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“Replacement or reduction of the Use of Methyl Bromide as a Phytosanitary Measure” adopted as a Recommendation for the Implementation of the International Plant Protection Convention (IPPC), at the Third Session of the Commission on Phytosanitary Measures (CPM-3) of the IPPC

Rome, 7-11 April 2008

**RECOMMENDATION FOR THE IMPLEMENTATION OF THE
IPPC**

IPPC Recommendation

***REPLACEMENT OR REDUCTION OF THE USE OF
METHYL BROMIDE AS A PHYTOSANITARY MEASURE***

(2008)

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INTRODUCTION

SCOPE

This document is an IPPC Recommendation as provided for in the IPPC (1997) (Article XI.2.g). This Recommendation¹ provides guidance to National Plant Protection Organizations (NPPOs) on the replacement or reduction in the use of methyl bromide as a phytosanitary measure in order to reduce emissions of methyl bromide.

REFERENCES

- Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer* (from the Fourth Meeting of the Parties to the Montreal Protocol, Copenhagen, 1992).
- Glossary of phytosanitary terms*, 2008. ISPM No. 5, FAO, Rome.
- Guidelines for a phytosanitary import regulatory system*, 2004. ISPM No. 20, FAO, Rome.
- Guidelines for inspection*, 2005. ISPM No. 23, FAO, Rome.
- Guidelines for regulating wood packaging material in international trade*, 2002, with modifications to Annex I, 2006. ISPM No. 15, FAO, Rome.
- Guidelines for the determination and recognition of equivalence of phytosanitary measures*, 2005. ISPM No. 24, FAO, Rome.
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- Montreal Protocol on Substances that Deplete the Ozone Layer*, 2000. UNEP Ozone Secretariat, United Nations Environment Programme. ISBN: 92-807-1888-6. <http://www.unep.org/ozone/pdfs/Montreal-Protocol2000.pdf>
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- Pest risk analysis for regulated non-quarantine pests*, 2004. ISPM No. 21, FAO, Rome.
- Phytosanitary principles for the protection of plants and the application of phytosanitary measures in international trade*, 2006. ISPM No. 1, FAO, Rome.
- Phytosanitary treatments for regulated pests*, 2007. ISPM No. 28, FAO, Rome.
- Report of the Methyl Bromide Technical Options Committee (1998). *Assessment of alternatives to methyl bromide, 30 October 1998*, 354 pp. UNEP, Nairobi, Kenya.
- Report of the Second Session of the Commission on Phytosanitary Measures, 2007. FAO, Rome.
- Requirements for the establishment of areas of low pest prevalence*, 2005. ISPM No. 22, FAO, Rome.
- Requirements for the establishment of pest free areas*, 1995. ISPM No. 4, FAO, Rome.
- Requirements for the establishment of pest free places of production and pest free production sites*, 1999. ISPM No. 10, FAO, Rome.
- The use of integrated measures in a systems approach for pest risk management*, 2002. ISPM No. 14, FAO, Rome.

DEFINITIONS

Definitions of phytosanitary terms used in this Recommendation can be found in ISPM No. 5 (*Glossary of phytosanitary terms*).

OUTLINE OF RECOMMENDATIONS

This IPPC Recommendation outlines areas for action and guidelines to replace or reduce the use of methyl bromide as a phytosanitary measure. With the overall aim of reducing release of methyl bromide into the atmosphere, NPPOs may consider methods of reducing the quantities of methyl bromide used, reducing methyl bromide emissions by physical means, and promoting and implementing phytosanitary measures that are economically and technically feasible as viable alternatives to the use of methyl bromide. The IPPC Recommendation also provides guidance on recording the use of methyl bromide.

¹ Nothing in this IPPC Recommendation shall affect the rights or obligations of contracting parties under other international agreements. Provisions of other international agreements may be applicable, for example the Montreal Protocol.

