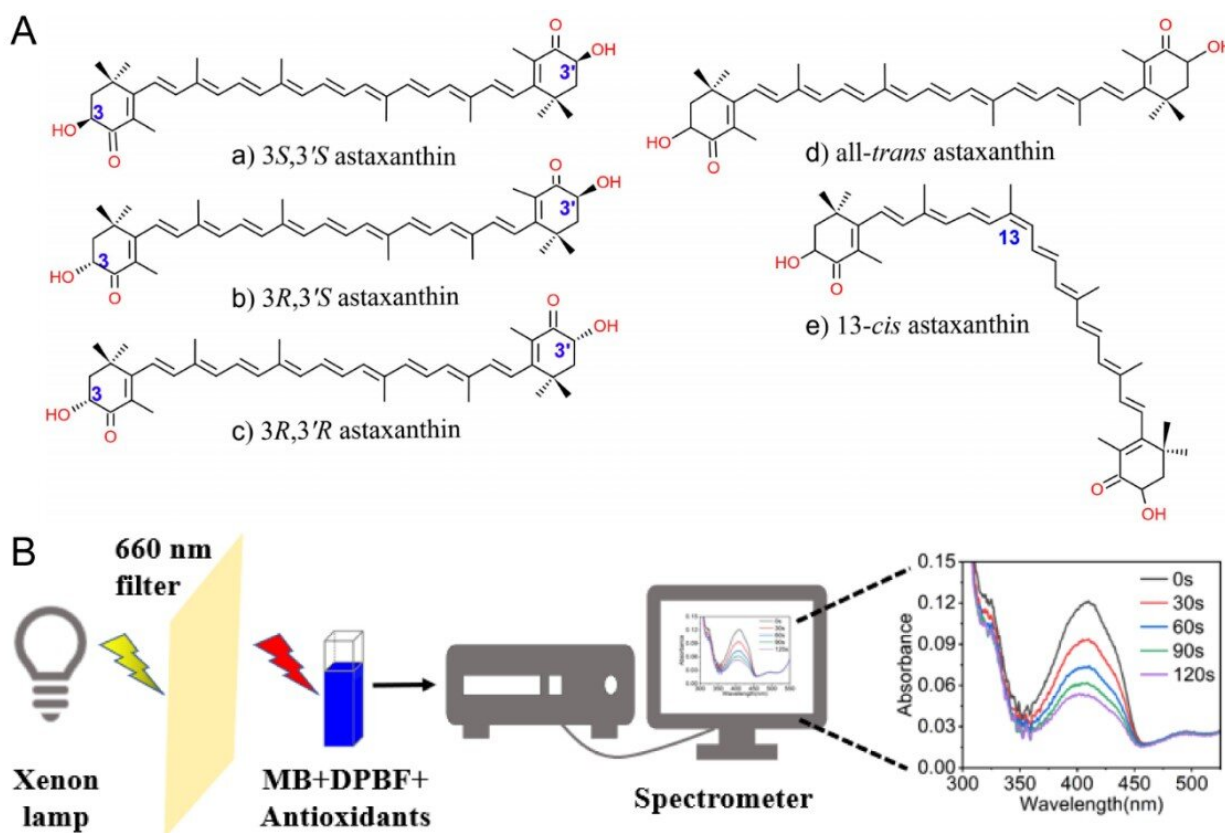


Differences found in antioxidant activities of astaxanthin isomers against singlet oxygen

August 16 2022, by Zheng Xinxin, Zhao Weiwei



(A) Structures of stereoisomers of astaxanthin. (B) Measurement of the singlet oxygen quenching capacity of antioxidants. Credit: Zheng Xinxin

Recently, researchers led by Prof. Huang Qing from Institute of Intelligent Machines, Hefei Institutes of Physical Science (HFIPS) of

Chinese Academy of Sciences (CAS) suggested a new method to evaluate the antioxidant activity of astaxanthin isomers against singlet oxygen.

The results were published in *Food Chemistry*.

Astaxanthin has excellent antioxidant properties and is widely used in food supplements. It has many isomers and their physical and [chemical properties](#) are also different. The team has been carrying out work on the source of [astaxanthin](#), properties and functions for years. In this study, they tried a spectroscopic method to investigate the antioxidant activity of isomers of astaxanthin against [singlet oxygen](#) ($^1\text{O}_2$). Singlet oxygen is a kind of reactive oxygen species (ROS) with [long life](#) and strong oxidation capacity. In the past, studies on the antioxidant activity of astaxanthin did not specifically distinguish the active oxygen species and generally ignored the difference in antioxidant activity of astaxanthin's isomers.

Based on previous research, scientists used [methylene blue](#) (MB) as a photosensitizer to generate $^1\text{O}_2$, and used probe 1, 3-diphenylisobenzofuran (DPBF) to detect $^1\text{O}_2$ in the solution. The singlet oxygen quenching capacities of astaxanthin isomers were evaluated by comparing the absorption changes of DPBF at 410 nm under different astaxanthin treatment, and the quenching constants of astaxanthin isomers were compared with that of vitamin E.

The study found that the singlet oxygen quenching constant of astaxanthin was three orders of magnitude different from that of vitamin E. The $^1\text{O}_2$ quenching capacities of the optical isomers of astaxanthin are almost identical in extracellular experiments. For the cis-trans geometric isomers of astaxanthin, the $^1\text{O}_2$ quenching capacity of cis-astaxanthin was significantly higher than that of all-trans astaxanthin.

It offered a simple and facile spectroscopic method to assess the antioxidant activity of different forms of astaxanthin against singlet oxygen and reveals significant differences between geometric isomers, which provided a new basis for the practical application of astaxanthin in the [food industry](#) and the development of future biological functions.

More information: Xinxin Zheng et al, Assessment of the antioxidant activities of representative optical and geometric isomers of astaxanthin against singlet oxygen in solution by a spectroscopic approach, *Food Chemistry* (2022). [DOI: 10.1016/j.foodchem.2022.133584](https://doi.org/10.1016/j.foodchem.2022.133584)

Provided by Hefei Institutes of Physical Science, Chinese Academy of Sciences

Citation: Differences found in antioxidant activities of astaxanthin isomers against singlet oxygen (2022, August 16) retrieved 27 April 2024 from <https://phys.org/news/2022-08-differences-antioxidant-astaxanthin-isomers-singlet.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.