(25) **Cowpea forage.** Cut sample at 6 inch to pre-bloom stage, at approximately 30 percent DM **Cowpea hay** Cut when pods are one-half to fully mature Hay should be field-dried to a moisture content of 10 to 20 percent

(26) **Crownvetch forage** Cut sample at 6 inch to pre-bloom stage, at approximately 30 percent DM **Crownvetch hay** Cut at full bloom stage Hay should be field-dried to a moisture content of 10 to 20 percent

(27) **Grass** Zero day crop field residue data for grasses cut for forage should be provided unless it is not feasible, e g pre-plant/pre-emergent pesticide uses A reasonable interval before cutting for hay is allowed **Grass forage** Cut sample at 6-8 inch to boot stage, at approximately 25 percent DM **Grass hay** Cut in boot stage Hay should be field-dried to a moisture content of 10 to 20 percent Grasses include barnyardgrass, bentgrass, Bermudagrass, Kentucky bluegrass, big bluestem, smooth bromegrass, buffalograss, reed canarygrass, crabgrass, cupgrass, dallisgrass, sand dropseed, meadow foxtail, eastern gramagrass, side-oats grama, guineagrass, Indiangrass, Johnsongrass, lovegrass, napiergrass, oatgrass, orchardgrass, pangolagrass, redtop, Italian ryegrass, sprangleton, squirreltailgrass, stargrass, switchgrass, timothy, crested wheatgrass, and wildryegrass Also included are sudangrass and sorghum forages and their hybrids For grass grown for seed only, PGIs (pre-grazing intervals) and (pre-harvest intervals) are acceptable Residue data may be based on the regrowth after harvesting the seed

(28) **Grass silage** Residue data on silage are optional, but are desirable for assessment of dietary exposure Cut sample at boot to early head stage, allow to wilt to 55-65 percent moisture, then chop fine, pack tight, and allow to ferment for 3 weeks maximum in an air-tight environment until it reaches pH 4 In the absence of silage data, residues in forage will be used for silage, with correction for dry matter

(29) **Lespedeza forage** Cut sample at 4-6 inch to pre-bloom stage, at 20-25 percent DM **Lespedeza hay: Annual/Korean** Cut at early blossom to full bloom stage **Sericea** Cut when 12-15 inches tall Hay should be field-dried to a moisture content of 10-20 percent

(30) **Millet forage** Cut sample at 10 inches to early boot stage, at approximately 30 percent DM **Millet hay** Cut at early boot stage or approximately 40 inches tall, whichever is reached first Hay should be field-dried to a moisture content of 10 to 20 percent Millet includes pearl millet

(31) **Millet grain** Kernel plus hull (lemma and palea) **Pearl millet** Kernel with hull (lemma and palea) removed

(32) **Millet straw** Data are required for proso millet only Proso millet straw Plant residue (dried stalks or stems with leaves) left after the grain has been harvested

(33) **Millet flour** Not produced significantly in the United States for human consumption Residue data are not needed at this time

(34) **Oats forage** Cut sample between tillering to stem elongation (jointing) stage **Oats hay** Cut sample from early flower to soft dough stage Hay should be field-dried to a moisture content of 10 to 20 percent **Oats straw** Cut plant residue (dried stalks or stems with leaves) left after the grain has been harvested (threshed)

(35) **Pea, field** Does not include the canning field pea cultivars used in human food Includes cultivars grown for livestock feeding only such as Austrian winter pea Field pea vines Cut sample any time after pods begin to form, at approximately 25 percent DM Field pea hay Succulent plant cut from full bloom through pod formation Hay should be field-dried to a moisture content of 10 to 20 percent

(36) **Pea, field, silage** Use field pea vine residue data for field pea silage with correction for dry matter

(37) **Peanut hay** Peanut hay consists of the dried vines and leaves left after the mechanical harvesting of peanuts from vines that have been sun-dried to a moisture content of 10 to 20 percent

(38) **(R)** Label restrictions against feeding may be allowed, e g *Do not feed green immature growing plants to livestock*, or *Do not harvest for livestock feed*

(39) **Pineapple process residue** (also known as wet bran) A wet waste byproduct from the fresh-cut product line that includes pineapple tops (minus crown), bottoms, peels, any trimmings with peel cut up, and the pulp (left after squeezing for juice), it can include culls

(40) **Potato granules and flakes** Residue data may be provided for either

(41) **Potato processed waste** Tolerance levels for wet peel should be used for dietary burden calculations Residue data may be provided from actual processed potato waste generated using a pilot or commercial scale process that gives the highest percentage of wet peel in the waste

(42) **Rapeseed meal** Residue data are not needed for rapeseed oil since it is produced for industrial uses and is not an edible oil The edible is only produced from canola (See canola)

(43) **Rice straw** Stubble (basal portion of the stems) left standing after harvesting the grain

(44) **Rye forage** Cut sample at 6-8 inch stage to stem elongation (jointing) stage, at approximately 30 percent DM Rye straw Cut plant residue (dried stalks or stems with leaves) left after the grain has been harvested (threshed)

(45) **Rye grain or wheat grain** Kernel (caryopsis) with hull (lemma and palea) removed

