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 **1967 EVALUATIONS OF SOME PESTICIDE RESIDUES IN FOOD**

 **THE MONOGRAPHS**

 The content of this document is the result of the deliberations of the

 Joint Meeting of the FAO Working Party of Experts and the WHO Expert

 Committee on Pesticide Residues, which met in Rome, 4 - 11 December,

 1967. (FAO/WHO, 1968)

 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

 WORLD HEALTH ORGANIZATION

 Rome, 1968

 ALDRIN

 This pesticide was evaluated by the 1966 Joint Meeting of the FAO

 Working Party and WHO Expert Committee on Pesticide Residues (FAO/WHO,

 1967). Since the previous publication, additional information on the

 identity of aldrin and the results of additional experimental work

 have become available. This new information and work is summarized and

 discussed in the following monograph addendum.

 IDENTITY

 Technical aldrin contains : per cent

 HHDN 90.5

 Other polychloro hexahydro

 dimethanonaphthalenes (isodrin) 3.5

 hexachlorotetrahydromethanoindene

 (compound 237 or chlordane) 0.5

 hexachlorocyclopentadiene (HCCPD) 0.2

 hexachlorobutadiene 0.6

 octachlorocyclopentene 0.5

 hexachloroethane less than 0.1

 HHDN diadduct 0.1

 bicycloheptadiene (BCH) less than 0.1

 toluene 0.3

 other compounds\* 3.6

 \* Primarily a complex mixture of compounds formed by polymerization

 of HCCPD and BCH during the aldrin reaction.

 EVALUATION FOR TOLERANCES

 USE PATTERN

 The annual aldrin and dieldrin production is believed to be in the

 order of about 10,000 tons per year, of which aldrin represents the

 major portion. Three quarters or more of the total production is used

 in agricultural fields, the principal use of both compounds being for

 soil treatment. Aldrin residues consist of aldrin and its epoxide

 dieldrin.

 RESIDUES RESULTING FROM SUPERVISED TRIALS

 Rootcrop residues will vary depending on a number of factors such as

 the crop, the soil residue, the type of soil, the interval between

 treatment or planting and harvest and other factors. In normal

 agricultural practice where rates of application usually lie between 1

 and 3 kg/ha, rootcrop residues will generally lie below 0.15 ppm,

 except for radishes, carrots and chicory roots (CCPR, 1967;

 Lichtenstein, 1965).

 Most of the residue found in lettuce is in the outer leaves. After

 removing these, the residue in the remainder of the head is below 0.1

 ppm, even in the case of the highest residues found. Under conditions

 of normal soil usage, residues in other vegetables and in fruit range

 generally below 0.1 ppm (CCPR, 1967).

 Although radio-tracer studies with very young plants have shown that

 dieldrin may be translocated (Morley, 1965), field trials under

 practical conditions have demonstrated that no detectable residues

 occur in the head in the case of wheat nor in the kernel in the case

 of maize, nor in stalks and leaves (CCPR, 1967).

 In normal practice rotation of forage crops such as alfalfa, meadow

 hay and oats or corn leads to no significant residues in the rotated

 crops. (CCPR, 1967). An apparent relationship was noticed between the

 oil content of the crop and the amount of dieldrin residue found

 therein (Bruce, 1966). For example, rotation of soybeans on corn leads

 to residues in the beans ranging below 0.1 ppm (CCPR, 1967). However,

 processing of such beans to produce edible oils, fats and meals

 removes all residues (Smith, 1967).

 Foliage application to fruits (e.g. apples, pears, cherries) under

 practical conditions leads generally to low residues in the order of

 0.05 ppm and lower. Similar application to other crops leads in

 general to low residues, except in the straw of cereals at short

 intervals between treatment and harvest, e.g. oats (CCPR, 1967). The

 persistence of aldrin on foliage has also been studied by Harrison et

 al., 1967. They found a very quick transformation of aldrin to

 dieldrin on leaves - 50 per cent of insecticide present was in the

 form of dieldrin one week after application. After one week total

 residues of aldrin and dieldrin were only about 55 per cent and after

 7 weeks 27 per cent of that originally applied.

 Seed treatment of vegetables and grain crops - general application

 rate 0.1 - 0.15 kg/ha -leads to insignificant residues in the crop

 (0.02 ppm or less) (CCPR, 1967).

 A study of the milk production and the animal feed and water intakes

 at certain U.S.A. dairies which were treated annually with aldrin,

 showed insignificant levels of residue in the milk and in the feed and

 water intakes. (CCPR, 1967).

 RESIDUES IN FOOD MOVING IN COMMERCE

 Samples of fruit and vegetables offered for sale in the U.S.A. and

 Holland showed residues well within the tolerances, except in the case

 of carrots in Holland (CCPR, 1967).

 RESIDUES IN FOOD AT TIME OF CONSUMPTION

 Total diet studies have been made in the U.S.A., Canada and the U.K.

 The most comprehensive, those in the U.S.A., have been conducted over

 a period of several years. This work has been summarized by Duggan and

 Dawson, 1967. Daily intake of aldrin by food classes was in the range

 from 0 to 0.001 mg/day.