BACKGROUND

The main purpose of the International Plant Protection Convention (IPPC) and the responsibility of its contracting parties is to prevent the spread and introduction of pests of plants and plant products and to promote appropriate measures for their control. In doing so, contracting parties also undertake the promotion of appropriate measures for the control of regulated pests. In its preamble, the IPPC states that in agreeing to the Convention, contracting parties take into account “internationally approved principles governing the protection of plant, human and animal health, and the environment”. The second meeting of the Commission on Phytosanitary Measures (CPM) “Encouraged contracting parties to promote best fumigation practices, recapture technology and development and use of alternatives to methyl bromide in phytosanitary measures where this was technically and economically feasible”. Thus, while pursuing the IPPC’s purpose, contracting parties are also encouraged to take into account environmental concerns, among which is protection of the ozone layer by reducing methyl bromide emissions.

IPPC contracting parties may also be party to the Montreal Protocol on Substances that Deplete the Ozone Layer. Signatories to the Montreal Protocol are obliged to protect the ozone layer by reducing, and ultimately eliminating, emissions of ozone-depleting substances through a phase-out of production and import and consumption of such substances, noting the quarantine and pre-shipment (QPS)² exemptions.

In the 1992 Copenhagen Amendment to the Montreal Protocol, methyl bromide was listed as an ozone-depleting substance subject to phase-out provisions of the Montreal Protocol. However, the use of methyl bromide for QPS purposes is currently exempt from the protocol’s phase-out provisions because of difficulties in identifying technically and economically feasible alternatives. There is currently no limit on the amount of methyl bromide that can be used for these QPS purposes. In 1999, in the Beijing Amendment to the Montreal Protocol, mandatory requirements for the provision of statistical data on amounts of methyl bromide used annually for QPS purposes were agreed to. This amendment entered into force in January 2001. Therefore, parties to the Montreal Protocol already have obligations to monitor and report their use of methyl bromide for QPS applications.

Methyl bromide has been widely used as a pest control treatment for many decades. It offers a broad spectrum of control for insects, nematodes, weeds, pathogens and rodents. Methyl bromide has been employed primarily as a soil fumigant before planting crops, and is also used for commodity treatment and structural fumigation. Most uses of methyl bromide as a phytosanitary measure are for the treatment of durable commodities, such as grains, cereals and dried foodstuffs, wood packaging materials, wood and logs, as well as perishable commodities, such as fruit.

It is recognized that alternatives to methyl bromide for use as phytosanitary measures are needed, particularly because there may be future restrictions on the use of methyl bromide. It is also recognized that there is a need for contracting parties to continue to use methyl bromide until equivalent and feasible alternative phytosanitary measures are available.

Some countries have already successfully reduced or eliminated the use of methyl bromide.

To be considered viable under the IPPC, phytosanitary measures that are alternatives to methyl bromide and that are equivalent to methyl bromide fumigation as per ISPM No. 24 (*Guidelines for the determination and recognition of equivalence of phytosanitary measures*) should also be economically and technically feasible. In comparison, the United Nations Environment Programme’s Methyl Bromide Technical Options Committee defined alternatives as “those non-chemical or chemical treatments and/or procedures that are technically feasible for controlling pests, thus avoiding or replacing the use of methyl bromide”.³

RECOMMENDATIONS

To reduce the risk of introduction of some quarantine pests, the need for methyl bromide as a phytosanitary measure remains until a range of equivalent alternatives has been developed. Contracting parties are encouraged to put in place a strategy that will help them to reduce the use of methyl bromide for phytosanitary measures and/or reduce emissions of methyl bromide. This may include the following areas for action:

- replacing methyl bromide use
- reducing methyl bromide use
- physically reducing methyl bromide emissions
- accurately recording methyl bromide use for phytosanitary measures.

In developing and implementing strategies to replace and/or reduce methyl bromide use and reduce emissions, contracting parties should also take into account any international obligations to which they may be subject and relevant IPPC principles. These principles are described in ISPM No. 1 (*Phytosanitary principles for the protection of plants and the application of phytosanitary measures in international trade*).

² This document refers to some terms used by the Montreal Protocol as follows: QPS (quarantine and pre-shipment) purposes, National Ozone Units. These are not IPPC terms and should not be interpreted as such.

³ Methyl Bromide Technical Options Committee, 1998.

