



Learn about pesticides and clothes

Few Iowans suffer acute poisoning from pesticide use today. This good safety record is possible because people are learning more about ways to minimize exposure to harmful chemicals.

Pesticides can enter the body through inhalation or accidental ingestion. However, the most common and least understood means of poisoning is through skin absorption. Whether liquid spray or granular, all forms of pesticide can soil your clothes, putting them in close contact with your skin where they may be absorbed. Granules may not stick to fabrics or leave evidence of soiling, but cotton fabrics may hold their pesticide residues.

Select the right clothing

Manufacturers' precautionary statements on the pesticide label indicate the type of protective covering that must be worn to reduce exposure to pesticides. Under the Worker Protection Standard (WPS), the specific items listed will vary with the toxicity of the chemical. Regardless of toxicity, regular working clothing should be worn at all times around most chemicals. This includes underclothing, a long-sleeved shirt, long pants, and socks. Most labels also specify chemically resistant gloves and boots. Other labels may specify use of coveralls, chemically resistant aprons, goggles, face shields, and respirators.

Clothing materials vary in their ability to resist penetration and permeation of pesticides. Cotton woven materials, such as heavy denim, may offer adequate protection from granular and dry formulations in limited exposure situations. For liquid sprays, chemically resistant materials or those with a chemically resistant finish offer more protection and can be worn over regular work clothing, especially for mixing

and loading tasks. This publication outlines care for regular work clothing of cotton or cotton-blend materials, such as denim jeans that 90 percent of Iowa farmers wear for pesticide application. Other Safe Farm publications explain how to care for more chemically resistant materials and what to do with disposables.

Launder clothing carefully

Traces of pesticide remain on work clothing, even after washing. Careful laundering techniques, however, can reduce pesticide residue to extremely small levels, measured in parts per million or billion. Whether or not trace residues in clothing represent a health hazard to humans is unknown — pesticides remain biologically active in the cloth and can suppress enzymes and kill fruit flies or cockroaches.

Wear clean clothes daily. If pesticide gets on clothes that are already soiled or dirty, the pesticide will be more difficult to remove than from clean clothes.

Discard all clothing heavily soiled with full-strength or concentrated liquid pesticides.

Step-by-step methods

Follow these laundering practices for all cotton and cotton-blend clothing worn around pesticides. These methods will lessen your exposure to pesticides and leave the least amount of residue in clothing.

- Wear chemically resistant gloves to handle pesticide-soiled clothes.
- Keep pesticide-soiled clothing separate from other family clothes before and during laundering to avoid transfer of residues.
- Wash pesticide-soiled clothing daily, and as soon as possible after wear to maximize removal of chemicals.
- Pre-rinse or pre-soak in a separate tub, on

Pesticide clothing safety

How much do you know ?

Test your skill with this quick quiz.

1. When should you wash pesticide-soiled clothing?
 - a) at the end of the pesticide use season
 - b) when it shows visible soiling or dirt
 - c) on a daily basis, as soon as possible after you quit work
 - d) all of the above, especially c.
2. It is okay to wash pesticide-soiled clothes with your family's regular wash. True or false?
3. Using bleach will guarantee removal of all pesticides from farm clothing. True or false?
4. Trace amounts of pesticides in clothes are harmful to your health.
 - a) true
 - b) false
 - c) answer is uncertain
5. Pesticides from soiled clothing can be absorbed through the skin. True or false?

See answers on back.

the line with a garden hose, or in the pre-rinse cycle of your washer; discard water used for rinsing or soaking.

- Fill tub again with hot or warm water for washing. Use cold water for the rinse cycle.

- Use a heavy-duty detergent, preferably phosphate-based or liquid.

- Do not overcrowd the washer; wash only a few items at a time.

- Use the highest water level setting, even for small loads.

- Use the longest wash time cycle—at least 10 to 12 minutes—not a shorter knit cycle. If your washer has a sudsaver feature, **never** use it for clothing soiled with pesticides.

- If possible, hang cotton and cotton-blend clothes on the line to dry in the sun. Sun helps degrade some pesticides.

- Before laundering family clothes, run the washer through a complete cycle without clothes to rinse pesticide residue out of your machine. Use hot water and detergent.

Repeated or multiple washing before drying helps remove more of the residue from work clothing. After washing, check wet clothes for visible staining, an unusual odor, or color differences and repeat the washing—before clothing is dried. If a second washing does not remove stains or odor, discard the clothes.

About laundering additives

- **Ammonia:** Ammonia has not been shown to help remove residues. Never use bleach and ammonia in the same wash load; toxic fumes result.

- **Chlorine bleach:** A three-hour soak in chlorine bleach solution may help remove chloropyrifos, but fabrics will be weakened and color may fade. This has not been shown to be effective with other pesticides.

For more information

When selecting clothes for pesticide safety, two other Safe Farm publications may help: *Cover up with coveralls and aprons*, Pm-1563a, and *Keep gloves handy for pesticide work*, Pm-1518e. For information about the Worker Protection Standard, see *WPS: New rules for pesticide safety*, Pm-1563b, or ISU Extension's *1991 Private Pesticide Applicator Study Guide*, PAT-1. All publications are available at your local extension office. This publication is based on these and other research articles:

■ Limiting Pesticide Exposure through

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- **Fabric softeners:** Studies show that fabric softeners neither help nor hinder residue removal in cotton fabrics.

- **Pretreatment sprays:** Solvent-based sprays assist removal of oil-based pesticide formulations in cottons.

- **Salt:** Salt helps remove paraquat, but not other pesticides. Add 1 cup of table salt to your wash load with regular detergent.

- **Starch:** Starch used on cotton or cotton-blend fabrics may help prevent pesticides from reaching the skin. Starch seems to trap pesticide so that both the starch and pesticide wash away in the next laundering. Starch must be reapplied after each wash. Heavy starching of lower pantlegs should not be uncomfortable for the wearer.

Other safety measures

Soil and water repellent finishes such as Scotchgard® and Zepel® help cotton fabrics resist penetration of pesticide sprays, but also make fabrics more difficult to launder.

If you use these repellents, renew them after every second or third wash.

Keep alert for new safety tips

Researchers continue to study protective clothing materials and laundering procedures. As new information becomes available, suggested laundering methods may change.

Always consult the pesticide label. Manufacturers offer many suggestions, but you must choose the protective clothing, equipment, and laundry methods required in your situation.

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Textile Cleaning Procedures, (1988) North Central Regional Research Bulletin #314, available from North Dakota State University, Fargo, North Dakota 58105.

■ Raheel, M., (1988) "Dermal Exposure to Pesticides." *Journal of Environmental Health* 51 (2):82-84.

■ Stone, J., and H.M. Stahr, (1989) "Pesticide Residues in Clothing: A Case Study of a Midwestern Farmer's Coverall Contamination." *Journal of Environmental Health* 51 (515):273-276.

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Pesticide clothing safety

What can you do?

You can reduce your exposure to pesticides by wearing protective gear and laundering work clothing properly. Always follow these guidelines when you work around pesticides:

- Wear fresh clothes daily.
- Follow precautionary labeling to choose protective gear.
- Keep pesticide-soiled clothes separate from your family's wash.
- Pre-rinse and/or repeat the wash for maximum pesticide removal.
- Discard all clothes that have been saturated with full-strength liquid pesticide concentrate.

Answers to quiz: 1-d; 2-False; 3-False; 4-c; 5-True



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