 FATE OF RESIDUES

 In soils

 Decker et al. (1965) measured the conversion of aldrin to dieldrin in

 soil and found that 50 per cent was converted after about 70 days;

 however, Edwards and Jeffs (1964) found that about 10 months was

 required to convert 50 per cent to dieldrin. On the other hand, Decker

 found a half life of aldrin residues (aldrin and dieldrin) below one

 month, whereas in the experiments of Edwards and Jeffs this time was

 about 19 months. Residue levels of aldrin (mostly present as dieldrin)

 do not accumulate indefinitely, as the result of yearly applications

 at a constant dosage rate, but will reach a maximum level which is, in

 practice, of the order of that resulting from a single annual dose

 (Decker, et al, 1965; Elgar, 1966). There is virtually no leaching of

 aldrin into deeper soil layers and thus no contamination of ground

 water which is eventually used as drinking or irrigation water

 (Edwards, 1966; Beynon, Edwards, Thompson, private communication;

 Beran and Guth, 1965; Lichtenstein, 1966).

 In storage and processing

 Most aldrin residues are present as dieldrin although aldrin itself is

 better eliminated in processing (Walker, 1965).

 NATIONAL TOLERANCES

 Country Tolerance, ppm Crop

 Canada 0.1 Asparagus, barley,

 beans,

 cantaloupes,

 celery, corn, cowpeas,

 cranberries,

 eggplants, muskmelons,

 oats, peas,

 peppers, pimentos,

 pumpkins, rye,

 soybeans, strawberries,

 tomatoes,

 watermelons, wheat,

 winter squash.

 0.25 Beets, beet tops,

 broccoli,

 Brussels

 sprouts, cabbage,

 carrots,

 cauliflower,

 Chinese cabbage,

 collards,

 cucumbers,

 endive, horse-radish,

 kale, kohlrabi,

 lettuce, mustard

 greens, onions,

 parsnips, radishes,

 rutabagas,

 spinach,

 squash, Swiss chard,

 turnips.

 German Federal The residue on

 Republic edible crops

 may not exceed

 the lower limit

 of detectability

 of the

 analytical

 methods.

 (continued)

 Country Tolerance, ppm Crop

 Netherlands \* 0.1 fruit and vegetables

 aldrin and

 dieldrin

 \*The Netherlands

 tolerances, listed

 in the Residue

 decree include the

 toxic metabolites

 and breakdown

 products.

 In the case of

 aldrin, dieldrin is

 considered

 as the main

 metabolite.

 In consequence

 of this a residue of

 aldrin plus dieldrin

 together may not

 exceed the 0.1

 ppm level.

 Sweden 0.1 fresh fruits, fresh

 berries,

 vegetables

 including potatoes.

 Switzerland 0.1 potatoes.

 USA

 (Tolerances are

 for total residues

 of aldrin and its

 epoxide dieldrin,

 resulting from the

 application of

 aldrin in or on raw

 agricultural

 commodities).

 (continued)

 Country Tolerance, ppm Crop

 0.1 (aldrin Asparagus, broccoli,

 plus Brussels

 dieldrin) sprouts,

 cabbage, cantaloupes,

 cauliflower, celery,

 cherries, cranberries,

 cucumbers, eggplant,

 grapes, lettuce, mangoes,

 muskmelons,

 nectarines, peaches,

 peppers,

 pimentos,

 pineapple, plums (fresh

 prunes), potatoes,

 pumpkins, strawberries,

 summer

 squash, sweet

 potatoes, tomatoes,

 watermelons, winter

 squash.

 zero Alfalfa, apples,

 apricots,

 beans, black-eyed

 peas, carrots, clover,

 collards, corn forage,

 corn grain, cowpeas,

 cowpea hay, endive

 (escarole), garden beets,

 garden beet tops,

 garlic, grain sorghum,

 grain sorghum forage,

 horse-radish, kale,

 kohlrabi,

 leeks, lespedeza,

 mustard greens, onions,

 parsnips, peanuts,

 peanut hay, pears, peas,

 pea

 hay, popcorn,

 quinces, radishes,

 rutabagas,

 salsify tops,

 salsify roots, shallots,

 soybeans, soybean hay,

 spinach, sugarbeets,

 sugarbeet

 tops, Swiss chard,

 turnips, turnip tops.

 (continued)

 Country Tolerance, ppm Crop

 Additional

 tolerances

 for total

 residues of

 aldrin

 and dieldrin

 are established,

 on an interim

 basis, pending

 referral to an

 advisory

 committee.

 0.1 straw of barley, oats,

 rice,

 rye, wheat

 0.05 grapefruit, lemons,

 limes,

 oranges, rice

 grain, tangerines.

 0.02 grain of barley, oats,

 rye,

 wheat.

 FAO/WHO RECOMMENDATIONS FOR TOLERANCES

 The meeting makes no recommendations for tolerances of aldrin per se,

 only for aldrin plus dieldrin - see monograph on latter compound.

 FURTHER WORK

 Further work desirable

 Following limited foliar application, aldrin residues as such were

 occasionally detected in total diets (Duggan and Weatherwax, 1967).

 Therefore further total diet studies are desired.

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 See Also:

 [Toxicological Abbreviations](http://www.inchem.org/documents/eintro/eintro/abreviat.htm)

 [Aldrin (ICSC)](http://www.inchem.org/documents/icsc/icsc/eics0774.htm)

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