Efficiency of Gloves and Working Coveralls in Reducing Operator Exposure to Pesticides[a)]

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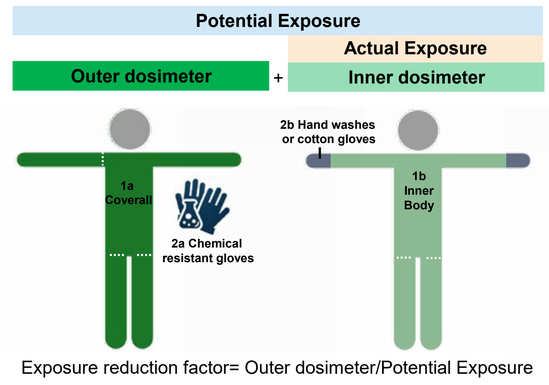


Exposure reduction factor= Outer dosimeter/Potential Exposure

Introduction

Personal Protective Equipment (PPE) is essential for reducing operator exposure when handling pesticides. European regulators adhere to the EFSA Guidance[b)] and use the Agricultural Operator Exposure Model (AOEM)[c,d)] to assess operator risk.

This study uses AOEM **data** to **show** gloves and coveralls **effectiveness in the field**, including mixing, loading, applying, and cleaning.

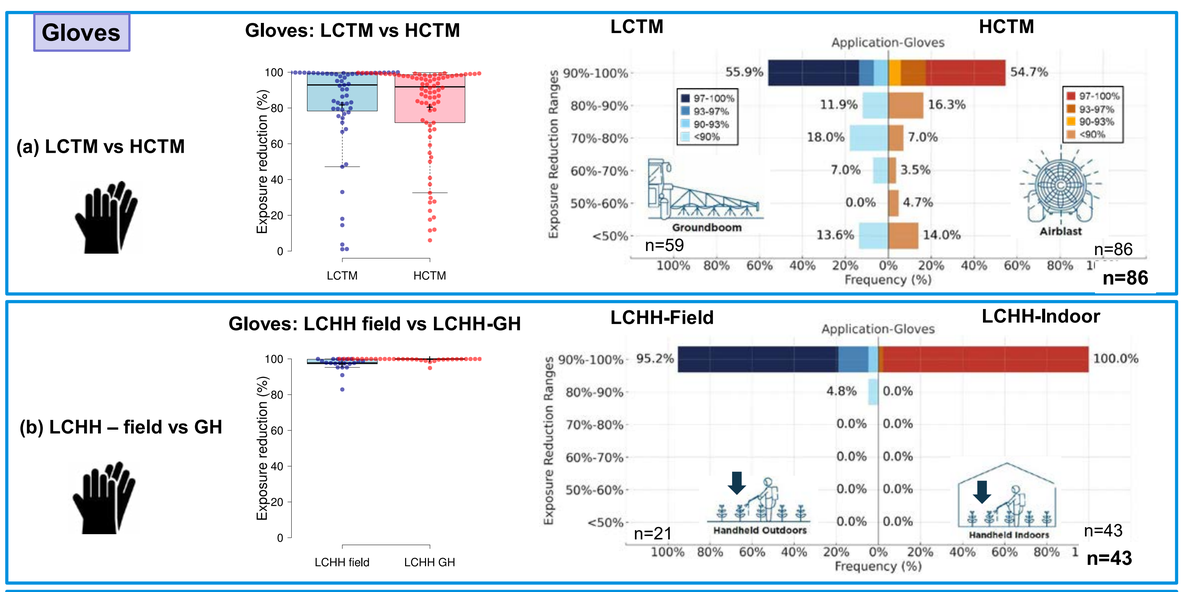
Our results prove that **chemical-resistant gloves and working coveralls greatly reduce exposure** during pesticide use.