1. Replacement of Methyl Bromide Use as a Phytosanitary Measure

In recognition of the desire to minimize the use of methyl bromide, contracting parties should, where possible, take actions to replace methyl bromide usage by increasing the application of alternative phytosanitary measures. Where methyl bromide fumigation is currently used as a phytosanitary treatment for regulated pests it may be replaced by an alternative phytosanitary measure in which no methyl bromide is used. This may involve the implementation of systems approaches, pest free areas (PFAs), areas of low pest prevalence (ALPPs), pest free places of production, pest free production sites and equivalence.

The following are examples of phytosanitary measures that may be implemented independently or in conjunction with other phytosanitary measures to replace methyl bromide as a phytosanitary treatment when equivalent:

- use of other chemicals such as treatments mentioned in Appendix 1 (e.g. sulfuryl fluoride)
- application of physical treatments (e.g. heating, cooling, irradiation)
- immediate commodity processing (e.g. grain being milled into flour on arrival)
- methods of production (e.g. soil-free growing media, tissue culture, sterile culture).

In situations where consignments are identified as non-compliant at the point of import, the use of methyl bromide should be avoided where possible (appropriate actions to be taken in the case of non-compliance are described in section 5.1.6.1 of ISPM No. 20: *Guidelines for a phytosanitary import regulatory system*).

The CPM, largely through the provisions of ISPM No. 28 (*Phytosanitary treatments for regulated pests*), is actively pursuing adoption of treatments that are viable alternatives to methyl bromide. As these alternatives become recognized, contracting parties are encouraged to use them in place of methyl bromide, where appropriate.

Where an ISPM contains options for various treatments for a commodity, and one of the options is methyl bromide (currently the only ISPM for which this is the case is ISPM No. 15: *Guidelines for regulating wood packaging material in international trade*) and others are considered to present less of an adverse environmental impact, parties are encouraged to use the lower-impact option(s).

Appendix 1 contains a list of articles that have historically been treated with methyl bromide and presents possible alternative phytosanitary treatments that could be used to replace or reduce the use of methyl bromide.

2. Reducing Volumes of Methyl Bromide Use as a Phytosanitary Measure

The reduction of methyl bromide emissions can be achieved through the use of reduced dosages of methyl bromide as a phytosanitary measure or decreased treatment frequency. In addition, existing methyl bromide use should be analysed carefully to determine if the treatment is appropriate and necessary.

The following approaches may, where appropriate, be pursued to reduce the use of methyl bromide as a phytosanitary measure:

- inspection-based fumigation instead of mandatory fumigation (i.e. to detect and identify the quarantine pest of concern)
- avoidance of unjustified re-fumigation with methyl bromide (i.e. re-fumigation should be used only when a quarantine pest situation is evident)
- improvement of treatment facilities as appropriate to maximize efficiency of fumigation, thus reducing replenishment or re-fumigation requirements
- increasing exposure time with a view to reducing dosage, where technically feasible
- compliance with phytosanitary requirements for exporting commodities
- avoidance of application in situations where efficacy is doubtful or marginal
- reassessment of doses and exposure times in order to reduce them
- use of optimal temperatures when fumigating
- use of appropriately sized treatment facilities
- evaluation of pest risk and treatment efficacy (through a pest risk analysis) to determine if a more appropriate dose or alternative treatment is possible.

3. Physically Reducing Methyl Bromide Emissions

Contracting parties should aim to minimize or eliminate the release of methyl bromide to the atmosphere by physical means. This may be achieved by upgrading facilities as appropriate to increase efficiency of methyl bromide application to improve:

- methyl bromide emissions control, e.g. by recapture, and/or reuse or destruction, through the use of leak-proof chambers and containment/capture bubbles, etc.
- fumigation performance, e.g. by use of bioassay controls where appropriate in lieu of concentration × time products, use of higher temperatures during fumigation through supplemental heat when necessary combined with air circulation, pressure testing etc., reduction of leakage

- gas circulation, e.g. by use of a carrier gas such as CO₂
- gas and temperature monitoring including proper calibration of equipment.

