

**Development of Probe-Based Ultraweak  
Chemiluminescence Technique for the  
Detection of a Panel of Four Oxygen-Derived  
Free Radicals and Their Applications in the  
Assessment of Radical-Scavenging Abilities of  
Extracts and Purified Compounds from Food  
and Herbs**

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摘要

**Abstract**

We report here the development of a probe-based ultraweak chemiluminescence (uwCL) method capable of detecting a panel of four oxygen-derived free radicals (ODFRs) including superoxide ( $O_2^-$ ), hydrogen peroxide ( $H_2O_2$ ), hydroxyl radical ( $\cdot OH$ ), and peroxy radical ( $ROO\cdot$ ) using different probes specific for these radicals performed by the same uwCL analyzer. The selected radical-generating systems and their corresponding uwCL-probing emitters were validated. These ODFR-detecting systems were subsequently utilized by us to assess the radical-scavenging ability (RSA) of a variety of extracts and purified constituents derived from foods and herbal preparations. Our approach for assessing RSA for these constituents is based on the suppression of uwCL generated by each ODFR, and the degrees of inhibition have been shown to be dose-dependent. For this reason, the estimation of  $IC_{50}$  for each testing compound can be obtained from the curve constructed based on the percent of inhibitions of uwCL versus the concentrations of the compound tested. To illustrate the practical applications of our devised methodology, data for comparative studies of RSA activities of fermented extracts of *Cordeceps sinensis*, purified methylgallate isolated from *Toona sinensis*, resveratrol purified from grape seeds, plus epimedin C from the aerial part of the *Epimedium* plant (*yinyanghuo*) are to be

presented.