



FIGURE 23.11 Mean percent applied dose of methylene bis phenyl isocyanate (MDI) removed by cellophane tape stripping following wash decontamination. This confirms that the MDI not removed by water and soap-and-water washes was still present on the skin.

MDI was still on the skin (Figure 23.11). In contrast, polypropylene glycol, DTAM, and corn oil removed 68% to 86% of the MDI in the first hour, 74% to 79% at four hours, and 72% to 86% at eight hours. Statistically, polypropylene glycol, DTAM, and corn oil were all better ($p < 0.05$) than soap and water at four hours and eight hours after dose application. These results indicated that traditional soap-and-water wash and the emergency water shower are relatively ineffective at removing MDI from the skin. More effective decontamination procedures, as shown here, are available.

23.5 CONCLUSION

Substantivity has been defined as the nonspecific absorption of material from skin. It is obvious that the standard washing procedures do not always readily remove materials from skin. How important is this in terms of occupational exposure? Kazen et al. (9) did hexane hand rinsings on occupationally exposed people. They analyzed the rinsings by electron capture and flame photometric/gas-liquid chromatography for pesticide residues to determine whether or not these chemicals persisted on the skin long after exposure. Chlordane and dieldrin apparently persisted on the hands of a former pest control operator for at least two years. Methoxychlor, captan, and malathion persisted for at least seven days on the hands of a fruit and vegetable grower. Parathion was found on the hands of one man two months after his last known contact with this pesticide. Endosulfan, dichlorodiphenyl-dichloroethane (DDD), kelthane, decthal, trithijon, imidan, and guthion have persisted on the hands of some exposed workers from less than a day to 112 days after exposure (10–15).

In conclusion, washing is generally good, but it does not prevent penetration of some chemicals. Surely, the understanding of the mechanism and the development of more efficient removal systems must be a high priority for research.

REFERENCES

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