

CHAPTER 1

INTRODUCTION

CONTENTS

- Scope of this Manual
- Historical background
- The object of the work of the JMPR
- The JMPR assessment process

1. 1 SCOPE OF THIS MANUAL

The Manual gives the historical background of the operation of the JMPR and describes the purpose of the work, the procedures involved in selection of compounds, the data requirements for estimating maximum residue levels and the principles followed in the evaluation of experimental results and information provided.

The definition of terms used in this Manual is given in Appendix II. The documents which were used in the preparation of the Manual are listed under “References.”

1.2 HISTORICAL BACKGROUND

The rapidly growing use of pesticides in agriculture after World War II gave rise to regulation by governments of the sale and use of pesticides to prevent chemicals with unacceptable properties being introduced onto the market. The use of chemicals was regulated in order to protect the users of pesticides, the consumers of treated foodstuffs, domestic animals and, at a later stage, the environment.

For this purpose governments requested manufacturers and other data submitters to submit information on the properties of their products and on their intended uses. As differences arose among countries on the extent and scope of data to be supplied, international organizations initiated attempts to harmonize requirements.

In April 1959, the Director-General of FAO convened a Panel of Experts on the Use of Pesticides in Agriculture in Rome. This panel considered various problems connected with the use of pesticides. With regard to pesticide residues the panel concluded that governments should be urged to include, in addition to public health authorities, bodies involved in agricultural pesticide and plant and animal protection which advise on regulations to control pesticide residue levels. Studies should be intensified on problems involving the analysis of pesticide residues in or on foodstuffs. Furthermore, the panel recommended studies to be undertaken jointly by FAO and WHO on the hazards arising from pesticide residues in and on food and feedstuffs, on the establishment of principles governing the setting up of pesticide tolerances, on the feasibility of preparing an International Code for toxicological data and residue data required to achieve the safe use of a pesticide.

A joint meeting of the FAO Panel of Experts and the WHO Expert Committee on Pesticide Residues was held in Rome in October 1961 to implement this recommendation. In their letter to the members of this meeting, the Directors-General of FAO and WHO stated that the meeting should consider, among other matters, principles for establishing tolerances for

pesticide residues in food. The meeting developed definitions for a number of terms, which laid the foundation for the current “Glossary of Terms” used by the JMPR. Although the meeting developed the concept of a “permissible level”, calculated from the Acceptable Daily Intake (ADI), the food factor and the average weight of the consumer, it accepted at the same time that the “tolerance”, which is comparable with the present MRL, be estimated “...taking into account the range of residues actually remaining when the food is first offered for consumption (following Good Agricultural Practice)...”. The meeting recommended to the Directors-General of FAO and WHO the promotion of studies on methods for carrying out toxicity studies and their evaluation, leading to ADIs and promotion of collaborative studies, leading to internationally acceptable analytical methods for pesticide residues. No conclusion was drawn with regard to the estimation of internationally acceptable tolerances. This might be ascribed to the meeting’s opinion that different countries may establish different tolerances for the same pesticide on the same food, but that this would not impede the free movement of that food in international trade as long as the permissible level was not exceeded.

In November 1962, an FAO Conference on Pesticides in Agriculture was held in Rome. The Conference expressed its concern that differences in residue tolerances existed not only among countries of different regions but also among those of the same region. FAO was strongly urged to investigate the reasons for these differences and, if possible, find ways to harmonize them. Consequently, the Conference recommended that the proposed Working Party on Pesticide Residues should pay particular attention to (a) the toxicity of pesticides and test methods; (b) the possible unification of tolerances; (c) coordination of methods of analyses; (d) surveys for collecting residue data; and (e) the establishment of a list of pesticides to which interested governments should give research priority. The Conference supported the principle that the amount of pesticide residue in food should not exceed that resulting from “Good Agricultural Practices” but recommended that governments should not adopt residue tolerances before international agreement on this subject had been achieved.

In a Joint Meeting of the FAO Committee on Pesticides in Agriculture and the WHO Expert Committee on Pesticide Residues held in Geneva from 30 September to 7 October 1963, the toxicological properties of a number of pesticides were studied for the first time and a few ADIs established. No developments took place in the area of residues.

