

This report contains the collective views of an international group of experts and does not necessarily represent the decisions or the stated policy of the World Health Organization or of the Food and Agriculture Organization of the United Nations.

**WORLD HEALTH ORGANIZATION
TECHNICAL REPORT SERIES**

No. 370

FAO AGRICULTURAL STUDIES

No. 73

PESTICIDE RESIDUES IN FOOD

**Joint Report
of the FAO Working Party on Pesticide Residues
and the WHO Expert Committee on
Pesticide Residues**

Geneva, 14-24 November 1966



Published by
FAO and WHO



WORLD HEALTH ORGANIZATION

GENEVA

1967

Monographs containing biological data, toxicological evaluations and data on residues in food and their evaluation are issued by FAO and WHO in a publication entitled :

Evaluation of Some Pesticide Residues in Food (FAO/PL: CP/15, WHO/Food Add./67, 32).

© FAO and WHO 1967

PRINTED IN SWITZERLAND

CONTENTS

	Page
1. Introduction	7
2. General considerations	9
2.1 Acceptable daily intake	9
2.2 Food consumption figures	10
2.3 Tolerances	10
2.3.1 Definitions	10
2.3.2 Methods employed in estimating tolerances	11
3. Evaluation of consumer hazards	13
4. Conclusions and recommendations	15
Annex	17

JOINT MEETING OF THE FAO WORKING PARTY ON PESTICIDE RESIDUES
AND THE WHO EXPERT COMMITTEE ON PESTICIDE RESIDUES

Geneva, 14-21 November 1966

Members :

- Dr W. F. Almeida, Director, Division of Microbiology and Hygiene, Biological Institute, São Paulo, Brazil
- Dr V. Beneš, Head of Department of Toxicology, Institute of Hygiene, Prague, Czechoslovakia
- Mr J. W. Cook, Deputy Director, Division of Food Chemistry, Food and Drug Administration, Washington, D.C., USA
- Dr J. M. Coon, Head of Pharmacology Department, Jefferson Medical College, Philadelphia, Penn., USA (*Chairman*)
- Dr H. Egan, Laboratory of the Government Chemist, Ministry of Technology, Cornwall House, Stamford Street, London, England
- Dr R. Goulding, Ministry of Health, London, England
- Dr H. Hurtig, Research Co-ordinator (Pesticides), Research Branch, Canada Department of Agriculture, Ottawa, Canada (*Vice-Chairman*)
- Dr H. Laudani, Director, Stored Product Insect Research and Development Laboratory, Agricultural Research Service, United States Department of Agriculture, Savannah, Ga., USA
- Dr Rokuro Sato, Professor of Pesticide Chemistry, University of Agriculture and Technology, Tokyo, Japan
- Dr B. Terracini, Institute of Anatomy and Histological Pathology of the University of Turin, Italy (*Rapporteur*)
- Dr N. van Tiel, Director, Plant Protection Service, Ministry of Agriculture and Fisheries, Wageningen, Netherlands
- Professor R. Truhaut, Director, Toxicological Research Centre, Faculty of Pharmacy of the University of Paris, France

Representative of the International Atomic Energy Agency :

Mr G. Wortley, Vienna, Austria

Observer invited by FAO :

Dr H. Frehse, Groupement Européen des Associations Nationales de Fabricants de Pesticides, Brussels, Belgium

Secretariat :

- Dr G. J. van Esch, National Institute of Public Health, Utrecht, Netherlands (*Consultant*)
- Dr R. C. B. Graham, Food and Drug Directorate, Department of National Health and Welfare, Ottawa, Canada (*Consultant*)
- Dr F. C. Lu, Chief, Food Additives, WHO, Geneva, Switzerland (*Joint Secretary*)
- Dr E. E. Turtle, Ministry of Agriculture, Fisheries & Food, Tolworth, Surbiton, Surrey, England (*Consultant*)
- Dr F. W. Whittemore, Crop Protection Branch, Plant Production and Protection Division, FAO, Rome, Italy (*Joint Secretary*)

FAO WORKING PARTY ON PESTICIDE RESIDUES

Geneva, 22-24 November 1966

Members :

