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TOXICITY OF TEFLON DISPERSING AGENTS

A brief summary of our toxicity work on AHT and other Teflon dispersing agents with emphasis on liver enlargement which seems to be the most sensitive sign of toxicity is given below. The detailed reports of work completed to date will be available within a few days.

AHT -(Ammonium 3,6 dioxa 2,5 di(trifluoro methyl undecafluorononanoate)

The oral ALD for rats was found to be 60 mg/kg. Survivors showed definite liver enlargement in doses down to 1.5 mg/kg and with possible changes at 0.45 and 0.13 mg/kg. Single doses of 12 mg/kg produced liver enlargement which tended to increase during the two months following the dose. One one-hundredthof the lethal dose or 0.6 mg/kg given daily 5 times a week for 2 weeks produced enlargement which was significant in those rats killed on the day of final treatment and in those killed 14 days later. Histological examination of the livers indicated that the enlargement was due to increase in cell size rather than an increase in the number of cells.

The lethal dose by skin absorption in rabbits was 130 mg/kg. Although the changes in liver weight in these rabbits are more difficult to evaluate, there was a tendency toward enlargement and similar signs of liver injury.

A 25% aqueous solution in contact with the eye caused damage which persisted through 8 days. Washing with water 20 seconds after instillation prevented permanent damage. Ten and twenty-five percent solutions were also irritating to guinea pig skin but did not cause skin sensitization.

C_8-APFC - (Ammonium perfluorocaprylate)

JAZ

The oral ALD for rats was 570 mg/kg. Liver enlargement was definite down to a dose of 200 mg/kg with possible early signs down to 1.5 mg/kg.

C_9-AFC - (Ammonium ω-hydrohexa decafluorononanoate)

The oral ALD was 1500 mg/kg. Survivors showed enlargement which appears evident in doses as low as 12 mg/kg.

"Teflon" Feeding Tests with "Teflon" 7, "Teflon" 6 made with C_8-AFFC, "Teflon" 6Cmade with C_9 and "Teflon" 6C made with AHT.

The compounds were fed at a level of 25% in the diet of rats for 3 weeks. Rats were sacrificed 2, 3 and 5 weeks after feeding of test materials started.

Livers of rats sacrificed after two and three weeks of continuous feeding showed slight enlargement only in the group fed "Teflon" 6C with AHT. After a two-week rest period the remaining rats were killed and those fed "Teflon" 6C with AHT and "Teflon" C_8 AFFC showed liver weights significantly different from the controls and those fed "Teflon" 7. The values of those fed "Teflon" 6C with C_9-AFC fell midway between the controls and the others. Although the numbers of animals used were small and the time offeeding relatively short, the trend observed confirms the earlier liver enlargement observed in rats fed 25% "Teflon" 6 resin in the diet for 90 days (H. Report No. 49-60). A direct comparison among these compounds is difficult to make in these feeding tests because we do not know the concentrations of the fluoro acid dispersing agents present.

Conclusions:

AHT is a very toxic compound. Not only does it have a low lethal dose but a single dose of 1/5 the lethal dose produced liver enlargement which increased with time. And 1/100 of the lethal dose fed 10 times produced definite liver enlargement. In addition, it was easily absorbed through the skin and produced liver damage in a second species. When "Teflon"containing less than 5 ppm AHT was fed to rats, it still produced enlargement which was apparent after 2 weeks.

The C_8 and C_9 acids have much lower acute toxicity, but they too have the ability to increase the size of the liver of rats at low doses. These short experiments may indicate differences in rate of development rather than qualitative differences but completion of microscopic examination of animals in the current series as well as dosing of greater numbers of rats at the critical levels and holding them for longer periods would be needed to establish the lowest effect level for each compound..

It is recommended that all of these materials, especially AHT, be handled with extreme care. Contact with the skin should be strictly avoided. Tests on a third species, e.g. dogs, should be carried out where changes in liver function could be studied over a long period of time. The results of such tests might also throw some light on any possible species differences in susceptibility. JAZ

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