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DPPH radical scavenging activity of selenocompounds: importance of selenium

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Abstract:

To investigate the antioxidant property of several selenocompounds we synthesized, 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging activity was determined by ESR. In this study, the experimental conditions for ESR measurement were also examined. Phosphate-buffered saline (PBS) was a better solvent for DPPH than dimethylsulfoxide (DMSO) or ethanol to obtain the strong signal intensity and the high S/N ratio. Among absolute signal intensity, absolute signal area, relative signal intensity to MnO, and relative signal area to MnO, the most suitable parameter corresponding to the concentration of DPPH was absolute signal intensity, because the correlation coefficient between absolute signal intensity and DPPH concentration was the highest. In low-molecular-weight selenocompounds, diethyldithiocarbamate selenotrisulfide (DEDC-SeT) had almost the same degree of DPPH radical scavenging activity as reduced glutathione or dithiothreitol, which are reference antioxidant compounds. The activity of DEDC-SeT was higher than that of sodium diethyldithiocarbamate or its disulfide form. Four polysaccharide-selenocystamine (SeCyst) conjugates, heparin-cystamine (Hep-Cyst), pullulan-selenocystamine (Pul-SeCyst), laminarin-selenocystamine (Lam-SeCyst), fucoidan-selenocystamine (Fuc-SeCyst) had DPPH radical scavenging activity which was similar to that of ascorbic acid or reduced glutathione. The activity of Hep-Cyst was higher than that of heparin or heparin-cystamine conjugate which has sulfur instead of selenium in the molecule. These results suggest that selenium is involved in the antioxidant activity of DEDC-SeT and polysaccharide-SeCyst conjugates.

Key words: [selenium](#), [selenocompound](#), [DPPH](#), [radical](#), [antioxidant activity](#), [ESR](#)

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