

DEVELOPMENT AND TESTING OF PROTECTIVE CLOTHING FOR LAWN APPLICATORS

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A three phase study was undertaken to develop and test protective clothing for lawn applicators. Clothing can add protection because during liquid spray application, the primary means by which chemicals enter the body is by being absorbed through the skin (1). The project was based on previous research in five different areas: Penetration of fabric by pesticide, deposition of pesticide on the body, thermal comfort of garments differing in fiber content and design, absorption of pesticides into the body, and laundry studies of pesticide removal.

The objective of the first phase of the study was to determine where pesticide was deposited on the body during spraying. Employees of Tru Green Corporation sprayed blue FD&C #1 dye during four 90 second timed walks at two different flow rates. The dye was mixed in the same ratio to water as the active ingredient of the organophosphate to be used in phase three. Subjects wore white nylon coveralls and gloves. The garments were photographed and cut apart at predetermined points so that 19 areas of the body were represented. The dye was rinsed from each garment piece and analyzed by standard spectrophotometric techniques. Analysis of variance tested whether the micrograms of dye per centimeter square differed by garment part. The lower legs, both front and back received a significantly greater deposit of spray than other body parts. The hands were next in order of amount deposited. More was deposited on the body when a faster flow rate was used, but the differences were not statistically significant.

The purpose of phase two was to design and construct prototype garments. Design criteria were identified, there was experimentation with construction variables, and sketches and protective garments were discussed with company officials. The protective garment used regular 50/50 cotton/polyester work pants, lined with a microporous film laminate in the lower legs, front and back, and the abdominal area. The shirt was a long sleeve knit in 50/50 cotton/polyester with a woven yoke overlay to protect the shoulder from contact with the hose.

In phase three six employees of Tru Green Corporation wore the protective garment on one of two test days while spraying Dursban, an organophosphate during regular work activities. On the other test day they wore the company's regular uniform, thus subjects served as their own control. Urinary excretion of 3,5,6-trichloro-2-pyridinol, the primary metabolite of chlorpyrifos, the active ingredient in Dursban, was used to determine whether the protective garment reduced the amount of pesticide absorbed into the body. Significantly less pesticide was absorbed while wearing the protective garments. However, the difference in absorption when the two types of clothing were worn varied a great deal among subjects.

Wolfe, H. R. (1973, April). Workers should be protected from pesticide exposure. Weeds Trees and Turf, pp. 12, 36-7, 52-3.