(46) **Sorghum flour** Residue data are not needed at this time since sorghum flour is used exclusively in the United States as a component for drywall, and not as either a human food or a feedstuff However, because 50 percent of the worldwide sorghum production goes toward human consumption, data may be needed at a later date

(47) **Soybean forage** Cut samples at 6-8 inches tall (sixth node) to beginning pod formation, at approximately 35 percent DM **Soybean hay** Cut samples at mid-to-full bloom stage and before bottom leaves begin to fall or when pods are approximately 50 percent developed Hay should be field-dried to a moisture content of 10 to 20 percent

(48) **Soybean silage** Residue data on silage are optional Harvest sample when pods are one-half to fully mature (full pod stage) In the absence of silage data, residues in forage will be used for silage, with correction for dry matter

(49) **Sugarcane bagasse** Information indicates that sugarcane bagasse is mainly used for fuel Residue data will not be needed at this stage, but may be needed at a later date

(50) **Sugarcane molasses** Residue data are needed for blackstrap molasses

(51) **Trefoil forage** Cut sample at 5-10 inch or early bloom stage, at approximately 30 percent DM **Trefoil hay** Cut at first flower to full bloom Hay should be field-dried to a moisture content of 10 to 20 percent

(52) **Vetch forage** Cut sample at 6 inch to pre-bloom stage, at approximately 30 percent DM **Vetch hay** Cut at early bloom stage to when seeds in the lower half of the plant are approximately 50 percent developed Hay should be field-dried to a moisture content of 10 to 20 percent

(53) **Wheat forage** Cut sample at 6-8 inch stage to stem elongation (jointing) stage, at approximately 25 percent DM **Wheat hay** Cut samples at early flower (boot) to soft dough stage Hay should be field-dried to a moisture content of 10 to 20 percent **Wheat straw** Cut plant residue (dried stalks or stems with leaves) left after the grain has been harvested (threshed)

(54) **Wheat** Includes emmer wheat and triticale No processing study is needed for a specific tolerance on emmer wheat

(55) **Wheat milled byproducts** Use highest value for wheat middlings, bran and shorts

References

The following references should be consulted for additional background material on this test guideline

1 Environmental Protection Agency Pesticide Re-registration Rejection Rate Analysis - Residue Chemistry, Follow-up Guidance for Generating Storage Stability Data, Submission of Raw Data, Maximum Theoretical Concentration Factors, Flowchart Diagrams EPA Report No 737-R-93-001, February 1993

2 Environmental Protection Agency Pesticide Re-registration Rejection Rate Analysis - Residue Chemistry, Follow-up Guidance for Updated Livestock Feeds Tables, Aspirated Grain Fractions (Grain Dust), A Tolerance Perspective, Calculating Livestock Dietary Exposure, Number and Location of Domestic Crop Field Trials EPA Report No 737-K-94-001, June 1994

3 Environmental Protection Agency Pesticide Re-registration Rejection Rate Analysis - Residue Chemistry EPA Report No 738-R-92-001, June 1992

4 Environmental Protection Agency FIFRA Accelerated Reregistration-Phase 3 Technical Guidance EPA Report No 540/09-90-078, December 1989

5 Environmental Protection Agency Pesticide Regulation Rejection (PR) Notice, tolerance Enforcement Methods-Independent Laboratory Confirmation by Petitioner, February 7, 1996

Appendix X

JMPR MANUAL FOR FAO PANEL MEMBERS

CONTENTS

INTRODUCTION

The purpose of this manual is to assist members of the FAO Panel to prepare draft documents for the Meeting in a consistent format It may also be useful to people preparing submissions for review by the FAO Panel The manual is not intended to deal with the evaluation process or to provide guidance on the estimation of maximum residue levels Documents prepared in the correct format assist JMPR members to digest information quickly, and after the Meeting make it easier for the editor to produce final copy for publication

GENERAL

Produce documents on a word-processor using Word version 97 or later

Introduce continuous line numbering into all documents for discussion Line numbers assist readers to find parts of the document to be discussed

Spell-check documents, if possible, with English (UK)

Use metric units and convert non-metric units to metric

1 lb	=	0 4536 kg
1 gal (US)	=	3 7854 litres
1 fl oz	=	0 02957 litres
1 acre	=	0 404687 ha
100 sq ft	=	9 290 sq m
1 lb/100 gal (US)	=	0 1198 kg/hl
1 gpa	=	9 353 l/ha (gpa is gallon per acre)
1 lb/acre	=	1 12 kg/ha
1 oz/1000 cu ft	=	1 0012 g/m^3 (space fumigation)

Convert lb ai/acre to kg ai/ha, formulation concentration % to g/kg or g/l and residue concentration ppm to mg/kg, but express feed concentrations of active ingredients in feeding trials as ppm This convention is used to avoid confusion between mg/kg feed and mg/kg body weight

FORMAT

Use Times New Roman font size 11 for text and, where possible, at least size 9 for tables

Left and right margins should be 1 inch (25 mm) and top and bottom margins 0 5 inch (12 5 mm) Lines should be fully justified, with widow/orphan protection

Tabs for general text should be set at half-inch (12 5 mm) intervals

Paragraphs immediately following a heading should be left aligned The first line of subsequent paragraphs should be indented half-inch (12 5 mm)

