Antioxidant peptides with angiotensin converting enzyme inhibitory activities and applications for angiotensin converting enzyme purification

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Abstract

Five commercial peptides, namely, reduced glutathione (GSH), oxidized glutathione (GSSG), carnosine, homocarnosine, and anserine, were used to test angiotensin converting enzyme inhibitory (ACEI) activities using N-[3-(2-furyl)acryloyl]-Phe-Gly-Gly (FAPGG) as a substrate. All of these peptides showed dose-dependent ACEI activities. Using 50% inhibition (IC(50)) of captopril as 0.00781 microM for the reference, the IC(50) values of GSH, carnosine, homocarnosine, and anserine were determined to be 32.4 microM, 5.216 mM, 6.147 mM, and 6.967 mM, respectively. GSH or carnosine showed mixed noncompetitive inhibition against ACE. When 0.0164 mM GSH or 0.4098 mM carnosine was added, the apparent inhibition constant (K(i)) was 49.7 microM or 3.899 mM, respectively. Commercial glutathione-Sepharose 4 fast flow, GSH-coupled CNBr-activated and GSH-coupled EAH-activated Sepharose gels were used for ACE purification. Commercial ACE could be adsorbed only by EAH-coupled GSH gels and eluted off the gels by increasing salt concentrations. These EAH-coupled GSH gels might be developed as affinity aids for ACE purification.