



Food and Agriculture Organization
of the United Nations

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FAO SPECIFICATIONS FOR PLANT PROTECTION PRODUCTS

2,4-D + DICHLORPROP

Food and Agriculture Organization of the United Nations
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Group on Pesticide Specifications

FAO Panel of Experts on Pesticide Specifications, Registration Requirements and Application
Standards

Technical Secretary: Dr. A.V. Adam
Plant Protection Service
Plant Production and Protection Division

FAO
Via delle Terme di Caracalla
00100 Rome, Italy - Telex: 610181 FAO I

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DISCLAIMER

FAO specifications are developed with the basic objective of ensuring, as far as possible, that pesticides complying with them are satisfactory for the purpose for which they are intended. However, the Group on Pesticide Specifications of the FAO Panel of Experts on Pesticide Specifications, Registration Requirements, Application Standards and Prior Informed Consent wishes to emphasize that, owing to the complexity of the problem involved, questions such as the suitability of pesticides for the control of a particular pest must be decided at national or provincial level. These specifications should not be assumed to be an endorsement of the use of a particular compound for a given purpose by either the Group of Experts or FAO.

Accordingly, neither the Food and Agriculture Organization of the United Nations (FAO) nor the members of the Group on Pesticide Specifications of the FAO Panel of Experts on Pesticide Specifications, Registration Requirements, Application Standards and Prior Informed Consent warrant that pesticides complying with these specifications are suitable for control of any given pest or for use in an particular area.

Furthermore, the preparation and use of pesticides complying with these specifications are not exempt from any safety regulation or other legal or regulatory provision applicable thereto. Neither FAO nor any member of the FAO Group of Experts shall be liable for any injury, loss, damage or prejudice of any kind that may be suffered as a result of the preparation or use of pesticides complying with these specifications.

Additionally, the Group of Experts wishes to warn users of specifications that improper field mixing and/or application of pesticides can result in either a lowering or complete loss of their efficacy. This holds true even in cases where such pesticides comply with the specifications indicated.

Accordingly, the Group of Experts and/or FAO can accept no responsibility for the consequences of improper field mixing and/or application.

INTRODUCTION

From time to time, FAO publishes booklets of specifications for technical materials and related formulations of plant protection products. Revisions of, and additions to, already published specifications will be issued when necessary, but during the interval between editions, revisions may be printed in the FAO Plant Protection Bulletin.

The specifications contained herein have been carefully reviewed and agreed by the Group on Pesticide Specifications of the FAO Panel of Experts on Pesticide Specifications, Registration Requirements and Application Standards after consultation with official government scientists, the pesticides industry through GIFAP (Groupement International des Associations Nationales de Fabricants de Produits Agrochimiques) and, where appropriate, with individual manufacturers 1/.

FAO now publishes three classes of specifications:

A) FAO Specifications (Code "S"): specifications that are acceptable on the basis of the evidence presented 2/, 3/.

1/ Should national pesticide specifications developed from these approved FAO specifications deviate from them, the national authority responsible for making such changes is requested to inform the FAO Plant Protection Service of the nature of and the reasons for the modifications.

2/ Methods of analysis and miscellaneous techniques referred to in these specifications have been developed and adopted by CIPAC (Collaborative International Pesticides Analytical Council Ltd.). See CIPAC Handbooks, 1 (1970): 1A (1980), 1B (1983), and CIPAC Proceedings 1980 and 1981, obtainable from Heffers Printers Limited, King's Hedges Road, Cambridge CB4 2PQ, England. The page numbers of specific methods are given in brackets in the specifications. A copy of a method not yet published can be obtained from the FAO Plant Protection Service.

3/ Information on standard waters for laboratory evaluation of pesticidal formulations will be found in "CIPAC Monograph 1, Standard Waters and an FAO survey on Naturally Occurring Waters" (1972). Heffers Printers Limited, King's Hedges Road, Cambridge. CB4 2PQ, England.