- Mr J. W. Cook, Deputy Director, Division of Food Chemistry, Food and Drug Administration, Washington, D.C., USA
- Dr H. Egan, Laboratory of the Government Chemist, Ministry of Technology, Cornwall House, Stamford Street, London, England
- Dr H. Hurtig, Research Co-ordinator (Pesticides), Research Branch, Canada Department of Agriculture, Ottawa, Canada (*Chairman*)
- Dr H. Laudani, Director, Stored Product Insect Research and Development Laboratory, Agricultural Research Service, United States Department of Agriculture, Savannah, Ga., USA
- Dr Rokuro Sato, Professor of Pesticide Chemistry, University of Agriculture and Technology, Tokyo, Japan
- Dr N. van Tiel, Director, Plant Protection Service, Ministry of Agriculture and Fisheries, Wageningen, Netherlands

Secretariat :

- Dr E. E. Turtle, Ministry of Agriculture, Fisheries & Food, Tolworth, Surbiton, Surrey, England (*Consultant*)
- Dr F. W. Whittemore, Crop Protection Branch, Plant Production and Protection Division, FAO, Rome, Italy (*Secretary*)

PESTICIDE RESIDUES IN FOOD

Joint Report of the FAO Working Party on Pesticide Residues and the WHO Expert Committee on Pesticide Residues

The FAO Working Party on Pesticide Residues and the WHO Expert Committee on Pesticide Residues met jointly in Geneva from 14 to 21 November 1966. The meeting was opened by Dr P. Dorolle, Deputy Director-General, WHO, on behalf of the Directors-General of the Food and Agriculture Organization of the United Nations and the World Health Organization. Dr J. M. Coon was unanimously elected Chairman and Dr H. Hurtig Vice-Chairman. Dr B. Terracini agreed to act as Rapporteur.

The FAO Working Party on Pesticide Residues held a further meeting from 22 to 24 November 1966, under the chairmanship of Dr H. Hurtig, to develop recommendations for methods of analysis appropriate for detecting the amounts of pesticides represented by the tolerances proposed by the Joint Meeting.

1. INTRODUCTION

At a joint meeting of the FAO Panel of Experts on the Use of Pesticides in Agriculture and the WHO Expert Committee on Pesticide Residues in 1961¹ it was recommended that studies be undertaken to evaluate the consumer hazard arising from the use of pesticides. The toxicological and other pertinent data on those pesticides known to leave residues in food, even when used in accordance with good agricultural practice, were to be examined and the conclusions made known. The FAO Committee on Pesticides in Agriculture and the WHO Expert Committee on Pesticide Residues held a joint meeting in Geneva in 1963 and issued a report² dealing with 37 pesticides and suggesting acceptable daily intakes for 15 of them.

These same substances were re-evaluated at a further joint meeting in Rome in 1965. In addition, five other pesticides and ten fumigants were evaluated with respect to the health hazards of treated foodstuffs to the

¹ *FAO Plant Production and Protection Division Report*, No. PL/1961/11; *Wld Hlth Org. techn. Rep. Ser.*, 1962, 240.

² *FAO Meeting Report* No. PL/1963/13; WHO/Food Add./23/(1964).

consumer, the results of these deliberations appearing in a report¹ and two supporting publications.^{2, 3}

The reports of these joint meetings, which were concerned primarily with the recommendation of acceptable daily intakes, were then considered by the FAO Working Party on Pesticide Residues with a view to recommending tolerances and appropriate methods of analysis for certain pesticides used on cereals.⁴ The recommendations made in the report of this meeting were presented to a meeting of member governments convened by the Codex Committee on Pesticide Residues at the Hague in January, 1966. At the conclusion of this meeting a list was prepared of pesticides that had already caused, or were thought to be likely to cause, difficulties in international trade because of the residues they left in foods. Since the Codex Committee realized that only a limited number of these compounds could be considered at one time and that there might be a need for urgent consideration of other compounds as well, it divided its list into two groups according to priority. The request was made that those in the first priority group be considered at the next joint meeting.

Certain new criteria for the interpretation of toxicological and related data recently recommended by the WHO Scientific Group on Procedures for Investigating Intentional and Unintentional Food Additives⁵ are relevant to the evaluation of the health hazards of pesticide residues. Furthermore, additional data have been made available on certain pesticide residues since the evaluations made at the 1965 joint meeting. The present meeting was thus convened to review these substances in the light of the new criteria and the additional data.

The FAO Working Party on Pesticide Residues undertook :

- (a) to survey and collect residue data ;
- (b) to propose pesticide residue tolerances ;
- (c) to recommend methods of analysis for pesticide residues ;
- (d) to make recommendations designed to initiate, stimulate and co-ordinate necessary research.

