

Can biomass-derived carbon dots improve photosynthesis?

Here, we present a closed-loop strategy using biomass-derived carbon dots (CDs) for improving photosynthesis. We demonstrate that the CDs act as both light converters and photosensitizers by converting solar irradiation to red light and supplying light-excited electrons into the photosynthetic electron transfer chain.

How do amine-functionalized CDs affect photosynthesis?

Amine-functionalized CDs are strongly conjugated to the chloroplast surface, assisting in photon absorption and electron transfer to chloroplasts. This accelerates the entire electron transfer chain in the photosynthetic reaction, thereby enhancing photosynthesis.

Do biomass-derived CDs enhance plant photosynthesis?

Those results suggest that our synthesized biomass-derived CDs are the most promising approach for enhancing plant photosynthesis. Additionally, we assessed the economic benefits of employing CDs based on the market values of various economically significant plants (Supplementary Fig. 16b).

Do biohybrids have more photosynthetic efficiency than cyanobacteria?

Biohybrids incorporating CDs and cyanobacteria or plant exhibited increased photosynthetic efficiency, when compared with the photosynthetic organism only.

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Photosynthetic Biohybrids Natural photosynthesis relies upon a series of light harvesting proteins that possess a series of limitations. They are optically limited to an absorption peak, capable of utilizing ...

A solar-powered zinc-ion hybrid capacitor (ZHC) based on natural thylakoids (Thy) and fluorescent carbon dots (CDs) was developed for simultaneous light harvesting and energy storage. ...

This work presents the successful integration of 104 CDs with photosynthetic organisms to create CDs-biohybrid systems that significantly 105 boost photosynthesis.

Abstract Read online Abstract Improving photosynthetic efficiency is pivotal for biomanufacturing and agriculture. Despite the progress on photosynthetic biohybrids integrating biocatalysts with materials, ...

first reviews the major progresses in modeling photosynthesis, and the major applications of systems modeling in guiding plant photosynthesis improvement, then discusses the future ...

BEIJING, March 11 (Xinhua) -- A Chinese research team has developed a carbon-based nanomaterial from agricultural waste biomass that can enhance plant photosynthesis and potentially boost crop ...

Under solar light irradiation, the embedded CDs in thylakoids (CDs/Thy) can convert the less absorbed green light into highly absorbed red light for thylakoids, besides, F&#246;rster resonance ...

Global agricultural productivity and food security are facing severe challenges from abiotic stresses, necessitating sustainable agricultural innovations to address this issue. Nanotechnology, ...

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