

The second exercise, which was conducted under summer conditions, showed that sarin was found in 7 of the 10 types of sample materials after 14 and 28 days of exposure, in all cases in amounts ranging from 0.2 per cent to 0.4 per cent of the applied amount of agent. No sarin was recovered from water, soil and grass.

Soman was found in 6 of the 10 types of sample materials after 28 days in percentages of applied amounts varying from 0.04 in paper to 3.5 in silicone. In this case no agent was found in the water, soil, grass or sand samples. After 14 days soman was also found in the sand sample, and more than 1 per cent was recovered in samples of paper, silicone, neoprene and polyurethane foam with activated charcoal. The highest recovery was again obtained with silicone, with 11.2 per cent of the applied amount.

Tabun is difficult to detect in samples exposed to prevailing weather conditions for periods of up to 28 days. In this exercise tabun was found only in the silicone sample after 28 days, but in this case the recovery was as high as 6.9 per cent of the applied amount. After 14 days tabun was found not only in silicone (8.3 per cent), but also in the paper sample (0.4 per cent).

The results of the experiments with mustard gas were quite similar to the results using soman, since mustard gas was found in all samples except water, soil, grass and sand after both 14 and 28 days, in percentages varying from 0.01 to 8.3 after 28 days, and 0.1 to 13.8 after 14 days. The polymer materials silicone, neoprene, butyl rubber and polyurethane foam with activated charcoal all contained more than 1 per cent of the applied amount of mustard gas after 28 days and seem to be good absorbents of mustard gas.

Diisopropyl methylphosphonate, which is a production impurity of sarin, is a stable chemical compound and was found in large quantities in all types of materials both after 14 and after 28 days of exposure. Water, grass, silicone and polyurethane foam with activated charcoal gave the best results with more than 10 per cent recovered after 28 days.

The results of the sample-handling experiments show that the samples should be transported at low temperature in order to enhance the possibility of positive verification of alleged use of chemical warfare agents. A positive verification will depend both on the chemical agent and on the sample matrix.

The results of 24 hours' storage at -20°C in a freezer show that all the agents were verified in all the various kinds of samples except tabun in water and grass. Tabun was found in percentages of applied amount ranging from 6.9 in sand to 64.5 in polyester/cotton fabric, sarin from 1.2 in grass to 93.7 in polyester/cotton fabric, soman from 6.5 in grass to 84.6 in butyl rubber, mustard gas from 8.2 in grass to 100 in polyester/cotton fabric and diisopropyl methylphosphonate from 9.9 in sand to 98.7 in grass.

In the samples stored for 24 hours at 0°C in a refrigerator, all agents were verified except tabun in water, grass and soil and sarin in grass. The recovered amounts were less than at -20°C , especially as regards tabun and mustard gas, but to some extent also as regards sarin, soman and diisopropyl methylphosphonate.