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LOWER LEVEL PHENOMENA OF DDT CUMULATION IN FEMALE ABDOMINAL FATTY TISSUE

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The authors found a significantly higher level of DDT storage in the fatty tissue samples of men than in women (mean pp'DDE was 12.8 ppm and 10.2 ppm respectively). By comparing the excretion of organochlorine insecticides in the milk of breast-feeding mothers with their total daily DDT intake by food, they registered considerably greater quantities of pp'DDE eliminated than ingested. By excluding the nondietetic DDT intake the authors explain this phenomenon by hormonal factors i. e. by increased mobilization of the stored DDT metabolites during the lactation period. The lower DDT storage found in women may also reduce the mean residue values related to the general population.

Irrespective of its restricted use the presence of DDT in the human environment will continue for some time yet to influence to a very great extent man's existence and of course, his health. The conclusions arrived at meetings of experts (1) show that DDT will continue to be used for controlling the vectors of certain diseases and even in the control of various agricultural pests. Taking into account the persistence of these compounds on one side and the quantities that have been used so far and that will be used in the future on the other, it is not hard to conclude that man's contact with DDT remains inevitable, whatever guarantees may be prescribed.

Past investigations of the toxicological, cancerogenic, mutagenic and other properties of DDT have yielded so many data that it may well be claimed that DDT is the most widely checked compound to date (2, 3). Even so, present knowledge does not offer a realistic idea of its effect upon man. Very little is known about the daily effect of small quantities of DDT on the general population, except that it is stored in the adipose tissue (4) and that it is thus present in all organs of vital importance. These effects can be evaluated by periodical determinations of the concentration of stored DDT and its degraded products in the human adipose tissue and blood or serum, and correlated with the data on the

daily intake of DDT with food. Some authors have found the concentration of stored DDT to be on a steady downward line and it is considered that the measures undertaken will further diminish its excretion (2).

Among numerous data of this kind there are some which suggest the existence of a significantly higher level of DDT, especially of pp'DDE, in males than in females. We found the same in 1967/68 after having investigated 100 samples of adipose tissue from the inhabitants of Belgrade and Serbia proper (5): the mean value of the total DDT depot was 10.2 ppm in women as compared to 12.8 ppm in men, the total mean value for the general population amounting to 11.5 ppm.

This difference of about 2—2.5 mg/kg of adipose tissue is to be found in papers published before (6) and after (7, 8) our report, although there have been papers (9) in which no difference was found. The existence of a difference has been explained in several ways, one being the relative complexity of female hormonal interrelationships which could conceivably result in an increased microsomal enzyme aotivity and a subsequent body burden reduction. This may also be interpreted in part by a differing female pattern of fat deposition and the likelihood of males having greater environmental exposure to pesticides. However, in the course of our examinations of the factors contributing to increased concentrations of organochlorine insecticides in infants (10) we found some interesting data which might help to explain this phenomenon too.

Namely, in investigating the daily intake of organochlorine insecticides by infants we also determined the entire daily intake of these insecticides with food by breast-feeding mothers and the daily excretion with milk. We found a significant disproportion between the total daily intake of DDT and its excretion as illustrated in Table 1.

From the above data the following may be concluded:

a) breast-feeding mothers excreted considerably greater quantities of pp'DDE with milk than they took in with food;

b) the disproportion was far greater in mothers of twins (A and B) than in mothers of a single child (persons C);

c) similar occurrences were not found in the case of other organochlorine insecticides, although we found (5) that the levels of stored dieldrin likewise differed according to sex, which was not suggested by other authors.

Since the experiment was carried out under controlled conditions and since the factor of non-dietetic DDT intake could be ignored on this occasion, obviously a powerful mobilization of the stored pp'DDE and other DDT derivatives takes place during the lactation period i. e., the surplus of DDE excreted with milk becomes more apparent. Knowing that the »good old practice« of breast-feeding is still maintained in some parts of the world, that in some regions this lactation period lasts up to six — nine months, that a balance in subsequent storage of DDT is not

Table 1

Total daily excretion of organochlorine insecticides in human milk compared to their total daily intake with food (expressed in γ/day person)

Person	Mean quantity of milk ml/day	Alpha BHC	Gama BHC	pp'DDE	pp'DDD	pp'DDT	op'DDT	Total as DDT	Dieldrin
A	1.590	8	22	828	16	154	9	1.078	9
B	1.249	3	14	745	14	179	9	1.033	3
C	527	1	4	67	3	25	2	105	<1
Total daily intake with food (2.660 g)		9	317	65	20	112	59	266	9

The result represents the mean value for the observed period of seven consecutive days.

A and B are mothers breast-feeding twins

C are mothers with one child.

attained at once and that such cases figure among the examined subjects from the general population, we may assume that such samples can significantly contribute to a decrease of the mean value for one group of examined subjects and thereby explain the phenomenon of reduced storage of DDT in women. This should be borne in mind when assessing the results of epidemiological studies of OC insecticide exposure.

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Sažetak

POJAVA MANJE KUMULACIJE DDT-ja U ABDOMINALNOM MASNOM TKIVU ŽENA

Autori su našli značajno višu razinu odlaganja DDT-ja u masnom tkivu muškaraca nego onom u žena (srednja vrijednost pp'DDE iznosila je 12.8 ppm za muškarce odnosno 10.2 ppm za žene). Uspoređujući izlučivanje organoklornih insekticida u mlijeku žena-dojilja s količinom DDT-ja unesenog hranom, izmjerili su znatno više eliminiranih rezidua no što bi odgovaralo ingestiji insekticida. Isključivši drugi put apsorpcije izuzev hranom, autori tumače tu pojavu hormonskim činiocima, tj. povećanom mobilizacijom deponiranih metabolita DDT-ja za vrijeme laktacijskog razdoblja. Smanjeno odlaganje DDT-ja u žena bit će da utječe i na srednje vrijednosti deponiranih metabolita za cjelokupnu populaciju nekog područja.

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