The WHO Expert Committee on Pesticide Residues undertook :

- (a) to review toxicological and related data on certain pesticide residues ;
- (b) to propose, where possible, acceptable daily intakes for man for those residues ;

¹ *FAO Meeting Report* No. PL/1965/10 ; WHO/Food Add./26.65.

² *FAO Meeting Report* No. PL/1965/10/1 ; WHO/Food Add./27.65.

³ *FAO Meeting Report* No. PL/1965/10/2 ; WHO/Food Add./28.65.

⁴ *FAO Meeting Report* No. PL/1965/12.

⁵ *Wld Hlth Org. techn. Rep. Ser.*, 1967, 348.

(c) to make recommendations designed to initiate, stimulate and co-ordinate necessary research.

2. GENERAL CONSIDERATIONS

The meeting took account of the principles enumerated in the first and second reports of the Joint Meeting of the FAO Committee on Pesticides in Agriculture and the WHO Expert Committee on Pesticide Residues^{1, 2} and also those set out in the second and fifth reports of the Joint FAO/WHO Expert Committee on Food Additives.^{3, 4} It was agreed to endorse these principles and to adhere to them in the toxicological assessments.

Further, a draft of the report of the WHO Scientific Group on Procedures for Investigating Intentional and Unintentional Food Additives⁵ was considered. It was recognized that the proposals made therein would prove valuable in dealing with some of the problems confronting the present joint meeting, notably those of establishing temporary acceptable daily intakes and temporary tolerances, and certain of the concepts were accepted and, in part, adopted.

The report of the first meeting of the FAO/WHO Codex Committee on Pesticide Residues was received. Note was taken as well of the report of the second session of the FAO Working Party on Pesticide Residues, particularly in relation to the introduction of new concepts and modification of others.

2.1 Acceptable daily intake

In the 1965 report of the joint meeting a statement was made about the minimum biological information required to arrive at an acceptable daily intake. It was pointed out that data on this scale were not often available. Consequently, it had been impossible to arrive at acceptable daily intakes, except for a very few pesticides.

The present meeting agreed to adhere to the principles set out in earlier reports^{1, 2} concerning the establishment of acceptable daily intakes. However, it also agreed to using a greater margin of safety in cases where several long-term studies have been reported and where the lowest dosage showed an effect of questionable significance. This was done for a few pesticides.

¹ *FAO Meeting Report*, No. PL/1963/13 ; WHO/Food Add./23 (1964).

² *FAO Meeting Report*, No. PL/1965/10 ; WHO/Food Add./26.65.

³ *Wld Hlth Org. techn. Rep. Ser.*, 1958, 144.

⁴ *FAO Nutrition Meetings Report Series*, No. 29 ; *Wld Hlth Org. techn. Rep. Ser.*, 1961, 220.

⁵ *Wld Hlth Org. techn. Rep. Ser.*, 1967, 348.

The possibility of adopting what have been referred to as temporary acceptable daily intakes (temporary ADI's) has also been considered in order to arrive at temporary tolerance figures. As a result, some temporary ADI's have now been estimated for some pesticides with the condition that additional necessary toxicological information be available within a specified period of time. These temporary ADI's have involved the application of a large safety factor. (Sometimes it is still impossible to estimate any ADI at all.) The figure will be reviewed within a specified period of time as set out in the relevant monographs. If no action has been taken to provide the further evidence required, it will be assumed that neither the manufacturers nor the user countries are interested in continuing the use of the pesticide.

2.2 Food consumption figures

As discussed on page 6 of the report of the second session of the FAO Working Party on Pesticide Residues,¹ when considering the amounts of given types of foods containing pesticides that may be consumed by the public, it has been found advisable to adopt figures that reflect a high consumption rather than an average one. For this purpose, calculations have been based upon the ninth decile of consumption, derived from consumer intake studies.² On this basis the daily consumption figure used in any calculation for a particular kind of food would be expected to be exceeded by only about 15% of the population. Furthermore, for various broad groups of foods, it has been found that the ninth decile figures range from 1½ to 3½ times the mean consumption of those foods.

