
Kyushu University

### Summary

Antibacterial activity of brown algae growing in shallow water was investigated by paper-pad antibacterial assays using fish-pathogenic bacteria. Among the brown alga tested, chloroform-methanol extract of *Eisenia bicyclis* has the strongest activity. The components of the extract were separated and isolated by column chromatography (30×1cm i.d., Wakogel C-300, CHCl<sub>3</sub>/MeOH/H<sub>2</sub>O 50:30:7 v/v) and thin-layer chromatography (Silicagel 60 F254 Merck, CHCl<sub>3</sub>/MeOH/H<sub>2</sub>O/AcOH 50:25:4:3 v/v). The each component, phloroglucinol, eckol (trimer of phloroglucinol), phlorofucofuroeckol (pentamer), dieckol (hexamer), 8,8'-bieckol (hexamer) and unidentified tetramer has antibiotic activity. Minimum inhibition concentration (MIC) of phloroglucinol was estimated to be 3mg/disk.

After Immersion of freshly collected *Eisenia bicyclis* in sea water or fresh water, release of the phlorotannins was estimated by HPLC (ODS column 25×0.45, gradient elution of A: 30% MeOH to B: MeOH). Nearly all amount (87%) of phlorotannins exuded into the water during 2 days after death of the cell.

In order to elucidate the inhibitory mechanism, glycosidase inhibition of phlorotannins were tested using visceral enzymes of top shell and their inhibitory activity was estimated.