The first meeting of the FAO Working Party on Pesticide Residues, recommended by the 1962 FAO Conference, took place in December 1963. The Working Party studied ways and means to arrive at recommendations for levels of residue tolerances. The following were considered essential:

Residue levels resulting from Good Agricultural Practice (GAP) should be obtained by FAO from governments and pesticide manufacturers. These data should be considered by the FAO Working Party on Pesticide Residues. After consideration of the ADI and of the national nutritional patterns as stated in the FAO Food Balance Sheets, the Working Party would propose tolerances for residues on individual crops for consideration by governments and by the Expert Committee on Pesticide Residues of the Codex Alimentarius Commission

residues found in surveys of marketed commodities

ADIs to be estimated by joint meetings of the WHO Committee on Pesticide Residues and the FAO Committee on Pesticides in Agriculture

national nutritional patterns

acceptable analytical methods for residues. These methods should also be adopted by the Pesticide Committee of the Codex Alimentarius.

For pesticides where an ADI had still to be estimated the Working Party would propose provisional tolerances. It was stated that the Expert Committee on Pesticide Residues of the Codex Alimentarius Commission (the predecessor of CCPR) should meet only after the FAO Working Party had collected and evaluated the required data and made its proposals for tolerances. This procedure would enable the Codex Committee, composed of government representatives, to act on the basis of technical information developed by specialists acting in their individual capacities.

1.3 THE OBJECT OF THE WORK OF JMPR

The current JMPR comprises the WHO Core Assessment Group and the FAO Panel of Experts on Pesticide Residues in Food and the Environment. It is an independent scientific expert body convened by both Directors General of FAO and WHO according to the rules of both organizations, charged with the task to provide scientific advice on pesticide residues.

The WHO Core Assessment Group is responsible for reviewing pesticide toxicological and related data and estimating no observed adverse effect levels (NOAELs) of pesticides and establishes Acceptable Daily Intakes (ADI) of their residues in food for humans. In addition, as data and circumstances dictate, the Group estimates acute reference doses (ARfDs) and characterizes other toxicological criteria such as non-dietary exposures.

The FAO Panel is responsible for reviewing pesticide use patterns (GAPs), data on the chemistry and composition of pesticides, environmental fate (as it impacts on residues in food or feed commodities), metabolism in farm animals and crops, methods of analysis for pesticide residues and for estimating maximum residue levels and supervised trial median residue values (STMRs) of pesticides in food and feed commodities. The toxicity of the active ingredient and its metabolites, evaluated by the WHO Core Assessment Group, is taken into consideration in deciding if residues may or may not give rise to problems of public health. The maximum residue levels are recommended to the Codex Committee on Pesticide Residues (CCPR) for consideration as Codex Maximum Residue Limits (Codex MRLs) to be adopted by the Codex Alimentarius Commission (CAC). The CCPR relies on the scientific advice provided by the JMPR when recommending international food standards for pesticide residues. It is essential that the Meeting provides state-of-knowledge evaluations. This requires independent assessment of all available data.

The monographs prepared by the FAO Panel contain all the information which was used to estimate maximum residue levels. In addition, they give supporting information such as the physical and chemical characteristics of the pesticides, distribution of residues in various tissues, storage stability of residues, effect of processing and cooking on residue levels and fate in the environment.

1.4 THE JMPR ASSESSMENT PROCESS

This Manual is limited to the procedure followed by the FAO Panel of Experts.

The evaluations carried out by the JMPR comprise three main categories:

- review of new compounds (compounds evaluated by the JMPR for the first time)
- review of compounds under the periodic review programme

- re-evaluation of new information relating to compounds other than new or periodic review chemicals.

The principles of evaluation of new compounds and compounds under the periodic review programme are very similar and follow the order of subjects described under Data and Information Requirements (Chapter 3). Re-evaluation of a compound is carried out when new information related to its use and residue levels becomes available, e.g., change in or new use patterns, data on metabolism or residue behaviour. The re-evaluation often deals with and clarifies a single question raised by the Codex Committee on Pesticide Residues. The scope and depth of periodic review and re-evaluations are substantially different, and they are explained in Chapter 5. To make a clear distinction between the periodic review and re-evaluation of compounds, the latter is often referred to by the FAO Panel as normal re-evaluation.