2.3 Tolerances

2.3.1 Definitions

Although the report on the 1963 joint meeting³ defines "tolerance" as the "permitted concentration of residue actually remaining when the food is first offered for consumption", the term is widely used to cover residues at some *other* stage in storage, transport or preparation of food before consumption. The term sometimes applies to residues on raw foodstuffs from which they are known to be removed or reduced during cooking or other necessary processing. In accordance with this concept, the FAO Working Party on Pesticide Residues, in the report of its second

¹ *FAO Meeting Report*, No. PL/1965/12.

² Adapted from: US Department of Agriculture, Institute of Home Economics, Agricultural Research Service (1957) *Information Bulletin No. 157* (see FAO/WHO Codex Alimentarius Commission, Committee on Food Additives, document 314120/E).

³ *FAO Meeting Report* No. PL/1963/13; WHO/Food Add./23 (1964).

session,¹ recommended that certain pesticides might be permitted in cereals in international commerce. To avoid further confusion the present joint meeting accepted that the word "tolerance", when used alone, should refer to "the concentration that is permitted in or on food". Various kinds of tolerances are therefore possible, depending upon the nature of the food and the stage at which the tolerance applies. These should be stated in each instance; as an example, the tolerances recommended at the second session of the FAO Working Party on Pesticide Residues were for "cereals in international commerce". When following this procedure, however, it must be borne in mind that intakes based solely on tolerances of this type may apparently exceed the acceptable daily intake of the pesticide, whereas those based on residues actually present at the time of consumption are within this range.

Furthermore, a temporary tolerance may be given in either of two circumstances: (a) when it is derived from a temporary ADI; (b) when it is derived from an ADI that could be exceeded when the pesticide is applied according to good agricultural practice. Such temporary tolerances are valid for a specified period during which additional data on toxicity and on the disappearance of the pesticide residues during storage and processing of food should become available.

Where unintentional residues of pesticides occur in foods from background and environmental contamination, it may be necessary to suggest that governments use "practical residue limits", which are subject to administrative decisions based on residues actually found.

2.3.2 *Methods employed in estimating tolerances*

In many cases, the same pesticide is used on a number of different foodstuffs. To take into account such multiple uses, a method of estimation based on proposals made in the sixth report of the Joint FAO/WHO Expert Committee on Food Additives² and in the second report of the Joint Meeting of the FAO Committee on Pesticides in Agriculture and the WHO Expert Committee on Pesticide Residues³ has been adopted. This procedure is as follows:

(a) The residues that can possibly occur in each type of food and drink liable to contain residues from known uses of the pesticide are estimated on the basis of available data.

(b) The possible daily intake of the pesticide by a member of the population is estimated on the assumption that all the foodstuffs on which

¹ *FAO Meeting Report*, No. PL/1965/12.

² *FAO Nutrition Meetings Report Series*, 1962, No. 31; *Wld Hlth Org. techn. Rep. Ser.*, 1962, 228.

³ *FAO Meeting Report*, No. PL/1965/10; WHO/Food Add./26.65.

the pesticides might have been used have been so treated, and working on the basis of consumption figures for the ninth decile of the population (high consumption figures, as listed in the Annex) for each kind of food. In estimating the actual intakes of the pesticides any available information on their losses, degradation or transformation during storage or processing before consumption, is taken into account.

(c) Assuming an average body-weight of 60 kg, the daily intake of the pesticide, ascertained in (b), is expressed in mg per kg per day.

(d) If the sum of the figures for the separate foods does not exceed the acceptable daily intake, the residue figures indicated in (a) form the basis on which recommendations are made for tolerances for given foods, bearing in mind the possibility of additive effects or synergism with other chemicals in the environment.

(e) In certain instances, it is necessary to set aside a portion of the acceptable daily intake to cover amounts of pesticides acquired from sources other than food, such as uses in households and against pests of medical and other importance.

The above procedure has been described in detail to illustrate the use that has been made of acceptable daily intake figures in developing the tolerances suggested in the monographs on the individual pesticides. Attention is drawn to the fact that the various assumptions made are not universally applicable. If national, regional or international authorities wish to employ this procedure and if precise information is available on any of the factors considered—such as the consumption pattern of a given kind of foodstuff in a given country, the losses resulting from a particular kind of processing, or the proportion of supplies of a given foodstuff treated in a given country—this information may be used in accordance with the method of calculation outlined in this report.

The meeting felt that much more information is necessary on food consumption patterns in different countries in order to permit assessment of the risks from residues of pesticides in different kinds of foods. The meeting was informed that FAO is at present undertaking work of this kind under the World Indicative Plan which it was hoped would yield suitable data.