4. Recording Methyl Bromide Use as a Phytosanitary Measure

To measure progress in reduction of methyl bromide emissions arising from use of methyl bromide as a phytosanitary measure, NPPOs are encouraged to accurately record and collate data on current usage and share this data with their country's National Ozone Unit⁴ (the national body responsible for the implementation of the Montreal Protocol).

The information on methyl bromide use for phytosanitary measures should contain:

- quantities of methyl bromide used in kilograms
- description of the articles⁵ fumigated where appropriate
- whether the use was on import or export commodities
- target pests.

5. Guidelines for Appropriate Use of Methyl Bromide as a Phytosanitary Measure

NPPOs are encouraged to be involved in the coordination of the following actions:

1. Review and consider how to change phytosanitary policies (e.g. phytosanitary import requirements) to replace and/or reduce methyl bromide where it is required and where an equivalent, technically feasible, practical and economically viable alternative exists. This may also require review and revision of bilateral agreements between countries.
2. Ensure that methyl bromide fumigation is used only for quarantine pests and that it is authorized or performed by the NPPO, including fumigation as emergency action for pests not previously assessed (as described in section 5.1.6.2 of ISPM No. 20: *Guidelines for a phytosanitary import regulatory system*).
3. Provide guidance to those responsible for methyl bromide fumigations for quarantine purposes on the importance of pursuing feasible alternative phytosanitary measures.
4. Develop and utilize phytosanitary measures that are equivalent, viable and feasible alternatives to methyl bromide.
5. Communicate to other NPPOs where there are viable alternatives to methyl bromide use.
6. Submit phytosanitary treatments that are effective, efficacious, documented, feasible and applicable alternatives to the use of methyl bromide to the IPPC Secretariat using the guidelines in ISPM No. 28 (*Phytosanitary treatments for regulated pests*).
7. Give highest priority to the development of alternative treatments for those commodities for which methyl bromide usage is high.
8. Liaise with research groups and funding bodies to develop alternative treatments as appropriate.
9. Coordinate with the National Ozone Unit, as appropriate, to facilitate the annual collection and reporting of methyl bromide usage data.
10. Post or link details of NPPO-approved alternatives for methyl bromide treatment on the International Phytosanitary Portal (<https://www.ippc.int>) for exchange of information.
11. Cooperate with the National Ozone Unit to implement a strategy to replace and reduce methyl bromide usage.
12. Exchange information on alternatives to methyl bromide usage between the NPPO and the National Ozone Unit.
13. Identify current treatments where methyl bromide is the only option, and provide sufficient information to the appropriate IPPC body for consideration in the development of potential viable alternatives (e.g. identify the commodity, pests associated with it for which methyl bromide is used, required efficacy).
14. Evaluate or re-evaluate pest risk (via pest risk analysis) to determine if the treatment prescription is appropriate and whether less rigorous treatment or alternative measures may be used.

⁴ Obligations for recording and reporting on methyl bromide usage exist under the Montreal Protocol.

⁵ The first column of the table in Appendix I provides a list of articles commonly fumigated.

APPENDIX 1

EXAMPLES OF POTENTIAL PHYTOSANITARY TREATMENTS TO REPLACE OR REDUCE METHYL BROMIDE

Listed in the table below are treatments that may be considered and validated as alternatives to methyl bromide and that are currently registered, where necessary, and used in at least one country⁶. These treatments may be employed to replace or reduce methyl bromide use in certain circumstances. Alternatively, phytosanitary measures may be considered, including PFA, ALPP and system approach, as alternatives for some of the treatments listed below. The use of the names of the articles presented in this appendix may be helpful for ensuring consistency in reporting QPS use.

The following considerations affect the choice of a measure:

- combination of crop type (flowers, fruits, foliage etc.) and/or species and pest species (insects, bacteria, fungi, virus etc.)
- lack of a national registration or existing equivalency agreement between countries, which may preclude use of particular treatments in particular countries
- economic factors that may affect use of the treatment in particular countries
- processes in the supply chain that may reduce pests to an acceptable level (e.g. washing, freezing, dicing)
- occurrence of resistance of a pest towards the envisaged alternative, which may change the necessary dosage schedule or preclude the alternative
- irradiation (it may not kill immature stages but it rather inhibits development to maturity)
- intended use of the commodity
- undesirable effects of chemical residues for operators
- provisions in relevant ISPMs
- other treatments that may be agreed to by countries based on bilateral agreements.

