



Foliar Formulation to Protect Plants from Abiotic Stress

Tech ID: 31998 / UC Case 2016-942-0

BACKGROUND

Abiotic stress such as cold, drought, and salt largely influences plant development and crop productivity. Plant abiotic stress leads to accumulation of reactive oxygen species (ROS) and a consequent decrease in photosynthetic performance.

Crops with enhanced oxidative stress protection may lead to maximized yield and tolerance to excess light, heat, salt stress, and other types of abiotic stress.

BRIEF DESCRIPTION

Prof. Juan Pablo Giraldo and his colleagues from the University of California, Riverside have developed a foliar formulation for increasing crop protection and photosynthetic performance when crops are under light, heat, and salinity stress. This is achieved by applying a nanomaterial (poly (acrylic acid) nanoceria, PNC) that interacts with plant chloroplasts to reduce abiotic stress.

The nanoparticle formulation uses a novel, scalable and biocompatible approach to protect plant seeds, seedlings, and mature plants from stress. The emerging field of nano-enabled agriculture has the potential to create crops that are protected from climate change induced stresses and have enhanced photosynthesis.

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OTHER INFORMATION

KEYWORDS

Poly acrylic acid nanoceria, PNC,
augmented photoprotection, plant,
abiotic stress, crop yield

CATEGORIZED AS

- ▶ **Agriculture & Animal Science**
 - ▶ Chemicals
 - ▶ Other
- ▶ **Nanotechnology**
 - ▶ NanoBio

RELATED CASES

2016-942-0

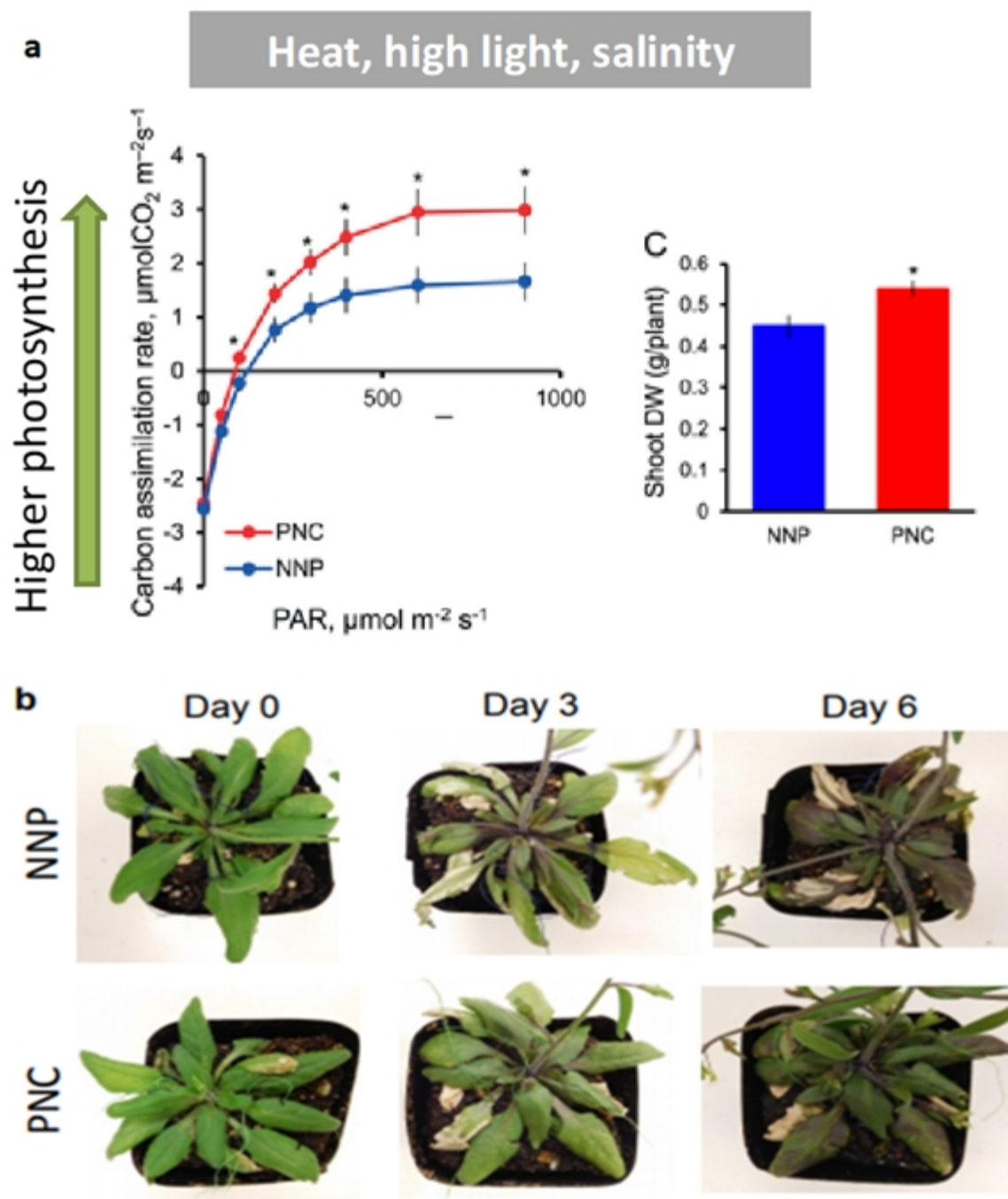


Fig 1: a, Nanoceria (PNC) increases photosynthesis and biomass in Arabidopsis plants under stress. No nanoparticles (NNP) are shown as control. b, Substantial damage to Arabidopsis plants exposed to excess light was mitigated by PNC.

SUGGESTED USES

- ▶ To maximize crop yield and increase crop resistance to damage caused by abiotic stress

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,798,938	10/13/2020	2016-942

RELATED MATERIALS

- ▶ Anionic Cerium Oxide Nanoparticles Protect Plant Photosynthesis from Abiotic Stress by Scavenging Reactive Oxygen Species
Honghong Wu, Nicholas Tito, and Juan P. Giraldo ACS Nano 2017 11 (11), 11283-11297 DOI: 10.1021/acsnano.7b05723 - 11/03/2017

