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Toxic target of trans-crotonaldehyde in mitochondria altered by diallyl disulfides for anti- myocardial ischemia

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Abstract The purposes of this study were to probe spectral behaviors of the toxic targets in trans-crotonaldehyde (TCA) in mitochondria altered by diallyl disulfides (DADS) derived from garlic. Ultraviolet absorption spectra showed that when ethanol as a solvent, the DADS blue shifted the peak of TCA from 318 nm to 312 nm. In mitochondria, the DADS further blue displaced the peak of TCA from 312 nm to 308 nm. Raman spectra displayed that the -S-S- of DADS directly interacted with the C=C toxic target of TCA, then the C=C-C of DADS interacted with the -CH=O toxic target of TCA. When DADS to TCA was 1:2, the DADS was the most powerful for the removal of the C=C and -CH=O toxic targets of TCA. Study suggested that the -S-S- of DADS altered the C=C toxic target of TCA, while the -C=C-C- of DADS eliminated the -CH=O toxic target of TCA *via* local electron delocalization. The above two together clearly depicted the spectral behaviors of the toxic targets of TCA in mitochondria altered by DADS. These results are of great significance and value to elucidate the effects of garlic organic polysulfide on myocardial ischemia for the extensive development and use of garlic extracts.

Key words: diallyl disulfide; trans-crotonaldehyde; spectral behavior; ultraviolet visible absorption spectrum; Raman spectrum