

# Educational Brief

## Copper Exposure, Permethrin Use, and Combined Toxicity Risks

### Public Health and Environmental Awareness Document

#### Purpose of This Document

This document is intended to educate residents, policymakers, and community advocates about **documented toxicological concerns related to copper exposure, permethrin insecticide use, and their combined effects**. It highlights existing research, observed risks, and public safety considerations. It also clearly states the author's position regarding public health protections.

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#### Background: Copper Research and Environmental Exposure

Research conducted in academic and environmental science settings, including work associated with the **University of Arizona** in Tucson, has examined the biological and environmental impacts of **copper exposure** in soil, water, and living organisms.

Copper is an essential trace mineral in small amounts; however, **excess exposure is well-documented to cause toxicity**, particularly affecting the **liver, heart, and nervous system**. Importantly, **damage from copper accumulation may remain clinically silent until organ injury is advanced**, meaning individuals may not realize harm is occurring until it is severe or irreversible.

#### Position Statement:

It is my position that copper should not be used at all in combination with residential spray programs in Florida. I believe the combination of copper and insecticides presents an unacceptable health risk to residents.

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#### Permethrin Overview

Permethrin is a widely used **synthetic pyrethroid insecticide** designed to act as a **neurotoxin to insects**. While effective for pest control, permethrin is not biologically inert in humans or animals.

## Known Health Effects of Permethrin

- **Neurotoxicity**

Permethrin interferes with nerve signaling by causing repetitive nerve impulses. High or repeated exposure may result in:

- Tremors
- Incoordination
- Muscle weakness
- Hyperthermia

- **Skin and Sensory Effects**

Dermal exposure is associated with **paresthesia**, including:

- Tingling
- Burning
- Itching
- Numbness

- **Systemic Symptoms**

Inhalation or ingestion may cause:

- Dizziness
- Headache
- Fatigue
- Nausea
- Vomiting
- Abdominal pain

- **Long-Term Exposure Concerns**

Emerging research has explored potential associations between chronic exposure and **blood disorders**, including MGUS (Monoclonal Gammopathy of Undetermined Significance), though research is ongoing.

- **Environmental Impact**

Permethrin is **extremely toxic to aquatic life and pollinators**, particularly fish and bees.

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# Copper and Permethrin: Interaction Risks

## Combined Toxicity

Studies in environmental and agricultural toxicology have shown that **copper compounds** (such as copper sulfate or copper hydroxide) combined with **pyrethroid insecticides** (including permethrin and cypermethrin) can result in **enhanced toxicity** in non-target organisms.

## Environmental Persistence

- Copper ions in soil can **slow the degradation of pyrethroids**, extending environmental exposure times.
- This persistence increases the likelihood of repeated human and ecological contact.

## Health Effects of Copper Exposure

Copper compounds are known to:

- Be corrosive to mucous membranes and the cornea
- Cause metallic taste
- Trigger nausea and intestinal pain
- Accumulate in the liver, potentially leading to **hepatic injury**
- Contribute to cardiovascular stress when levels exceed normal metabolic handling

## Concern Statement:

Even short-term exposure (1–3 months) may place significant stress on otherwise healthy body systems. The cumulative and synergistic effects of copper and permethrin are not adequately communicated to the public.

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## Public Awareness and Risk Communication

Many residents are **not fully informed** about the health implications of residential spray programs or the **combined chemical exposures** involved. This lack of awareness prevents informed consent and limits individuals' ability to protect themselves.

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## Safety Considerations (Educational Only)

### • Skin Protection

Avoid direct skin contact with permethrin-treated areas when possible; dermal exposure may cause irritation or numbness.

- **Ventilation**  
Ensure adequate airflow in treated environments to reduce inhalation risk.
- **Medical Guidance**  
Individuals experiencing symptoms or with underlying health sensitivities should consult a qualified medical professional.
- **Environmental Protection**  
Avoid application near water sources due to extreme aquatic toxicity.

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## Academic Contact (Referenced)

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*(Provided for academic reference and research context.)*

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## Closing Statement

This document calls for **greater transparency, precautionary policy, and public education** regarding residential chemical spray programs. When health impacts may be delayed, cumulative, or synergistic, **prevention and informed choice must come first**.