A page header should be introduced on the top left of each page of the draft document to show the title of the document, for example PHORATE Evaluation, or PHORATE Appraisal, or RESIDUES IN FEEDS Report

Position page numbers at "Top of page (header)", and centred and use Times New Roman font size 11

TABLES

This section contains guidelines for creating tables Examples of particular table layouts, e g residue data tables, are provided under the relevant headings in the section "Draft residue evaluation (draft monograph) "

Insert tables in their intended positions in the text or thereabouts, not at the end of the monograph Although it is customary to collect tables at the end of articles for publication in journals, different considerations apply to the production of camera-ready copy

Use the Table function in Word to create a standard table with a double-line border, i e Table/Insert Table/Autoformat /Formats Elegant Apply a double line under the heading row by using the "Tables and Borders" toolbar An example of the standard table is provided below

Generally, separate items of information should be recorded in separate cells of tables For example, the Codex Commodity Number and the Codex commodity description should be in

separate cells of the row In particular, ensure that separate lines of tables are in separate rows of cells

Do not join cells vertically (as distinct from deleting lines separating them) this causes the same problems as cells that are several lines deep

Use the portrait (vertical) rather than the landscape (horizontal) layout for tables as far as possible Use the same page margins as stated above Wide tables can sometimes be accommodated vertically by using font size 9

Use the "Headings" function for multi-page tables to ensure that the table header appears at the top of each page Do not include the table caption as a header within the table itself as the caption will appear on subsequent pages and thus make it difficult for the reader to find the beginning of a long table

Do not construct a table covering several pages as a series of separate single-page tables This usually produces a number of partly filled pages

Generally avoid the use of symbols and indicate endnotes to a table (at the end of the table rather than at the bottom of the page) by superscript numbers

Avoid abbreviations if they make the table difficult to understand If an abbreviation is unlikely to be familiar to readers and is not in the list of abbreviations at the beginning of the JMPR Report and Evaluations, explain its meaning in a table endnote

Common specialized abbreviations which do not need explanation are

acute RfD	acute reference dose
ADI	acceptable daily intake
CAC	Codex Alimentarius Commission
CAS	Chemical Abstracts Service
CCPR	Codex Committee on Pesticide Residues
CXL	Codex MRL
EMRL	extraneous maximum residue limit
g ai/m	grams active ingredient per metre
g ai/m^3	grams active ingredient per cubic metre
g ai/t	grams active ingredient per tonne
GAP	good agricultural practice(s)
HR	highest residue in the edible portion of the commodity found in the trials used to estimate a maximum residue level in the commodity
HR-P	highest residue - processed commodity
IEDI	international estimated daily intake
IESTI	international estimated short term intake
kg ai/ha	kilograms active ingredient per hectare
kg ai/hl	kilograms active ingredient per hectolitre
LOQ	limit of quantification (limit of quantitation)
LP	large portion consumed (kg food/day) for IESTI calculations
mg/kg	milligrams per kilogram
MRL	Maximum Residue Limit
PHI	pre-harvest interval

RAC	raw agricultural commodity
STMR	supervised trials median residue
STMR-P	supervised trials median residue, processed commodity
TMDI	theoretical maximum daily intake

Note that the above abbreviations, and those of names of countries and organizations, are printed without stops (thus UK, USA, FAO, CCPR) but general abbreviations in common use have stops (*e g , etc , i e , viz*) Consult the list at the beginning of recent JMPR Reports and Residue Evaluations for the correct form of abbreviations Note the form of *et al* (italics, with full stop after 'al')

Use Codex commodity descriptions[26] if possible and deal with commodities in the order of the "Types" in the Codex Classification of Foods and Feeds, i e , Fruits, Vegetables, , and then in the order of the groups within the types, e g Citrus fruits, Pome fruits, Stone fruits, etc

Express residue concentrations as mg/kg and include references or study numbers in residue tables as it is important to identify the source of any reported data

DIAGRAMS

Use either electronic copies provided by manufacturers or draw diagrams using a commercial chemical structure drawing program, as shown below

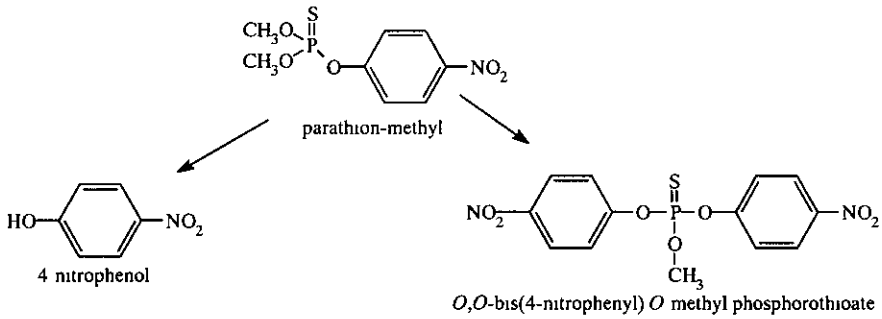

Figure X 1 Aerobic soil metabolism of parathion-methyl (Evaluations 2000, Part 1 – Residues, p 580)

JMPR REPORTS

Published JMPR Reports consist of 6 chapters and a number of annexes

Some chapters and annexes are essentially compiled by the editor The chapters and annexes of special interest to Panel members preparing for a Joint Meeting are the following

