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Author information

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Abstract

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Abstract

We studied the *in vitro* antioxidant activities of neutral aqueous solution systems (water products marketed as drinks) containing hydrogen gas (H_2), 2-carboxyethyl germanium sesquioxide (Ge-132), and platinum (Pt) nanocolloid as additives. We evaluated the abilities of these aqueous solutions to inhibit the oxidation of biomolecules catalyzed by an enzyme and induced by reactive oxygen species (ROS) and also to scavenge ROS directly using electron spin resonance (ESR) spectrometry. The concentrations of inorganic elements including Ge and Pt were measured by inductively coupled plasma-mass spectrometry (ICP-MS) and inductively coupled plasma-atomic emission spectrometry (ICP-AES). All the water products examined more or less inhibited the oxidation of 3,4-dihydroxyphenylalanine by tyrosinase and that of L-histidine in an L-ascorbic acid/Cu^{2+} reaction system. The results of ICP-MS and ICP-AES analyses revealed that Ge, Pt, and some major minerals existed in the water products at concentrations approximately equivalent to those reported by their manufacturers. The ESR spectra indicated that the dissolved Ge-132 molecules and the supplemented Pt nanocolloid particles reduced hydroxyl and superoxide anion radicals. However, under the conditions employed, aqueous H_2 did not display such a scavenging ability for these ROS. Our results suggest that H_2, Ge-132 and Pt nanocolloid dissolved or supplemented in neutral aqueous media exhibited antioxidant activities *in vitro* due to the direct scavenging of ROS and/or by other mechanisms.

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