The agenda of the meetings is decided by the Joint Secretaries of FAO and WHO, based on the priority list proposed by the Codex Committee on Pesticide Residues and approved by CAC, and on the information on availability of sufficient data for evaluation. When a new compound or one undergoing periodic review is evaluated, it is generally preferable to conduct the toxicological and residue reviews in the same year. Practical problems may, however, arise, e.g., when the residue definition is uncertain the residue evaluation cannot proceed satisfactorily or efficiently. In such cases, it is preferable that the toxicological evaluation precede the residue evaluation.

Member countries, industry and other data submitters are requested to supply the FAO Panel with all relevant information on identity, metabolism and environmental fate, methods of residue analysis, use patterns (registered and officially authorized uses), supervised residue trials, farm animal feeding studies), fate of residues in storage and processing, and in special cases information on residues occurring in food in commerce or at consumption, and national residue definitions.

The FAO Joint Secretary of JMPR assigns the compounds for review to the members of the FAO Panel and informs data submitters accordingly. The companies submit the required information to the Panel member, who performs the evaluation of the companies' data together with the information received from the member countries through the FAO Joint Secretary before the meeting, and prepares the draft Monograph containing the summarized experimental data and relevant information, and the draft Appraisal containing an assessment of the results and draft recommendations.

During the Joint Meeting the FAO Panel discusses the draft monographs and appraisals and agrees on the recommendations. The JMPR recommendations are based only on the results of the scientific assessment of the data supplied. In the absence of sufficient toxicological and residue data the Meeting cannot make recommendations for maximum residue levels. The FAO and WHO Expert Groups coordinate their activities and, as needed, discuss chemical and toxicological aspects, e.g., metabolism patterns, level and toxicological significance of metabolites, clarify or resolve problematic issues, and finally the groups issue a joint Report containing the conclusions and recommendations of the Meeting.

It is the prerogative of the CCPR to accept or reject those recommendations, including recommendations to withdraw previous maximum residue levels suitable for use as Codex MRLs. The CCPR has the option to consider other factors that it deems appropriate in retaining MRLs.

A short introduction to the assessment process carried out by the FAO Panel is described below. A more detailed account of each stage of the process is given in succeeding sections.

In the process of evaluation of a new compound (or periodic review compound), a wide range of information and experimental data are reviewed.

The physical and chemical properties of the active ingredient, the metabolism and degradation of the compound in animals, plants, soil and water are studied to determine the composition and distribution of residues. Based on this information, and taking into account the available analytical methodology as well as the toxicological significance of metabolites and degradation products, the Panel recommends the definitions of residues for enforcement purposes and for dietary intake calculations.

The JMPR does not approve uses. It is emphasised that residues derived from supervised field trials can only be used for estimating maximum residue levels if the trial conditions can be matched with relevant national GAPs. The maximum residue level estimates are based on already approved maximum national uses (critical or maximum GAP), which normally lead to the highest residue populations in the portion of commodities to which Codex MRLs apply (Appendix VI). An exception is where the highest residue may raise acute intake concerns. Under such circumstances, if suitable residue data are available, the JMPR identifies an alternative GAP that would lead to residues of an acceptable magnitude.

The maximum residue levels for residues in commodities of animal origin are mainly estimated taking into consideration the results of farm animal feeding studies and residues occurring in feed items and, to a lesser extent, the information obtained from animal metabolism studies. MRLs for animal commodities may also relate to the residues arising from direct animal treatments.

The analytical methods with accompanying chromatograms and information on stability of residues during sample storage are evaluated to assess the reliability of trial data and to estimate Limits of Quantification of residues which can be realistically achieved in regulatory laboratories.

The fates of residues during processing and cooking, as well as residues in the edible portion are taken into consideration in the estimation of dietary intake.

The results of national monitoring programmes provide useful information, on residues occurring under practical use conditions, which are used for the estimation of extraneous residue levels (EMRLs) and as a special case maximum residue levels in spices (Chapter 6, Section 11.1).

The fate of residues in the environment is evaluated to assess the possibility of uptake of residue by the crop, e.g., from a soil treatment, and by follow-up crops, and the contamination of the environment by persistent residues likely to lead to residues in food or feed commodities.