In its evaluation of the available residue data, the FAO Working Party on Pesticide Residues frequently encountered situations where little, if any, information was available on the post-harvest fate of pesticides on many crops. For this reason, amongst others, it has been necessary in many instances to take a highly conservative approach and assume that the residues found on the crops at harvest do not undergo any subsequent degradation prior to consumption. If and when data relevant to this question can be provided, higher tolerances or shorter pre-harvest intervals might be considered.

It must be pointed out that the tolerance figures proposed for specific compounds were arrived at only after incorporating many safety factors, among them being :

- (a) a conservative approach in establishing acceptable daily intakes ;
- (b) the assumption that all the food of a particular type will contain the residue ;
- (c) the assumption that the residue will be present in all the food to the limit of the tolerance ;
- (d) the adoption of high consumption figures, which would be exceeded by only about 15% of the population ; where the residue is present in more than one type of food, it may be assumed that the combined high consumption figures for all such foods would be exceeded by much less than 15% of the population ;
- (e) where data were not available, unless the general opinion of the Working Party indicated otherwise, it was assumed that there was no disappearance of residues in storage, handling or processing before consumption by man.

3. EVALUATION OF CONSUMER HAZARDS

The following pesticides were considered on this occasion ; aldrin, dieldrin, carbaryl, DDT, diphenyl, ethylene dibromide, gamma-BHC, heptachlor, hydrogen phosphide, malathion, methyl bromide, organic mercury compounds, piperonyl butoxide and pyrethrins—all of these being in the Priority I list prepared by the Codex Committee on Pesticide Residues.

Wherever possible, acceptable daily intakes were arrived at ; in a few instances these were of a temporary nature with appropriate stipulations. On the basis of these figures, certain tolerances were proposed.

Also examined from the toxicological standpoint were : diazinon, dichlorvos, dimethoate and phosphamidon. However, of these compounds the FAO Working Party included only dichlorvos in its programme for 1966. The data on this compound were so incomplete that no recommendations for tolerances could be made.

The acceptable daily intakes, tolerances and practical residue limits are summarized in the accompanying table.

**SUMMARY OF ACCEPTABLE DAILY INTAKES, RECOMMENDED TOLERANCES,
TEMPORARY TOLERANCES AND PRACTICAL RESIDUE LIMITS RECOMMENDED**

Compound	Acceptable daily intake (max.) (mg/kg body-weight)	Recommended tolerances (ppm)	Practical residue limits (temporary) (ppm)
aldrin and dieldrin	0.0001	none recommended	milk 0.003 meat (on fat basis) 0.2 vegetables 0.05
carbaryl	0.02	olives none recommended berries (cane) 1.2 ^a citrus 10 ^a cereals, cereal products, other fruit, vegetables (including shelled nuts) 1.0 ^a	
DDT	0.01	berries (cane), nuts (shelled) 1.0 ^a citrus 4.0 ^a other tree fruits 7.0 ^a vegetables 1.0-7.0 ^a meat, fish, poultry (on fat basis) 7.0 ^a	milk 0.005 milk products (on fat basis) 0.2
dichlorvos	0.004	no tolerances recommended for 1966	
diphenyl	0.125	citrus 110	
ethylene dibromide methyl bromide	1.0 as bromide	dried eggs, spices, herbs 400 ^a cereals 50 dried figs 250 ^a avocados 75 ^a dried raisins, dates 100 ^a dried peaches 50 ^a dried prunes 20 ^a other dried fruits 30 ^a citrus fruit, strawberries 30 ^a other fresh fruit 20 ^a	[lower limit of analytical method for ethylene dibromide is 1 ppm]
gamma-BHC (gamma-HCH)	0.0125	cereals 0.5 ^a vegetables, small fruits 3.0 ^a milk products (on fat basis) 0.1 ^a	milk 0.004 meat and poultry (on fat basis) 0.7
heptachlor (and heptachlor epoxide)	0.0005	root vegetables (other than potatoes), cole crops, head lettuce, spinach, other leafy vegetables (from applications to seed and soil only) 0.1 ^a	meat (on fat basis) 0.05 potatoes 0.05 milk 0.002 milk products (on fat basis) 0.025
hydrogen phosphide	unnecessary	cereals, raw 0.1 ^a	

^a Temporary tolerance.

