

Antioxidant activities of dioscorin, the storage protein of yam (*Dioscorea batatas* Decne) tuber

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Abstract

Dioscorin, the storage protein of yam (*Dioscorea batatas* Decne) tuber (which is different from dioscorine found in tubers of *Dioscorea hirsuta*), was purified to homogeneity after DE-52 ion exchange column according to the methods of Hou et al. (J. Agric. Food Chem. 1999, 47, 2168-2172). A single band of 32 kDa dioscorin was obtained on a sodium dodecyl sulfate-polyacrylamide gel electrophoresis gel with 2-mercaptoethanol treatment. This purified dioscorin was shown by spectrophotometric method to have scavenging activity against 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical in a pH-dependent manner. There is a positive correlation between scavenging effects against DPPH (8-46%) and amounts of 32 kDa dioscorin (5.97-47.80 nmol) added in Tris-HCl buffer (pH 7.9), which are comparable to those of glutathione at the same concentrations. Using electron paramagnetic resonance (EPR) spectrometry for DPPH radical detection, it was found that the intensities of the EPR signal were decreased by 28.6 and 57 nmol of 32 kDa dioscorin in Tris-HCl buffer (pH 7.9) more than in distilled water compared to controls. EPR spectrometry was also used for hydroxyl radical detection. It was found that 32 kDa dioscorin could capture hydroxyl radical, and the intensities of the EPR signal were significantly decreased dose-dependently by 1.79-14.32 nmol of 32 kDa dioscorin ($r = 0.975$) compared to the control. It is suggested that 32 kDa dioscorin, the storage protein of yam tuber, may play a role as antioxidant in tubers and may be beneficial for health when people take it as a food additive or consume yam tubers.