The influence of different treatments on the free radical scavenging activity of burdock and variations of its active components

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Abstract

The root of burdock (Arctium lappa L.) has long been cultivated as a popular vegetable in Taiwan and Japan for dietary use and folk medicine. The present study investigated the influence of the different treatments of peeling and heat treatment on (1) the free radical scavenging activity of burdock, using a 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assay and on (2) variations of its active components, chlorogenic acid and caffeic acid, by a HPLC method. Treatments were divided into four groups: group I, root of burdock without heat treatment; group II, peeled root of burdock without heat treatment; group III, root of burdock with heat treatment; and group IV, peeled root of burdock with heat treatment. Freeze-dried powders from both the root and peeled root of burdock, after heat treatment, had poor physical properties due to the apparent coagulation according to visual observations. The active phenolic components, chlorogenic acid and caffeic acid, existed mainly in the skin of burdock root, and the content of chlorogenic acid was much higher than that of caffeic acid. Burdock possessed significant free radical scavenging activity, which was mainly attributed to chlorogenic acid, whose free radical scavenging activity was similar to that of caffeic acid and higher than that of vitamin E. Peeling of the root greatly decreased the free radical scavenging activity and the concentrations of these two active components, due to elimination of the components in the discarded skin. Heat treatment slightly decreased the free radical scavenging activity, which was partially due to the degradation of chlorogenic acid.