List of articles fumigated	Examples of potential phytosanitary treatments to consider to replace or reduce methyl bromide
Commodities	
Bulbs, corms, tubers and rhizomes (intended for planting)	Hot water, pre-plant quarantine soil sterilization (steam or chemical), pesticide dip, or a combination of these treatments
Cut flowers and branches (including foliage)	Controlled atmosphere (CO ₂ , N ₂) + combination treatment, hot water, irradiation, phosphine, phosphine/carbon dioxide mixture, pyrethroids + carbon dioxide, ethyl formate + carbon dioxide
Fresh fruit and vegetables	Cold treatment, high-temperature forced air, hot water, irradiation, quick freeze, vapour heat treatment, chemical dip, phosphine, combination of treatments
Grain, cereals and oil seeds for consumption including rice (not intended for planting)	Heat treatment, irradiation, ethyl formate, carbonyl sulphide, phosphine, phosphine + carbon dioxide, controlled atmosphere (CO ₂ , N ₂)
Dried foodstuffs (including herbs, dried fruit, coffee, cocoa)	Heat treatment, carbon dioxide under high pressure, irradiation, ethyl formate, ethylene oxide, phosphine, phosphine + carbon dioxide, controlled atmosphere (CO ₂ , N ₂), sulfuryl fluoride, propylene oxide
Nursery stock (plants intended for planting other than seed), and associated soil and other growing media	Hot water, soil sterilization (steam or chemical e.g. methyl isothiocyanate (MITC) fumigants), pesticides dip, phosphine, combination of any of these treatments
Seeds (intended for planting)	Hot water, pesticide dip or dusting, phosphine, combination treatments
Wood packaging materials ⁷	Heat treatment (contained in Annex 1 of ISPM No. 15). Further alternative treatments may be added in the future.
Wood (including round wood, sawn wood, wood chips)	Heat treatment, kiln-drying, removal of bark, microwave, irradiation, MITC/sulfuryl fluoride mixture, methyl iodide, chemical impregnation or immersion, phosphine, sulfuryl fluoride
Whole logs (with or without bark)	Heat treatment, irradiation, removal of bark, phosphine, sulfuryl fluoride

⁶ The treatments indicated in the table below may not have been adopted by CPM.

⁷ It is noted that ISPM No. 15 (*Guidelines for regulating wood packaging material in international trade*) is the only ISPM currently listing approved treatments for wood packaging material. Wood packaging material is the only commodity for which specific treatments are currently described in an ISPM.

List of articles fumigated	Examples of potential phytosanitary treatments to consider to replace or reduce methyl bromide
Hay, straw, thatch grass, dried animal fodder (other than grains and cereals listed above)	Heat treatment, irradiation, high pressure + phosphine, phosphine, sulfuryl fluoride
Cotton and other fibre crops and products	Heat treatment, compression, irradiation, phosphine, sulfuryl fluoride
Tree nuts (almonds, walnuts, hazelnuts etc.)	Carbon dioxide under high pressure, controlled atmosphere (CO ₂ , N ₂), heat treatment, irradiation, ethylene oxide, ethyl formate, phosphine, phosphine + carbon dioxide, propylene oxide, sulfuryl fluoride
Structures and equipment	
Buildings with quarantine pests (including elevators, dwellings, factories, storage facilities)	Controlled atmosphere (CO ₂ , N ₂), heat treatment, pesticide spray or fogging, phosphine, sulfuryl fluoride
Equipment (including used agricultural machinery and vehicles), empty shipping containers and reused packaging	Controlled atmosphere (CO ₂ , N ₂), heat treatment, steam, hot water, pesticide spray or fogging, phosphine, sulfuryl fluoride
Other items	
Personal effects, furniture, crafts, artefacts, hides, fur and skins	Controlled atmosphere (CO ₂ , N ₂), heat treatment, irradiation, ethylene oxide, pesticide spray or fogging, phosphine, sulfuryl fluoride