P027 On the inhibition of hydroxyl radical reactivity by plant phenolics

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Hydroxyl radical ($OH^{\bullet}$), which is formed in biological environments from superoxide, either through the intervention of superoxide dismutase or upon combination with nitrogen monoxide, is responsible for much of the cellular damage associated with oxidative stress. Among the various procedures used for detecting the formation of $OH^{\bullet}$, several of these, including the method described by Jansson et al., are based on the quantification of fluorescent hydroxycoumarins. The present communication describes how this method, which was initially designed to analyse drinking water, has been adapted to the study of inhibitors of free radical-driven oxidations. Our work focuses on coumarin-3-carboxylic acid, which is oxidized by Cu^{2+}/ascorbate, with fluorescent 7-hydroxycoumarin-3-carboxylic acid being detected at 355/460 nm. The test compounds used were dicaffeoylquinic acid, its methyl ester, isoprenylhydroquinone glucoside, and epigallocatehin gallate (EGCG).

Good linearity and reproducibilty were obtained in the range of 0.009-0.3 μM 7-hydroxycoumarin-3-carboxylic acid. The optimal concentrations of substrate and ascorbate were found to be 0.53 mM and 5.33 mM, respectively. The hydroxylation process was quite resistant to the effects of natural phenolic compounds, with EGCG showing a 30% inhibition at 100 μM. Unlike what we had observed in previous studies, in these reactions the ortho-dihydroxyaryl structure was devoid of any special interest.