Chapter 2 General considerations Reports on any issue not specifically related to a compound are prepared for Chapter 2

[26] FAO/WHO 1993 Codex Classification of Foods and Animal Feeds in Codex Alimentarius, 2nd ed , Volume 2 Pesticide Residues, Section 2 Joint FAO/WHO Food Standard Programme FAO, Rome

Chapter 3 Dietary risk assessment for pesticide residues in food The summarized results of the dietary risk assessments are reported in Chapter 3

Chapter 4 Reports on individual compounds The editor will convert Appraisal documents into reports for Chapter 4 Panel members, when writing Appraisals, should be aware that essentially the same words will appear as the JMPR report on the compound, which means that Appraisals should be complete in themselves and should not refer to specific Tables or Figures, etc , in the draft Evaluation

Annex 1 Detailed table of all MRL, STMR, HR, ADI, acute RfD and residue definition recommendations from the meeting Annex 1 is compiled from the recommendation tables of each compound by the editor or FAO Joint Secretary

Annex 3 Spreadsheet calculations of long-term intakes and comparison with ADIs

Annex 4 Spreadsheet calculations of short-term intakes and comparison with acute RfDs

ACTIONS BEFORE THE MEETING

The FAO Joint Secretary to the JMPR will assign a "peer reviewer" for each compound on the FAO Panel agenda The primary reviewer should send an essentially complete evaluation, an appraisal and dietary intake spreadsheets (electronic copies), to the peer reviewer approximately 4-6 weeks prior to the meeting The peer reviewer should read the papers and send comments to the primary reviewer so that final drafts can be prepared for the meeting In the last two or three weeks before the meeting, Panel members are usually very busy with final preparations and will not have time to devote full attention to the review of lengthy documents For the pre-meeting peer review process to work properly documents must be distributed in adequate time

Panel members should send an electronic copy of the table of recommendations for each compound to reach the FAO Joint Secretary two weeks before the commencement of the meeting The purpose is to allow the FAO Joint Secretary or the editor to prepare much of Annex 1 before the meeting

Panel members should send an electronic copy of the table of recommendations and of the section on processing studies and residues in the edible portion of food commodities for each compound to reach the WHO Joint Secretary two weeks before the commencement of the meeting The purpose is to inform GEMS/Food about potential dietary intake situations for the compounds being evaluated

Panel members should send final drafts of their papers to the FAO Joint Secretary in time for copies to be prepared for the meeting

Authors should prepare a brief list of questions on each compound and points for discussion by Panel members The list should be available on the first day of the Panel meeting and should aim to focus attention on the difficult questions that have arisen during the review

For the purposes of the meeting, the draft evaluation and the draft appraisal are prepared as two separate documents The final monograph published in the FAO Evaluations Part 1 – Residues includes both the draft evaluation and the draft appraisal

Communication with the compound sponsor

Panel members should ensure that copies of all contact (e-mail, fax or letter) with the compound sponsor are delivered to the FAO Joint Secretary Panel members should also ensure that copies of replies from the company are delivered to the FAO Joint Secretary

Examples of necessary communication with the compound sponsor during the preparation of the draft evaluation are

- acknowledgment of receipt of the dossier
- questions about missing studies or missing data
- questions about missing pages in a study
- questions about conflicting statements in a study
- questions about undated GAP
- questions of fact
- follow up on details on apparent outliers
- preliminary draft of evaluation (summary of factual material) and a request for comment on errors and omissions

There should be no discussion with the compound sponsor about the draft appraisal (discussion of interpretations) before the meeting Questions of interpretation should be discussed by the Panel before being raised with the compound sponsor

DUTIES OF THE FAO PANEL CHAIRMAN AND RAPPORTEUR

The Chairman maintains liaison with the WHO Group Chairman on the progress of the Meeting, and together they arrange the schedule for joint sessions The FAO Panel Chairman serves as either Chairman or Vice-Chairman of the Joint Meeting

The Chairman ensures that all items are given reasonable discussion and tries to bring the Meeting to an agreement Reasonable progress must be made, and the intention is to distribute advanced drafts of general report items to the WHO Group by the fourth last day of the Joint Meeting and final drafts of most report items by the third last day of the Joint Meeting

The system has evolved where individual Panel members act as rapporteurs for discussion on any documents they have prepared With the volume of work to be dealt with it would not be practical to channel all the work through one person

The FAO Panel Rapporteur keeps in touch with the WHO Group Rapporteur, ensures that documents are exchanged, and keeps records of the exchanges

The FAO Panel Rapporteur acts as the channel for copying, and ensures that documents are not delayed

DRAFT RESIDUE EVALUATION (DRAFT MONOGRAPH)

Prepare a draft evaluation for the Meeting using the following format The use of upper case, alignment of headings, bold and underlining should follow this format In the top right-hand corner of the first page state the year, the draft number and the author's family name A reference number will be assigned to the compound at the Meeting (e g FAO/2001/ref no) EV1 is added to the file name to show that it is draft 1 of the evaluation The layout is shown below

FAO/2001/
AUTHOR
COMPOUND_EV1 doc
DRAFT 1

COMPOUND (Codex number) [Bold upper case, centred]

