

## Bioactivity and Bioavailability of Lycopene-Rich Carotenoid Concentrate Extracted from Tomatoes

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Lycopene as a natural antioxidant may provide protection against a broad range of epithelial cancers and some chronic diseases. Lycopene-rich carotenoid concentrate as a functional food is extracted from tomatoes by food processing. Lycopene would undergo degradation via isomerization and oxidation during extraction under different processing conditions, which impacts its bioactivity and reduce the functionality for health benefits. It is the key process how to maintain high bioactive property during food processing and storage. The study has been carrying on to determine the anti-oxidant properties of lycopene-rich carotenoid concentrate on lipid peroxidation which was generated from the oxidation of (-linolenic acid. The effects of thermal treatment, O<sub>2</sub> and light on the stability of lycopene bioactivity were determined. Results have shown that lycopene bioactivity potency depends on the extent of isomerization, and the composition of lycopene-rich carotenoid concentrate. *Cis*-isomers have high bioactivity but are less stable. Lycopene-rich carotenoid concentrate has higher bioactivity than puree lycopene. Synergistic effect of lycopene-rich carotenoid concentrate is based on the content of lycopene, and other carotenoids in the extract concentrate. A true assessment of health benefits of lycopene-rich carotenoid concentrate depends on the lycopene content of all *trans*-isomers, *cis*-isomers, other carotenoids, and their composition. The bioavailability of lycopene-rich carotenoid concentrate is being investigated in the clinic trial, which is a collaborative experiment with Human Nutraceutical Research Unit in University of Guelph.