



The Connecticut Agricultural Experiment Station

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123 Huntington Street

New Haven, CT 06511

203.974.8500

Toll free: 1.877.855.2237

Fax: 203.974.8502

Email: caes@ct.gov • portal.ct.gov/caes

PRESS RELEASE

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MEDIA CONTACTS:

Dr. Washington da Silva, Ph.D. (Virologist)
Department of Plant Pathology and Ecology
The Connecticut Agricultural Experiment Station
123 Huntington Street, New Haven, CT 06511
Phone: (203)-974-8546
Email: Washington.daSilva@ct.gov

Dr. Nubia Zuverza-Mena, Ph.D. (Chemist)
Department of Analytical Chemistry
The Connecticut Agricultural Experiment Station
123 Huntington Street, New Haven, CT 06511
Phone: (203)-974-8459
Email: Nubia.Zuverza@ct.gov

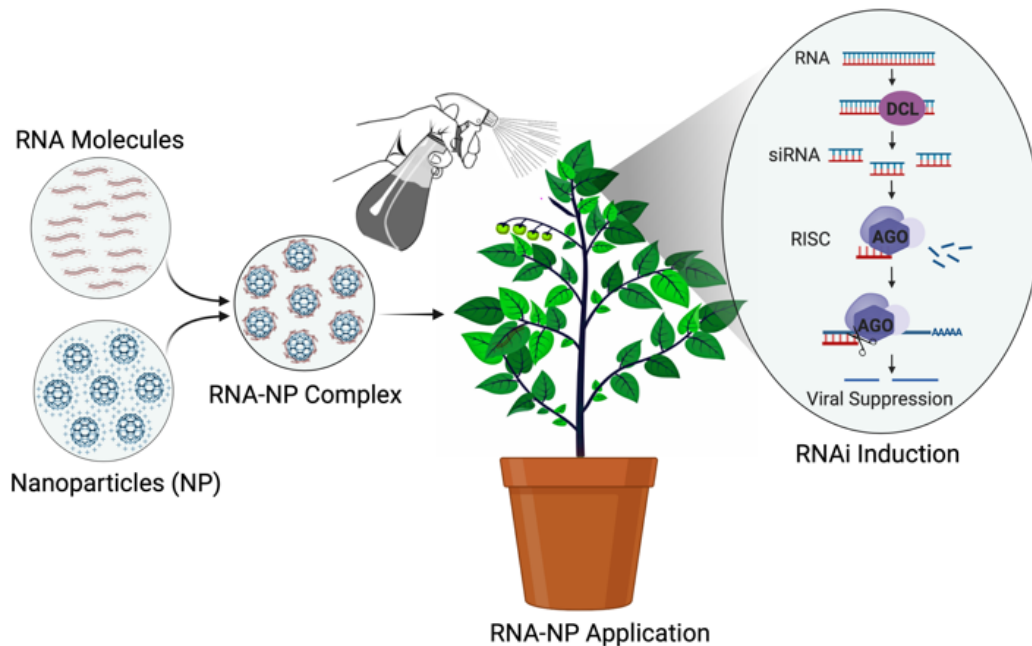
USDA Awards The CT Agricultural Experiment Station \$636,646.00 to Fight Plant Viruses with Nanotechnology

New Haven, CT - The USDA National Institute of Food and Agriculture (NIFA) has awarded scientists at The Connecticut Agricultural Experiment Station (CAES) a three-year grant to develop a system to deliver antiviral therapeutics to plants using nanoparticle carriers. The project leader is Dr. Washington da Silva, a virologist in the Department of Plant Pathology and Ecology, in collaboration with Dr. Nubia Zuverza-Mena, a chemist in the Department of Analytical Chemistry.

Plant diseases caused by viruses result in over \$30 billion in global crop losses annually. Because there are no antiviral treatments, viral diseases are extremely hard to control, and farmers must choose resistant plant varieties or spray pesticides to control virus-carrying insects. In his recent work, Dr. da Silva has identified specific ribonucleic acid (RNA) molecules that induce RNA interference (RNAi), an evolved plant defense mechanism that we are seeking to activate or enhance, in plants and prime plants to successfully resist viruses. However, RNA is unstable, and the effect only lasts for a short period before the RNA is degraded.

The new funding will allow Drs. da Silva and Zuverza-Mena to develop and test sustainable nanoparticles as carriers for the RNA. Nanoparticles are molecules smaller than 100 nm, or 1,000th the thickness of a human hair, and some types can be used safely for protection and delivery of compounds into cells. The CAES researchers will develop nanoparticles that prolong the delivery of RNAs in plants, as a first step toward durable and sustainable control of plant viruses. "As safe applications of nanomaterials develop, nanotechnology is becoming a promising resource to promote sustainable agriculture", said Dr. Zuverza-Mena. Dr. da Silva added, "RNA molecules are natural and occur in every living organism, and they are biocompatible and biodegradable. To fully harness the potential of RNA in fighting plant viral infections, we need to develop an effective delivery system. Nanotechnology may become the most powerful tool in our toolbox!"

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Overview of the research activities proposed. RNA molecules will be synthesized in the lab and conjugated with nanocarriers, forming an RNA-NP complex. The complex will be sprayed on plants' canopy for slow release of RNA into plant leaves, which will induce RNA interference (RNAi), a cascade of natural enzymatic reactions in the plants that result in viral infection suppression.