MICROBICIDAL ACTIVITY OF ISOThIOCYANATES (ITCS) EXTRACTED FROM HORserAdish (ARMORACIA RUSTICANA) ROOT ON ORAL MICROORGANISMS

Park HW*, Kim SJ†, Shin IS‡.

*Department of Dentistry, Gangneung-Wonju National University, 120 Gangnung daehangno, Gangneung city, Gangwon 210-702, Korea
†Department of Marine Food Science and Technology, Gangneung-Wonju National University, 120 Gangneung daehangno, Gangneung city, Gangwon 210-702, Korea

Tooth decay is one of the most common of all disorders and usually occurs in children and young adults but can affect anyone. It is a common cause of tooth loss in younger people. The horseradish (Armoracia rusticana) is a hardy perennial herb cultivated in temperate regions mainly for the culinary value of its roots. It is a pungent spice used in daily foodstuffs, including western dishes that contain beefsteak and frankfurter, and is a member of the Cruciferae family. Horseradish liberates isothiocyanates (ITCs) in a reaction with myrosinase (or thioglucoside glucohydrolase), and extracts of horseradish were reported to demonstrate antimicrobial activity against food-poisoning bacteria. The microbicidal activities of isothiocyanates (ITCs) extracted from horseradish root by distillation were investigated against oral microorganisms: 6 strains of facultative anaerobic bacteria, Streptococcus mutans, Streptococcus sobrinus, Lactobacillus casei, Aggregatibacter actinomycetemcomitans, Staphylococcus aureus and Enterococcus faecalis; 3 strains of obligate anaerobes, Fusobacterium nucleatum, Prevotella nigrescens, and Clostridium perfringens and one strain of yeast, Candida albicans. The ITCs extracted from horseradish root demonstrated strong microbicidal activity against all oral microorganisms. The minimum bactericidal concentration (MBC) of the ITCs ranged from 875.0 to 6,000 mg/L against facultative anaerobic bacteria, 156.0 to 625.0 mg/L against obligate anaerobic bacteria, and was 625.2 mg/L against C. albicans. The ITCs extracted from horseradish root showed the highest microbicidal activity, 156.0 mg/L, against F. nucleatum. These results suggest that the ITCs extracted from horseradish root may be a candidate for use as a microbicidal agent against oral pathogenic microorganisms.