

Antioxidant and nitric oxide production inhibitory activities of galacturonyl hydroxamic acid

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Abstract

The self-prepared pectin hydroxamic acid has been reported to have antioxidant activities [Yang, S. S., Cheng, K. D., Lin, Y. S., Liu, Y. W., & Hou, W. C. (2004). Pectin hydroxamic acids exhibit antioxidant activities in vitro. *Journal of Agricultural and Food Chemistry*, 52, 4270–4273]. In this study, the galacturonic acid (GalA), the monomer unit of the pectin polymer, was esterified with acidic methanol (1 N HCl) at 4 °C with gentle stirring for 5 days to get galacturonic acid methyl ester which was further reacted with alkaline hydroxylamine to get galacturonyl hydroxamic acid (GalA-NHOH). The GalA-NHOH was used to test the antioxidant and antiradical activities in the comparison with GalA. The scavenging activities of GalA-NHOH against DPPH radicals (half-inhibition concentration, IC₅₀, was 82 μM), hydroxyl radicals detected by electron spin resonance (IC₅₀ was 0.227 nM in the comparison with Trolox of 0.433 μM), superoxide radicals (IC₅₀ was 830 μM) were determined. The protection activities of GalA-NHOH against hydroxyl radicals-mediated calf thymus DNA damages, linoleic acid peroxidation and peroxynitrite-mediated dihydrorhodamine 123 oxidations were also investigated. It was found that the GalA-NHOH exhibited dose-dependently antioxidant activity and few or none was found in GalA. The GalA-NHOH was used to evaluate the suppressed activity of nitric oxide (NO) productions of RAW264.7 cells in the presence of lipopolysaccharide (LPS, 100 ng/ml) as inducers. It was found that GalA-NHOH (0.02–0.1 mg/ml) could dose-dependently suppress the NO productions (expressed as nitrite concentrations) in RAW264.7 cells without significant cytotoxicity.