Fact Sheet

HONEY BEES

DATE: September 2020
LOCATION: Texas

NanoCrop

The objective of this study was to assess the acute contact toxicity potential of NanoCrop, Powered by PureCrop NanoTech, to adult worker honey bees (*Apis mellifera*) per the Environmental Protection Agency Office of Chemical Safety and Pollution Prevention Guideline 850.3020. The results concluded that **NanoCrop is non-toxic to honey bees**, even at three times the recommended use amount.

Trial Conditions

In this study, adult worker honey bees were exposed to NanoCrop by direct topical application at the nominal dose of 25 µg (.025mL) a.i. (active ingredient)/bee. Deionized water with Polysorbate 80 was used as the vehicle for all groups. A single dose of the NanoCrop solution was administered to 100 bees. Another group of 100 bees was dosed with the vehicle only, serving as the vehicle control. A third group of 100 bees served as the untreated control. Three additional groups of 100 bees were dosed with the toxic standard, Dimethoate, at 0.01 µg/bee, 0.1 µg/bee, or 1.0 µg/bee and served as positive controls.

Procedure

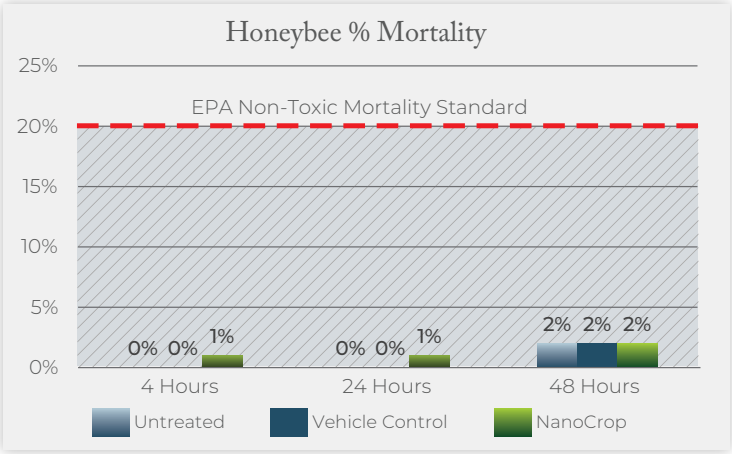
Approximately 0.833 mL of NanoCrop was placed in a 10 mL container and mixed with the vehicle to make a 12.5 µg a.i./µL solution. A single dose of NanoCrop solution, the vehicle, or the positive control was applied to each bee's thorax via a micro-applicator. All bees were dosed topically on the dorsal side of their thorax with 2 µL of the appropriate solution.

***Note that the dosage of NanoCrop is 3x higher than the recommended usage amount.** This was done to comply with EPA testing guidelines.*

Conclusions

For a valid test, no more than 20% of the bees in either the untreated or the vehicle control group could be dead at the end of the test. All bees were observed at approximately 4, 24, and 48 hours after dosage for mortality and clinical signs of toxicity, particularly signs of intoxication (ataxia, lethargy, hypersensitivity, etc.). Results were evaluated by comparing mortality between the treated and untreated control groups.

> "Since mortality in the test substance group did not exceed the mortality in the untreated and vehicle control groups and control mortality was less than 20%, the LD_{50} for the test substance, **[NanoCrop] is considered to be greater than the nominal dose of 25 µg a.i./bee and was non-toxic when administered by contact to adult honey bees."**
>
> - Cole Younger, PhD
> *Study Director, Entomologist*
> *STILLMEADOW, Inc.*



**All references to "NanoCrop" in this fact sheet and referenced data refer to and reference PureCrop1 data, results, and application. NanoCrop's formula is based on PureCrop NanoTech and is optimized for commercial agriculture application. Results will be comparable.*

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NanoCrop Label Summary

OPTIMIZED FOR COMMERCIAL AG
POWERED BY PURECROP NANOTECH

NanoCrop

Modes of Action

INSECTICIDE

Eliminates sap-sucking insects by interfering with their digestive enzymes, causing constant micelle expansion and rupturing the insect. NanoCrop — Powered by PureCrop NanoTech — is safe for use around beneficial insects, such as honey bees, predatory mites and wasps, and ladybugs.

FUNGICIDE

Contains surface acting agents that physically remove mold and mildew from the leaf's surface. The micelle encapsulates and biodegrades spores, while also preventing reattachment and growth for up to ten days due to its translaminar properties.

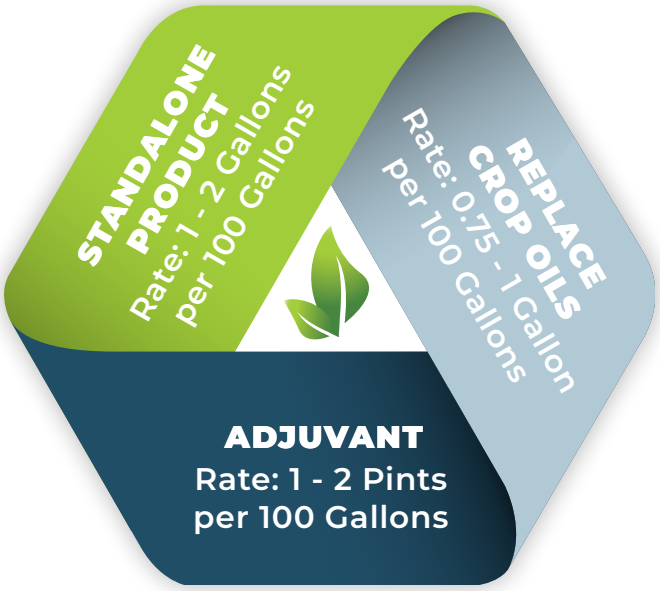
BIOSTIMULANT

NanoCrop is made of long-chain fatty acids that the plant converts into amino acids, which reduces interfacial tension, and enhances mesophyll conductance and ion transfer capacity—resulting in the ability to respond to abiotic stress, maximizing water and nutrient utilization and improve overall plant health.

SUPRA-MOLECULAR SURFACTANT

NanoCrop utilizes surfactant molecules, micelles, to lower the surface tension of water. They enable NanoCrop to spread and adhere to leaf surfaces uniformly, while dispersing evenly in water and mix indefinitely. Micelles do not clog or flood the stomata due to their size and are compatible with most products, except other surfactants.

NanoCrop Uses



PESTS & DISEASES

Including, but not limited to: Aphid, Asian Citrus Psyllid, Broad Mite, Citrus Rust Mite, Spider Mite, Russet Mite, Thrips, Whiteflies, Lygus, Stink Bug, Leaf-Footed Plant Bug, Mealybug, Scale, Snail, Botrytis, Fusarium Wilt, Downy Mildew, Powdery Mildew, Alternaria, Anthracnose, Bacterial Blast, FireBlight.

BUFFER RECOMMENDATIONS

Buffer water to pH 5.5-5.8 with citric acid before adding NanoCrop. Do not buffer with ammonia sulfates or sodium based buffers.

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