Compound	Acceptable daily intake (max.) (mg/kg body-weight)	Recommended tolerances (ppm)	Practical residue limits (temporary) (ppm)
malathion	0.02	fruit and dried fruit (excluding citrus), nuts, cereal and cereal products 8.0 citrus fruit 4.0 vegetables, leafy 6.0 vegetables, other 3.0	
organo-mercurials	none	none	0.02-0.05 (see monograph)
piperonyl butoxide	0.03 (temporary, for 5 years)	cereals 20 ^a fruit (for canning), dried fruit, dried vegetables, oil seeds, tree nuts 8.0 ^a	
pyrethrins	0.04 (temporary, for 3 years)	cereals 3.0 ^a fruit (for canning), dried fruit, dried vegetables, oil seeds, tree nuts 1.0 ^a	
diazinon	0.002	no action in 1966	
dimethoate	0.004	no action in 1966	
phosphamidon	0.001	no action in 1966	

^a Temporary tolerance.

4. CONCLUSIONS AND RECOMMENDATIONS

1. In the interest of public health and agriculture, further joint meetings of the FAO Working Party and the WHO Expert Committee on Pesticide Residues should be convened to review, in the light of additional toxicological and related information, pesticides already evaluated, and also to consider pesticides not yet dealt with by the joint meetings. It is considered desirable that these meetings be held at regular and frequent intervals.

2. The organochlorine pesticides have been used extensively and have proved efficacious. Many have been shown to be persistent and cumulative in the animal and human body. In addition, there is evidence that even in low doses they have an effect on the liver. During the past few years, evidence has become available that these compounds stimulate the activity of microsomal enzymes in the liver cells. These enzymes may affect the metabolism of other compounds. The toxicological significance of these changes is difficult to interpret.

It is strongly recommended that WHO should promote the development of toxicological studies on these compounds to resolve any doubts that may still remain about their safety to consumers.

3. In the course of its deliberations on the toxicity and analysis of pesticide residues, the Joint Meeting has re-emphasized the importance of ascertaining the nature and amount of the residues in food. There is a need for a better knowledge of the nature of the terminal residues of some pesticides and for improvements in some of the analytical methods of residue determination, as set out in the individual monographs. The joint meeting agreed that these problems should be referred to the International Union of Pure and Applied Chemistry for consideration and, where appropriate, to the International Atomic Energy Agency.

4. In the course of its work, the FAO Working Party on Pesticide Residues frequently encountered gaps in information on world patterns of pesticide use, residues resulting from experimental programmes, residues found in commerce, and losses of residues during storage and food processing. The results of residue analyses of total diets have also been particularly useful in assessing the probable actual intake of pesticide residues by man. The Director-General of FAO is requested to ask member governments to obtain these data and to make them available to FAO.

Annex

**HIGH FOOD CONSUMPTION FIGURES BASED ON USA
SURVEY¹**

<i>Food</i>	<i>High consumption (grams/person/day)</i>
<i>Milk, cream, ice cream and cheese, fluid milk equivalent</i>	1100
Fresh fluid milk, total	900
Whole	800
Processed milk	200
Cream	30
Ice cream, ice milk	70
Cheese	70
<i>Fats and oils, total</i>	100
Table fats, total	50
Butter	30
Margarine	40
Shortening	30
Salad and cooking oils	20
Salad dressings (commercial)	30
<i>Flour and other cereal products, total</i>	170
Flour other than mixes	90
Prepared flour mixes	50
Breakfast cereals (excluding baby cereals)	40
Other cereals	40
<i>Bakery products, total</i>	240
Bread	180
Baked goods other than bread	90
<i>Eggs</i>	110
<i>Meat, poultry and fish, total</i>	500
Meat, total	400
Beef	250

¹ The table shows figures (rounded) calculated from the USA's "high consumption" values of food intake and are based on the ninth decile figures of food consumed in an area of the USA according to a Household Food Consumption Survey carried out in 1955. These are given as examples of figures that might be used in estimating possible daily intakes of pesticides (see pp. 12 and 13).