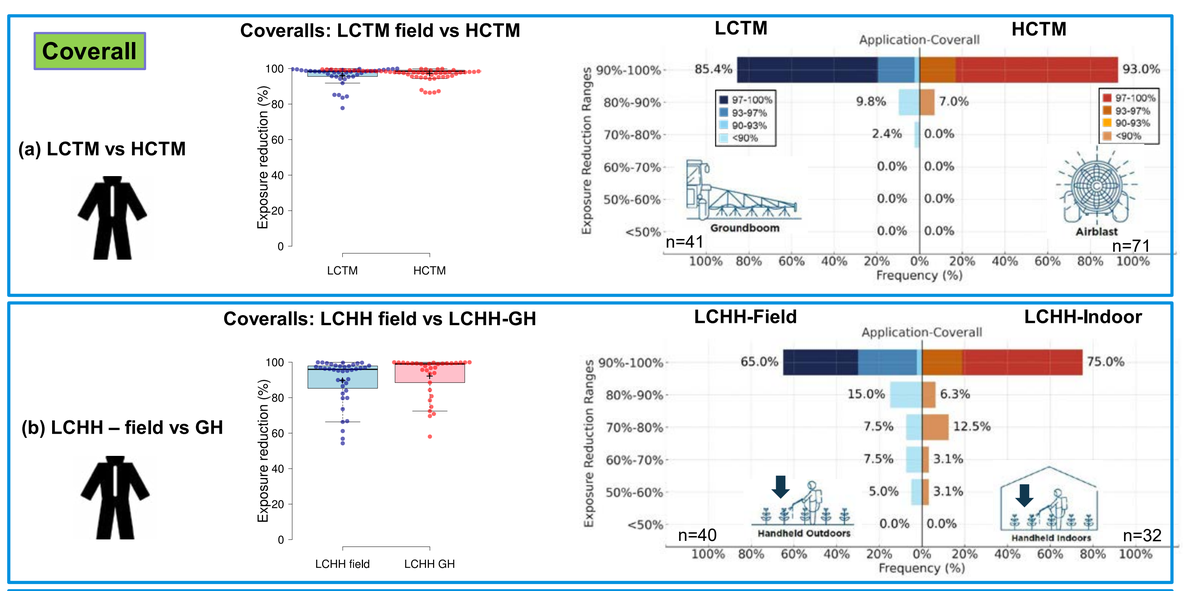
Methods

Data Source: Utilized the Agricultural Operator Exposure Model (AOEM) based on 48 exposure studies from 10 European countries, under real farm conditions.
PPE Tested: Efficiency of chemical-resistant nitrile gloves and working coveralls evaluated.
Scenarios: Mixing/Loading and application using various sprayer types, including groundboom, airblast, and handheld, both outdoor and indoor (greenhouse).
Analysis: Exposure reduction for hands and body estimated using exposure reduction factors calculated separately for M&L and application scenarios.

Exposure reduction of gloves and coverall during Application

Abbreviations: LCTM = Low Crop Tractor Mounted (Groundboom), HCTM = High Crop Tractor mounted (Airblast), LCHH = Low Crop Hand Held, HCHH = High Crop Hand Held, GH = Greenhouse





Exposure reduction of gloves and coverall during Mixing&Loading

Key findings

Gloves & Coveralls Work: Using nitrile gloves and certified coveralls greatly reduces exposure for workers handling PPPs.
Proven Across Tasks: Exposure reduction was consistently over 90% for mixing, loading, and applying, even in greenhouses.
Real-World Proof: These results show that PPE recommended by AOEM works in real-world situations. Outliers are considered in the evaluation, but can be explained by bad practices (Gloves not worn).

Conclusion

Nitrile gloves and working coveralls greatly reduce operator exposure to pesticides during mixing, loading, and application. This highlights their essential role in safely using PPPs, supporting established European safety standards and good practices in agriculture. These findings strengthens current PPE recommendations and emphasize that operators need to be properly trained and adhere to label instructions when applying pesticides

References

a) Kuster et al. (2024), Efficiency of Working Coveralls and Nitrile Gloves in Reducing Operator Exposure to Pesticides, under revision
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d) Großkopf C, Mielke H, Bloch D, Martin S, Risikobewertung Bf (2020) Update of the Greenhouse Agricultural Operator Exposure Model, 2020. , BfR-Wissenschaft. Bundesinst. für Risikobewertung, Berlin. https://doi.org/10.17590/20200708-134754.