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July 8, 1971

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Cadmium

In my opinion this is yet another scare report--put in the context of smoking (as was selenium, polonium-210)--since cadmium, as virtually every element of the periodic table, is present in the environment and thus presumably in smoke.

Cadmium has been detected in the atmosphere, in drinking water and rain water, in wheat, flours, coffee and in tea and vegetables. Three references are cited in the literature giving values of cadmium in tobacco (1.40, 1.13, and 1.56 $\mu\text{g}/\text{cigt.}$), but only one of these deals with the concentration in mainstream smoke. Szadkowski, et al., [Archiv. f. Hyg. u. Bact., 153, 1-8 (Feb., 1969)] found the following results when cigarettes were smoked (2 sec. duration puff of 30 cc taken at 30 sec. intervals):

Tobacco	1.40 \pm 0.22 $\mu\text{g}/\text{cigt.}$
Gas Phase	0.03 \pm 0.02 "
Part. Phase	0.15 \pm 0.13 "*"
Total Smoke	0.18 \pm 0.12 "
Ash and Butt	0.41 \pm 0.14 "

* Particulate phase values differed from filter and non-filter cigarettes as shown below for 5 different cigarettes:

0.267 $\mu\text{g}/\text{cigt.}$	} non-filter	0.0074 $\mu\text{g}/\text{cigt.}$	} filter
0.161 "		0.0244 "	
0.275 "			

No description of tobaccos or filters was given.

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Nandi, et al. (Lancet, December 20, 1969) found 1.13 $\mu\text{g}/\text{cigt.}$ in the tobacco, 0.18 $\mu\text{g}/\text{cigt.}$ in ash, and 0.16 $\mu\text{g}/\text{cigt.}$ in the butt and filter. He estimated 0.80 $\mu\text{g}/\text{cigt.}$ in the smoke by difference. (If one assumes that 30% of the total amount in smoke--mainstream and sidestream--is in the mainstream smoke, then the 0.24 $\mu\text{g}/\text{cigt.}$ one calculates is in good agreement with Szadkowski's value of 0.23 $\mu\text{g}/\text{cigt.}$ from non-filter cigarettes.)

The mean daily intake of cadmium in foods and drinking water has been estimated at 23 $\mu\text{g.}$ An institutional diet of 2500 calories per day contained 18 μg of cadmium.

The threshold limit value of cadmium (recommended maximum allowable concentration in air for an 8-hour day) is 0.089 mg/m^3 or 89 $\mu\text{g}/\text{m}^3$. This corresponds to 258 μg of cadmium per 8-hour day for a man with a 6 liter minute volume. If one uses Szadkowski's value of 0.0089 $\mu\text{g}/\text{puff}$, a person smoking 1 puff per minute for 8 hours might inhale 4.3 μg of cadmium during that time. (Assuming 10 puffs/cigt. would be 48 cigarettes in 8 hours). This amount is only 1/60 the threshold limit value. The value is 1/5 the mean daily intake in the diet. One must also consider that not all the cadmium inhaled would be absorbed by the lungs.

We are not contemplating doing work on cadmium at the present time. If you have any questions please let me know.

TSO:mro
cc: Dr. H. Wakeham

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