- B) FAO Provisional Specifications (Code "(S)"): specifications which are usable but may require some further work (e.g., final clarifications of certain methods of analysis).
- C) FAO Tentative Specifications (Code "ts"): specifications that the Group on Specifications believe may prove useful but for which critical data (e.g., collaboratively studied methods of analysis) may not yet be available.

The clauses of the specifications are divided into "requirements" and "information", the latter being indicated in the individual specifications by an asterisk. The information clauses provide the buyer with additional safeguards by indicating potential difficulties for which adoption of a definite requirement is not yet practicable.

Wherever possible, standards for apparatus and common names for pesticides are those approved by the International Standards Organization (ISO). Where such standards and names are not available, those recommended by the British Standards Institution (BSI) are used.

For solids, technical liquids, volatile liquids (of maximum boiling point 50°C) and viscous liquids (with minimum viscosity of 1000 centipoises at 20 C) the FAO Specifications shall be based on a grammes/kilogram (g/kg) expression of content. For all other liquids the active ingredient content of the product shall be declared in terms of grammes per litre (g/l) at 20° C. The content may also be requested in terms of g/kg and density.

In the cases of dispute, however, where a user of the specifications has information on the content both in terms of g/l and g/kg, the g/kg value will be accepted as the correct statement of content.

Allowable variations in analytical results (i.e., tolerances in content of active ingredient) with respect to specific pesticide consignments are intended to cover reasonable variations in content of active ingredient during manufacture, but mainly to compensate for possible inaccuracies in relevant methods of analysis. For examples

of such permitted tolerances, see document mentioned in footnote 4/.

4/ For detailed definitions and other essential background information on basic procedures and technical principles adopted by the Group on Pesticide Specifications of the FAO Panel of Experts on Pesticide Specifications, Registration Requirements and Application Standards, see Plant Production and Protection Paper 13, "The Use of FAO Specifications for Plant Protection Products", FAO, Rome, 1979 (Available in English, French or Spanish).

INFORMATION

COMMON NAME: 2,4-D
CIPAC CODE NUMBER: 1
EMPIRICAL FORMULA: $C_8H_6Cl_2O_3$
RMM: 221.0

CHEMICAL NAMES:

2,4-D is the ISO common name for (2,4-dichlorophenoxy) acetic acid (IUPAC 1/ and CA 2/; Registry No. 94-75-7).

COMMON NAME: DICHLORPROP
CIPAC CODE NO: 84
EMPIRICAL FORMULA: $C_9H_8Cl_2O_3$
RMM: 235.1

CHEMICAL NAMES:

Dichlorprop is the ISO name for (\pm)-2-(2,4-dichlorophenoxy) propionic acid (IUPAC); (\pm)-2-(2,4-dichlorophenoxy)propanoic acid (CA; Registry No. 120-36-5)

2,4-D + DICHLORPROP SALT AQUEOUS SOLUTIONS

FAO Tentative Specification October 1983
(1.4+84.4/SL/ts/-)

.1 DESCRIPTION

The product shall consist of 2,4-D and dichlorprop (both complying with the respective FAO Provisional Specifications October 1983) as the active ingredients, formulated as a 2,4-D + dichlorprop salt aqueous solution. It shall be free from visible suspended matter or sediment.

.2 ACTIVE INGREDIENT**.2.1 Salt(s)**

The names of the 2,4-D and dichlorprop salt(s) present shall be stated (Note 1).

.2.2 Identity tests*

Where the identity of the active ingredients is in doubt the extractable acids shall comply with any two of the following tests:

.2.2.1 GLC

The major component in the sample chromatogram shall have the same retention time as those from a standard 2,4-D and dichlorprop chromatographed under identical conditions.

.2.2.2 TLC

The major component in the sample chromatogram shall have the same R_f value as those from a standard 2,4-D and dichlorprop.