EXPLANATION [Bold upper case, left aligned]

IDENTITY [Bold upper case, left aligned]

METABOLISM AND ENVIRONMENTAL FATE [Bold upper case, left aligned]
Animal metabolism [Bold, sentence case, left aligned]
Plant metabolism [Bold, sentence case, left aligned]
Environmental fate in soil [Bold, sentence case, left aligned]
Environmental fate in water-sediment systems [Bold, sentence case, left aligned]

RESIDUE ANALYSIS [Bold upper case, left aligned]
Analytical methods [Bold, sentence case, left aligned]
Stability of pesticide residues in stored analytical samples [Bold, sentence case, left aligned]
Definition of the residue [Bold, sentence case, left aligned]

USE PATTERN [Bold upper case, left aligned]

RESIDUES RESULTING FROM SUPERVISED TRIALS ON CROPS [Bold upper case, left aligned]

FATE OF RESIDUES IN STORAGE AND PROCESSING [Bold upper case, left aligned]
In storage [Bold, sentence case, left aligned]
In processing [Bold, sentence case, left aligned]
Residues in the edible portion of food commodities [Bold, sentence case, left aligned]

RESIDUES IN ANIMAL COMMODITIES
Direct animal treatments [Bold, sentence case, left aligned]
Farm animal feeding studies [Bold, sentence case, left aligned]

RESIDUES IN FOOD IN COMMERCE OR AT CONSUMPTION [Bold upper case, left aligned]

NATIONAL MAXIMUM RESIDUE LIMITS [Bold upper case, left aligned]

REFERENCES [Bold upper case, centred]

EXPLANATION

Provide a very brief history of the compound in the introductory sentence

> *Parathion-methyl was first evaluated in 1965 and has been reviewed several times since, most recently in 1991, 1992, 1994 and 1995*

If a question was raised at the CCPR refer to the Session number and year

> *At the 30th (1998) Session of the CCPR it was suggested (ALINORM 99/24, Appendix VII)*

If the compound is being reviewed in the CCPR periodic review programme, state this in the first paragraph

> *Parathion-methyl was listed by the 1998 CCPR (30th Session, ALINORM 99/24, Appendix VII) for Periodic Re-evaluation for residues by the 2000 JMPR*

Mention briefly previous JMPR requests for further information if relevant to the topic Summarize the information available to the Meeting State that information was supplied by [list of countries] and the (basic) manufacturers Do not include company names

For new and periodic review compounds, state explicitly whether information was or was not provided on critical supporting studies (metabolism, farm animal feeding, processing, analytical methods, freezer storage stability)

For periodic review compounds, begin with the EXPLANATION section followed by the IDENTITY section Omit the EXPLANATION section for new compounds

IDENTITY

- ISO common name
- Chemical name
  - IUPAC
  - CAS
- CAS Registry No
- CIPAC No
- Synonyms and trade names
- Structural formula
- Molecular formula
- Molecular weight

Physical and chemical properties

Pure active ingredient

- Appearance
- Vapour pressure

- Melting point
- Octanol-water partition coefficient
- Solubility
- Relative density
- Hydrolysis
- Photolysis
- Dissociation constant

Technical material

- Purity
- Appearance
- Density
- Melting range
- Stability

Formulations

METABOLISM AND ENVIRONMENTAL FATE

Animal metabolism

For new and periodic review compounds animal metabolism studies should be available to both the FAO Panel and the WHO Group The FAO Panel reviews laboratory animal metabolism studies to help in the interpretation of farm animal metabolism and feeding studies This information includes rates and pathways of excretion, identity and relative abundance of metabolites, and possible target organs for residues The FAO Panel reviewer should specifically request animal metabolism studies for a new compound or a periodic review compound if they have not been provided

Introduce the section with a statement of the type of metabolism data received

> *The Meeting received information on the fate of orally dosed spinosyns in lactating goats and laying hens and dermally applied spinosyns in lactating goats*

Each study can then be introduced with a paragraph which acts as a checklist of the information to be recorded

> *Tissue, egg and excreta residues were measured in laying hens (groups of 5, each bird weighing 1 0-1 4 kg) dosed orally once each day for 7 days by capsule with radiolabelled mancozeb ([^{14}C]ethylenediamine) equivalent to 3, 14 or 36 ppm mancozeb in the feed (study reference) The feed intake was 88-96 g dry wt/bird/day Eggs and excreta were collected throughout, and birds were slaughtered 24 hours after the final dose for tissue collection*

Examine the animal metabolism in terms of the requirements for farm animal feeding studies (see Chapter 3 section, "Information and data from farm animal feeding and external animal treatment studies") Draw conclusions from the animal metabolism which will assist interpretation of the farm animal feeding studies Make statements about bioaccumulation and possible target tissues for residues

Include studies on bioaccumulation in fish in this section

Include an animal metabolism diagram at the end of the section

Plant metabolism

Introduce the section with a statement of the type of metabolism data received

> *The Meeting received information on the fate of spinosyns after foliar application to apples, cabbage, tomatoes, turnips, grapes and cotton*

Again, the studies can then be introduced with a paragraph which acts as a checklist of the information to be recorded

