

## Small Steps Offer Big Protection

“We don’t have an adequate understanding of the toxicity of many herbicide and pesticide formulations to humans. The farmer’s best strategy is to minimize exposure.” – Allan Cessna, PhD



A study by Allan J. Cessna, a research scientist with Agriculture and Agri-Food Canada (AAFC) currently on secondment to the Environment Canada National Water Research Institute in Saskatoon, and R. Grover, then director of the AAFC Research Station in Regina, provides convincing evidence that very simple steps such as wearing clean clothing and pulling on a pair of neoprene gloves can offer farmers significant protection from the potentially toxic effects of herbicides during spraying.

Cessna and Grover studied the exposure to and absorption of bromoxynil by 13 farmers near Regina during mixing and spraying operations. Bromoxynil is an herbicide used to control weeds in cereal crops, and was applied using tractor-drawn sprayers. The study used air samples, hand washes and dermal-patch dosimeters to measure the amount of herbicide available for inhalation or skin absorption during spraying, and tested urine samples to estimate herbicide residues in the body.

All participants used their own tractors and spraying equipment, and followed their normal application procedures. They were issued with standardized clean clothing for all exposures, including socks, workpants, t-shirts and cotton coveralls, along with knee-high rubber boots and hard hats. In addition, for 5 of the 13 exposures, farmers wore gauntlet-style neoprene gloves during spray operations.

The study showed that farmers using sprayers with larger-capacity tanks (thereby reducing the number of refills needed) and those with tractor cabs received significantly less exposure to bromoxynil than did those with smaller tanks and no cabs. However, the study also demonstrated that newly laundered clothing and neoprene gloves provided significant protection against herbicide absorption by the skin.

Specifically, the study showed that the two layers of cotton worn by the farmers reduced levels of herbicide exposure by over 15 times. Gauntlet-style neoprene protective gloves reduced levels of herbicide deposited on the hands by 25 times.

“The hands are the primary location for exposure to chemicals during spraying,” Cessna says. “Hands are involved in all stages of the spraying operation. Gloves may feel awkward, but they reduce risk considerably. Wearing clean clothing during each spray operation also helps to reduce exposure.”

Cessna points out that while herbicide container labels do provide specific direction in cases where special precautions—such as using respirators—should be taken, all such chemical formulations have the potential to be toxic. By taking very basic steps, farmers can dramatically reduce their risk of exposure.

#### Points to Consider

- Wearing gauntlet-style neoprene gloves can reduce exposure of hands to herbicides during mixing and spraying by 25 times.
- Two layers of freshly laundered cotton can reduce levels of exposure in the chest region by 15 times.

The Cessna and Grover study was published in 2002 by Archives of *Environmental Contamination and Toxicology* (Vol. 42, pp. 369-382, “Exposure of ground-rig applicators to the herbicide bromoxynil applied as a 1:1 mixture of butyrate and octanoate.”)

