Feeding trials with dairy cows show

DDT Detectable

in milk is proportional to DDT in daily feed

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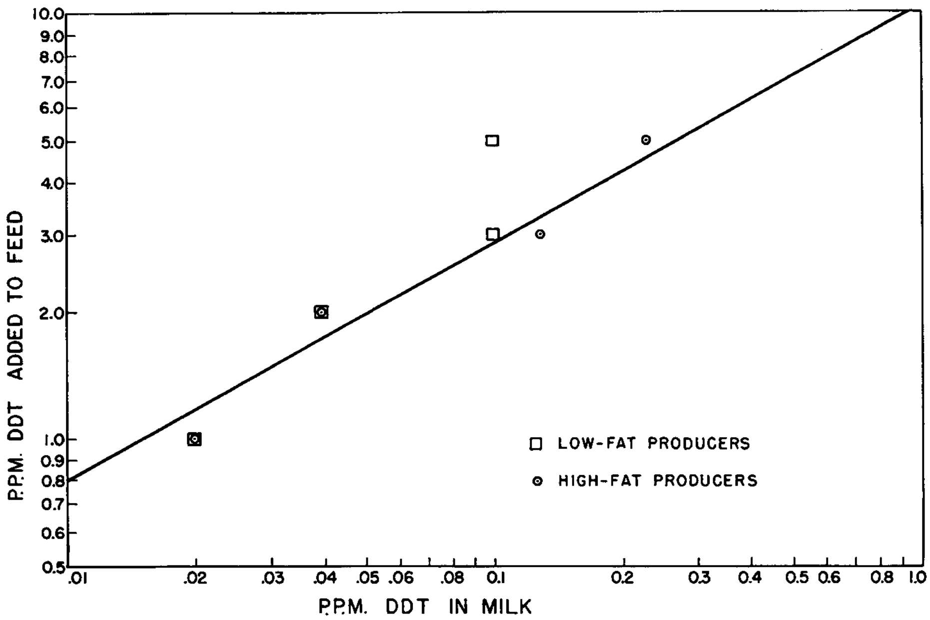
A feeding experiment with dairy cows was conducted in an attempt to define a level of DDT in feeds that would be undetectable in the milk. For six weeks pairs of animals—including producers of both high- and low-fat milks—were fed daily rations containing 0–5 ppm—parts per million—of DDT, based on their feed intake.

In another experiment six cows were fed one ppm of added DDT over a period of eight weeks. Milk was analyzed periodically for fat and DDT content. The maximum level of added DDT in the feed that did not produce a detectable residue in the milk was 0.5 ppm. At levels of 1, 2, 3, and 5 ppm of added DDT, detectable residues were found in the milk of all animals. DDT concentration in milk was proportional to the DDT level in the feed. A correlation between DDT residue and butterfat concentration in milk at each feeding level was found. No such correlation existed between total DDT excretion and total fat production.

The amount of DDT added daily to the feed was plotted in logarithms against the concentration of DDT in the milk. Extrapolation of the resulting straight line to 0.01 ppm of DDT in milk—the undetectable amount—gave a value of 0.8 ppm in the feed while the experimental value was 0.5 ppm.

Log plot of ppm—parts per million—of DDT found in milk when various amounts of DDT were added to the daily feed.



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Manganese concentrations in the plant tissue suggest a reason for the unusual effect of nitrogen. The manganese content of plants receiving nitrogen at the rate of 100 pounds per acre was only slightly higher than those without nitrogen. However, those receiving heavier nitrogen applications contained much higher concentrations of manganese. The different sources of nitrogen did not differ significantly in this respect.

The soil pH, determined on each pot at the end of the experiment, shows that the different nitrogen sources had different soil acidification effects. Ammonium sulfate had a strong acidifying effect—which would in turn make manganese more available to the plant. In contrast, the soil pH was higher where calcium nitrate was used, an effect that should depress manganese concentrations in the plant. Ammonium nitrate produced an effect on the soil pH median to the other two sources. The pH was lowered slightly where it was used, in direct proportion to its ammonium content relative to ammonium sulfate.

Numerous studies have shown that as the soil becomes more acid, manganese uptake by the plant and availability in the soil usually are increased. Other studies have shown that heavy nitrogen fertilization increased the manganese concentration in the tissue, but those studies usually related the phenomenon to lower soil pH caused by ammoniacal fertilizers.

The pH of Watsonville Fine Sand Soil Three Months After the Application of Different Sources and Rates of Nitrogen Fertilizer

Source of nitrogen	pH of soil in pots — Pounds nitrogen applied per acre: 0	100	200	400
	pH	pH	pH	pH
No nitrogen	4.8	..	..	..
Ammonium sulfate	..	4.7	4.6	4.4
Ammonium nitrate	..	4.9	4.8	4.7
Calcium nitrate	..	4.8	5.0	5.0

The tests with the onion plants indicate that the high manganese concentrations in the plant tissue, as a result of heavy nitrogen fertilization, might be a direct effect of the nitrogen on the plant rather than an indirect effect of such treatment on the soil pH.

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