> *A tomato crop was treated with radiolabelled mancozeb ([^{14}C]ethylenediamine) at 2 7 kg ai/ha, on nine occasions at approximately weekly intervals, and ripe tomatoes were harvested 5 days after the final treatment (study reference)*

Draw conclusions from the plant metabolism studies which assist interpretation of the residue trials State whether the residues are on the surface or within the tissues Describe the mobility of the residues within the crop and say whether transfer from foliage to fruit, root or other edible portion is likely Draw attention to any plant metabolite which is not also an animal metabolite

Include a plant metabolism diagram at the end of the section

Environmental fate in soil; Environmental fate in water-sediment systems

Follow the same format as described for the animal and plant metabolism sections, i e provide an introductory statement and then a paragraph describing the studies on each mode of environmental fate

Include studies on residues in rotational crops under "Environmental fate in soil"

RESIDUE ANALYSIS

Analytical methods

The introductory sentence or paragraph should state the range of analytical methods received for evaluation and should mention the analytes (parent and degradation products) and the substrates tested

Each analytical method should be briefly described in one or two paragraphs Include the extraction, cleanup and final method of determination (e g GLC-FPD) Draw attention to critical or difficult steps in the analysis and difficult substrates Report the method validation analytical recoveries in terms of substrates tested, spiking levels, number of tests and range of recoveries State the LOQ

Include the results of testing the compound through standard enforcement and multi- residue analytical methods whether the compound is successfully analysed by the method or not

Stability of pesticide residues in stored analytical samples

The introductory sentence should summarize the information provided to the JMPR

> *The Meeting received data on the stability of residues in snap beans, kidney beans, cotton seed, strawberry, plum, apple, sunflower seed, almond kernel, spinach, green peppers, orange, clover, canola seed, canola crude oil, canola meal, canola processing waste, sorghum flour, maize and processed maize commodities stored frozen*

Definition of the residue

A discussion on residue definition is necessary for new and periodic review compounds It is not needed for other cases unless a specific question has arisen about residue definition

Explain the basis for proposed residue definitions and indicate if the definitions apply to crop or animal commodities or both The explanation would normally take into account metabolism of the compound, practical regulatory analytical methods and other matters The opinion of the WHO Expert Group should be sought on the toxicological importance of some metabolites Conclude the section with statements of the residue definitions For example

Definition of the residue (for compliance with MRL)

Definition of the residue (for estimation of dietary intake)

USE PATTERN

Introduce the section with a statement of the compound uses

> *Parathion-methyl is registered in many countries for control of insect pests on fruit, vegetables, cereals, oilseeds and forage crops The information available to the Meeting on registered uses is summarized in Table*

Comparison of Good Agricultural Practice (GAP) with conditions in the supervised trials is a necessary part of the evaluation process and therefore the table of GAP should be prepared in such a way to allow easy comparison An excerpt of the GAP table from the parathion-methyl evaluation (Evaluations 2000, Part 1 – Residues, p 617) is provided below for reference

The first column in the table should list the crops, and all uses on each crop should be brought together This facilitates evaluation of the residue data Other columns in the table should list countries (in alphabetical order), the formulation type, application (method, rate, spray concentration, number) and PHI Note that this is the general case and there is often a need for further information such as details of the use pattern (e g furrow treatment, seed treatment), crop growth stage, grazing withdrawal, etc

Avoid trade names in the table, give the composition and formulation type, e g 100 g/kg WP, 200 g/l EC Use CIPAC abbreviations for formulation types (see Appendix III)

Indicate where official labels have been provided GAP summaries provided to JMPR have often included details that are not on labels, e g only one of application rate and spray concentration may be stated on the label but both have been included in GAP summaries provided to JMPR The maximum number of applications is often not on the label US labels

may state the maximum amount of pesticide permitted in a season, which should be included in the table as maximum amount rather than calculated to a maximum number Any information that is not on a label should be indicated by a table endnote if it is included in the table

Indicate by an endnote to the table uses that are not yet official but are still proposed uses

Table X 1 Registered parathion-methyl uses

Crop	Country	Form	Application				PHI
			Method	Rate, kg ai/ha	Spray conc kg ai/hl	Number	days
Agric and horti crops	Netherlands	EC	soil treatment	2 6		1	
Alfalfa	Hungary	CS 450 g/l	foliar	0 45			14
Alfalfa	Hungary	EC 480 g/l	foliar	0 24-0 34			14
Alfalfa	USA	EC 480 g/l	foliar	0 28-1 1			15
Apple	Australia	ME 240	foliar	-	0 03	note[1]	14

[1] apples and pears – apply as determined by trap counts at minimum intervals of 2 weeks

Remarks can be added as table endnotes, e g aerial application, field and glasshouse use, glasshouse use only, growth stage restriction, post-harvest use, seed treatment, table grapes only, wine grapes only

If there are many uses, split them into separate tables for fruits, vegetables, etc

Use the following units for application rates and spray concentrations, note that abbreviations are without full stops

field treatment	kg ai/ha
grain treatment, post-harvest	g ai/t
furrow treatment	g ai/m
space fumigation	g ai/m^3
spray concentration	kg/ai/hl

