

Superoxide Anion Scavenging Activity and Metal Contents of Coffee

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ABSTRACT

Superoxide anion radical, which is an active form of molecular oxygen, has both beneficial and harmful effects to organisms. Especially, superoxide anion is proposed to cause oxidative injury to cells and tissues due to the successive formations of more reactive oxygen species such as hydrogen peroxide and hydroxyl radicals. Coffee which contains both polyphenols like tannins and metalloproteins like superoxide dismutases is highly expected to scavenge the active oxygen species such as superoxide anion. We studied the beneficial effect of coffee in terms of both superoxide anion scavenging activity (SSA) and metal contents of coffee which we take every day, by evaluating with ESR (electron spin resonance)-spin trapping, neutron activation analysis (NAA) and flameless atomic absorption (FAA) methods. Coffees imported from different countries were found to have SSA in the range of 470~1360 SOD unit/ml of coffee extract, indicating that almost coffees examined have relatively good SSA. Nineteen sorts of elements were detected by both NAA and FAA methods, depending on the kind of coffee. A correlation between SSA and the metal ratio Mn/Fe was found, indicating the occurrence of SOD-like activity of coffee. Thus, every time when we drink a cup of coffee (130 ml), SSA which corresponds to 61~177 kilounit SOD was indicated to be taken.