.2.2.3 HPLC

The major components in the sample chromatogram shall have the same relative retention times as those from a standard 2,4-D and dichlorprop chromatographed under identical conditions.

* Method available from the Plant Protection Officer, FAO Plant Production and Protection Service.

.2.3 Extractable acids*

The extractable acid content expressed as dichlorprop shall be not more than $1.18x + 1.11y$ where x is the content of 2,4-D and y is the content of dichlorprop found under 2.4 (Note 2).

.2.4 2,4-D and dichlorprop*

The nominal 2,4-D and dichlorprop contents (g/l at 20°C or g/kg; Note 3) shall be declared and when determined the content obtained shall differ from that declared by not more than $\pm 7.5\%$ of the declared content.

.3 IMPURITIES

.3.1 Free phenols*

Maximum: $(0.5x + 1.5y)\%$ (Note 4) expressed as 2,4-dichlorphenol (Note 5), where x and y are the 2,4-D and dichlorprop contents found under 2.4 (Note 6).

.3.2 Water insolubles*

The product shall pass through a 250 μm test sieve and not more than 1 g/kg shall remain on a 150 μm test sieve.

.4 PHYSICAL PROPERTIES

.4.1 Stability on dilution (MT 41, CIPAC 1, p. 933)

The product, after dilution with CIPAC Standard Water C, shall give a clear or opalescent solution, i.e., free from more than a trace of sediment and/or visible solid particles.

.5 STORAGE STABILITY

.5.1 Stability at 0°C (MT 39.2, CIPAC 1, p. 932)

After storage at 0°C (Note 7) for 48 hours there shall be no separation of material.

.5.2 Stability at 54°C*

After storage at 54 \pm 2°C for 14 days the product shall continue to comply with 2.4, 3.2, 4.1 and 5.1.

* Method available from the Plant Protection Officer, FAO Plant Production and Protection Service.

.6 CONTAINERS

They should be lined, where necessary, with a suitable material or the interior surfaces treated to prevent corrosion and/or deterioration of the contents.

They should comply with pertinent national and international transport and safety regulations.

NOTE 1 In the case of mixed salt formulations the approximate content of each shall be stated.

NOTE 2 On a 2,4-D content of 100 g/l and dichlorprop content of 200 g/l the maximum permitted extractable acid content would be $100 \times 1.18 + 200 \times 1.11 = 340$ g/l.

NOTE 3 If the buyer requires both g/l at 20 C and g/kg then in case of dispute the analytical results shall be calculated as g/kg.

NOTE 4 Interim limit which will be reviewed when collaborative work is complete on determination of free phenols.

NOTE 5 The content of free phenols is limited to avoid taint of neighbouring crops and foodstuffs.

NOTE 6 On a 2,4-D content of 100 g/kg and a dichlorprop content of 200 g/kg the maximum permitted free phenol content would be 3.5 g/kg of the product.

NOTE 7 A test temperature of 0 C may not be suitable for products intended for use in cold countries and an alternative test temperature may be specified.

SUBMISSION OF DRAFT SPECIFICATIONS TO FAO

Any organization, commercial firm or interested individual is encouraged to submit relevant specifications, or proposals for revision of existing specifications, for pesticide products for consideration and possible adoption by FAO. Correspondence should be addressed to the Pesticides Control Officer, Plant Production and Protection Division, FAO, Via delle Terme di Caracalla, 00100, Rome, Italy.

General guidelines in preparing draft specifications are given in Plant Production and Protection Paper 128, *Manual on the Development and Use of FAO Specifications for Plant Protection Products, Fourth Edition*, FAO, Rome, 1995 (English only).

Specifications which are considered suitable for further processing are assigned priorities and circulated to appropriate organizations and specialists to comment. Comments, together with other relevant information, are then reviewed in detail by the Group on Specifications of the FAO Panel of Experts on Pesticide Specifications, Registration Requirements, Application Standards and Prior Informed Consent. The drafts are converted into FAO Provisional Specifications, or full FAO Specifications.