RESIDUES RESULTING FROM SUPERVISED TRIALS ON CROPS

Where there are many residue tables, insert a list of them at the beginning of the section, in numerical order An excerpt from a list of parathion-methyl residue tables is provided below (Evaluations 2000, Part 1 – Residues, p 594)

The Meeting received information on parathion-methyl supervised field trials for

Fruits	Table 20	Apple, pear
	Table 21	Peach
	Table 22	Grapes
Vegetables	Table 23	Onions
	Table 24	Broccoli
	Table 25	Cabbage

Describe in introductory paragraphs those points that apply to all the trials, e g expression of residues below LOQ, adjustment for recoveries, rounding and residues in control plots

> *Residue levels and application rates were reported as chlormequat chloride, but the residues were generally recalculated as cation in the Appraisal When residues were not detected they are shown as below the LOQ (e g <0 1 mg/kg) Residues, application rates and spray concentrations have generally been rounded to two significant figures but for residues near the LOQ to one significant figure Residue values from the trials conducted according to maximum GAP have been used for the estimation of maximum residue levels These results are double underlined*
>
> *Laboratory reports included method validation with batch recoveries at residue levels similar to those occurring in samples from the supervised trials Dates of analyses or duration of residue sample storage were also provided Field reports provided data on the sprayers used and their calibration, plot size, residue sample size and sampling date Although trials included control plots, no control data are recorded in the tables except where residues in control samples exceeded the LOQ Residue data are recorded unadjusted for % recovery*

Discuss details which are not readily included in the tables but are still needed to assess the validity and relative importance of the results, for example the intervals between spray applications, the number of replicate plots, whether samples are replicates from the same or different plots or merely replicate analyses of the same sample, the size of plots, growing season, method of application, irrigation and, in animal trials and feed studies, animal weights and ages The reviewer's judgement is required to decide which details could influence the residues or the validity of the trials

Tables of residues resulting from supervised trials should be carefully prepared in such a way as to assist evaluations An excerpt from the parathion-methyl evaluation (Evaluations 2000, Part 1 – Residues, p 602) is provided below for reference

Deal with commodities in Codex commodity order, i e fruits before vegetables, citrus fruits, then pome fruits, stone fruits, etc Where a crop produces more than one commodity, e g cereal crops produce grains and forage and fodder, prepare separate residue data tables for the grain and the forage and fodder

The table caption should be clear and comprehensive Include the compound and the crops or crop groups, and indicate that the residues were found in supervised trials

The year in the first column of the table is the year of the trial (year harvested) rather than the year of the report Where trials have been conducted in a large country, include the state or region in brackets after the country, e g USA (CA)

"Application" should include the formulation type, the rate of application (kg ai/ha), spray concentration (kg ai/hl), the water volume (l/ha) and the number of applications

List the pre-harvest intervals (PHIs) vertically and report individual residues as far as possible If there are a number of values at the same level they can be recorded as <0 05 (7), where there are 7 values of <0 05 mg/kg

Double underline those residues which have been selected for estimation of STMR, but wherever such underlining is used its meaning should be explained in a table endnote or a note in the table caption Alternatively, the meaning of underlining in the tables may be explained in the introductory paragraphs of the section, "Residues resulting from supervised trials on crops " Underlining is very helpful for people assessing the results, particularly when the tables are extensive, and allows other Panel members to see where the reviewer has judged data to be within or outside GAP If there is a particular need, single underline those residues that are within GAP but not sufficiently close to maximum GAP for estimation of STMR

Round numbers in tables to a practical level, usually 2 significant figures A formulation concentration should be reported as 250 g ai/kg, not 250 00 g ai/kg Residues should be reported as 0 36 and 4 5 mg/kg, not 0 363 and 4 47 mg/kg

Near the LOQ (limit of quantification) rounding to 1 significant figure is recommended For example, if the LOQ is 0 05 mg/kg, report residue data from 0 05 to 0 09 mg/kg to 1 significant figure

Table X 2 Parathion-methyl and paraoxon-methyl residues in wine grapes from supervised trials in France and Italy Double-underlined residues are from treatments according to GAP and are valid for estimating maximum residue levels

GRAPES country, year (variety)	Application					PHI days	Residues, mg/kg		Ref
	Form	kg ai/ha	kg ai/hl	water, l/ha	no		parathion-methyl	paraoxon-methyl	
France, 1994 (Chenin Blanc)	CS	0 29	0 15	200	2	0 3 7 14 21 35	0 09 0 05 0 11 0 06 0 05 <u>0 07</u>	<0 01 <0 01 <0 01 <0 01 <0 01 <u><0.01</u>	AP/2582/HR F1 951174
France, 1994 (Chenin blanc)	EC	0 30	0 15	200	2	0 3 7 14 21	0 05 0 04 0 01 <0 01 <u><0 01</u>	<0 01 <0 01 <0 01 <0 01 <u><0.01</u>	Tours F1 951175
France, 1994 (Grenache)	CS	0 32	0 16	200	2	0 3 7 14 21 31	0 28 0 16 0 28 0 11 <u>0 13</u> 0 07	<0 01 <0 01 <0 01 <0 01 <u><0 01</u> <0 01	AP/2582/HR Site II 951174
Italy, 1994 (Sangiovese) - red	CS	0 30	0 060	500	2	0 7 14 21	0 30 0 12 0 14 0 16 <u>0.18</u>		407240