<i>Food</i>	<i>High consumption (grams/person/day)</i>
Veal	50
Pork	150
Lamb, mutton	50
Variety meats and game	50
Luncheon meats	60
Poultry, total	120
Chicken	110
Fish and shellfish	60
<i>Sugar and sweets, total</i>	150
Sugar	100
Syrups, molasses, honey	20
Jellies, jams	30
Candies (commercial)	30
<i>Potatoes and sweet potatoes, total</i>	210
Fresh	200
Potato chips and sticks	10
<i>Fresh vegetables, total</i>	370
Dark green and deep yellow	70
Other green	170
Tomatoes	60
Other than tomatoes, and green and deep yellow vegetables	130
<i>Fresh fruits, total</i>	450
Citrus	230
Other than citrus	250
<i>Commercially frozen fruits and vegetables, total</i>	50
Vegetables other than potatoes	40
<i>Commercially canned fruits and vegetables, total</i>	200
Fruits, except baby and junior foods	100
Vegetables, except baby and junior foods	140
<i>Fruit and vegetable juices, fresh, frozen, canned, and powdered</i>	200
Canned citrus	60
Canned fruit, other than citrus	50
Canned tomato and other vegetable	60
Frozen concentrated	30

<i>Food</i>	<i>High consumption (grams/person/day)</i>
<i>Dried fruits and vegetables, total</i>	40
Dried fruit	20
Dried vegetables	20
<i>Beverages</i>	
Coffee	50
Tea	5
Soft drinks, etc.	140
<i>Miscellaneous foods</i>	
Nuts (shelled weight) and peanut butter	20
Soups, except canned baby soups	60
Catsup, chili sauce, etc.	20
Pickles, olives, relishes	30
Puddings, pie fillings, miscellaneous sweets (commercial)	20
Other mixtures, prepared or partially prepared	50
Leavening agents	5

**WORLD HEALTH ORGANIZATION
TECHNICAL REPORT SERIES**

<i>Recent reports :</i>		Price		
		s.d.	\$	Sw. fr
No.				
333	(1966) Chemistry and Physiology of the Gametes Report of a WHO Scientific Group (23 pages)	3/6	0.60	2.—
334	(1966) Immunological Aspects of Human Reproduction Report of a WHO Scientific Group (21 pages)	3/6	0.60	2.—
335	(1966) WHO Expert Committee on Onchocerciasis Second report (96 pages)	6/8	1.25	4.—
336	(1966) Sampling Methods in Morbidity Surveys and Public Health Statistics Tenth report of the WHO Expert Committee on Health Statistics (29 pages)	3/6	0.60	2.—
337	(1966) Training and Preparation of Teachers for Medical Schools with Special Regard to the Needs of Developing Countries Fifteenth report of the WHO Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel (26 pages)	3/6	0.60	2.—
338	(1966) Haemoglobinopathies and Allied Disorders Report of a WHO Scientific Group (40 pages)	5/-	1.00	3.—
339	(1966) Specifications for the Identity and Purity of Food Additives and their Toxicological Evaluation: Some Anti-microbials, Antioxidants, Emulsifiers, Stabilizers, Flour-Treatment Agents, Acids and Bases Ninth report of the Joint FAO/WHO Expert Committee on Food Additives (24 pages)	3/6	0.60	2.—
340	(1966) Methods of Planning and Evaluation in Applied Nutrition Programs Report of a Joint FAO/WHO Technical Meeting (77 pages)	4/-	0.80	2.40
341	(1966) Principles for Pre-Clinical Testing of Drug Safety Report of a WHO Scientific Group (22 pages)	3/6	0.60	2.—
342	(1966) Prevention of Rheumatic Fever Report of a WHO Expert Committee (27 pages)	3/6	0.60	2.—
343	(1966) WHO Expert Committee on Dependence-Producing Drugs Fifteenth report (18 pages)	3/6	0.60	2.—
344	(1966) Immunotherapy of Cancer Report of a WHO Scientific Group (38 pages)	5/-	1.00	3.—
345	(1966) The Training of Health Laboratory Personnel (Technical Staff) Fourth report of the WHO Expert Committee on Health Laboratory Services (31 pages)	3/6	0.60	2.—
346	(1966) Research on Genetics in Psychiatry Report of a WHO Scientific Group (20 pages)	3/6	0.60	2.—
347	(1966) WHO Expert Committee on Nursing Fifth report (32 pages)	3/6	0.60	2.—
348	(1967) Procedures for Investigating Intentional and Unintentional Food Additives Report of a WHO Scientific Group (25 pages)	3/6	0.60	2.—
349	(1967) Measurement of the Public Health Importance of Bilharziasis Report of a WHO Scientific Group (93 pages)	6/8	1.25	4.—
350	(1967) National Health Planning in Developing Countries Report of a WHO Expert Committee (40 pages)	5/-	1.00	3.—