Excerpt from Table 22 (Evaluations 2000, Part 1 – Residues, p 602)

FATE OF RESIDUES IN STORAGE AND PROCESSING

In storage

Include information on the fate of residues during commercial storage of food commodities, e g during cold storage of fruit or silo storage of cereal grains

In processing

Introduce the section with a statement on the data provided on processed commodities

> *The Meeting received information on the fate of incurred residues of parathion-methyl and paraoxon-methyl during the processing of apples, peaches, grapes, olives, snap beans, soya beans, potatoes, sugar beet, wheat, maize, rice, cotton seed, sunflower seed and canola Information on the fate during drying of hops is included in the supervised residue trials*

Set out tables carefully so that it is absolutely clear which sample is derived from which in the processing Indicate the scale of the process by the weight of commodity processed Note any problems with sampling or analysis Provide a brief description of the field treatments in the trial and state the application rate in the study with respect to the maximum label rate (e g 5×label rate)

Introduce each processed commodity with a paragraph summarizing the information provided, tabulate the residue data and include a flow diagram to explain complex commercial processes

> *Soya beans Parathion-methyl was applied twice to soybeans at 2 8 kg ai/ha (5×label rate) in two trials in the USA in 1988 and the crops were harvested 15 days after the final treatment for processing (Figure X 2) In one trial (MP-SY-2102) the residue levels were below the LOQ for all commodities In trial MP-SY-2101 parathion-methyl levels depleted in the meal and increased in the oils (Table X 3)*

Table X 3 Parathion-methyl and paraoxon-methyl residues in soybeans and processed commodities

SOYBEANS country, year (variety)	Form	Application kg ai/ha	kg ai/hl	water, l/ha	no	PHI days	commodity	Residues, mg/kg parathion-methyl	paraoxon-methyl	Ref
USA (IA), 1988 (Pioneer 9271)	EC	2 8		200	2	15	dry seed	0 15	<0 05	MP-SY-2101
							meal	<0 05	<0 05	
							hulls	0 12	<0 05	
							crude oil	0 71	<0 1	
							refined oil	0 57	<0 1	

Excerpt from Table 59 (Evaluations 2000, Part 1 – Residues, p 654)

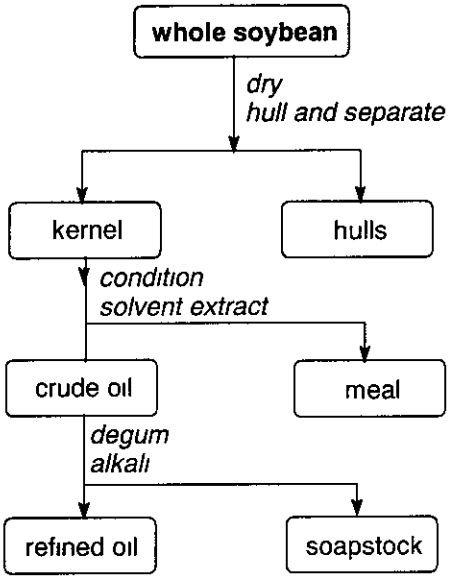

Figure X 2 Soybean processing (ref)

(Evaluations 2000, Part 1 – Residues, p 655)

Processing factors (residue in processed commodity – residue in raw commodity) may be included in the processing residue data table in simple cases In more complex cases with different residue definitions for enforcement and dietary intake it is preferable to summarize processing factors in a separate table

Residues in the edible portion of food commodities

Draw attention to those commodities where residue levels in the edible portion are different from those in the whole commodity, e g citrus, bananas, trimmed celery and cabbage with outer leaves discarded

RESIDUES IN ANIMAL COMMODITIES

Direct animal treatments

Pesticides may be applied directly to farm animals for control of lice, flies, mites and ticks Application may include dips, sprays, pour-ons and jetting Residue trials using the required method of application, dosage and withdrawal times are needed if residues may occur in animal commodities Where feasible, data from supervised residue trials on animals should be summarized in tables similar to those for crops

Farm animal feeding studies

Farm animal feeding studies use unlabelled compounds to establish the relationship between the levels of the residues in the feed and likely residues in tissues, milk and eggs

Farm animal feeding studies may be introduced by a paragraph that acts as a checklist of the information

Groups of 10 laying hens (each bird weighing 1 0-1 3 kg) were fed aged mancozeb residues at nominal levels of 5, 15 and 50 ppm in the diet for 28 days (study reference) Eggs were collected each day for analysis On day 29 six hens from each group were slaughtered for tissue collection The remaining hens from each group were placed on a residue-free diet and slaughtered on days 36 and 43 Birds consumed 130 g dry wt feed each per day

RESIDUES IN FOOD IN COMMERCE OR AT CONSUMPTION

Introduce the section with a statement on the residue monitoring data provided Tabulate the information and list the country, commodity, number of samples analysed and the residues detected

NATIONAL MAXIMUM RESIDUE LIMITS

It will usually be necessary to summarize the information in a table The normal column headings will be Country, Commodity, MRL Table endnotes will be required if countries are using different residue definitions

REFERENCES

References to unpublished reports, journals and books should be listed alphabetically in the form shown in the examples below in two columns in 9 pt