7.22 **EMULSIONS FOR SEED TREATMENT (ES)**

Note for preparation of draft specifications. Do not omit clauses or insert additional clauses, nor insert limits that are more lax than those than given in the guidelines, without referring to section 4. From the “Notes” provided at the end of this guideline, incorporate only those which are applicable to the particular specification.

The guidelines for seed treatment formulations do not apply to formulations intended for film-coating or pelleting of seeds. They include special clauses, related to their use pattern, although some of the corresponding test methods are not yet developed. The influence of treatment on germination is of major importance but it is not the subject of a specification clause because no test method is applicable to all types of seeds. To avoid adverse effects, users should apply the formulation strictly according to the recommendations of the manufacturer and should not treat seeds for which effect on germination is not known. Treated seeds should be stored in a suitable container and should be protected from excessive temperature and moisture.

**…… [ISO common name] EMULSION FOR SEED TREATMENT** (Note 1)

[CIPAC number]/ES (month & year of publication)

7.22.1 **Description**

The material shall consist of a water-based emulsion containing technical ...... [ISO common name], complying with the requirements of FAO specification ...... , in the form of ....... (see Section 4.2), together with any necessary formulants including colouring matter (Note 1). It shall be easy to homogenize (i.e. after gentle shaking of small commercial containers or stirring of the contents of large containers, the material shall be homogeneous), and suitable for dilution with water if necessary.

7.22.2 **Active ingredient**

7.22.2.1 **Identity tests** (Note 2)

 The active ingredient shall comply with an identity test and, where the identity remains in doubt, shall comply with at least one additional test.

7.22.2.2 **...... [ISO common name] content** (Note 2)

 The ...... [ISO common name] content shall be declared (g/kg or g/l at 20 ± 2 ºC, Note 3) and, when determined, the average content measured shall not differ from that declared by more than the appropriate tolerance, given in the table of tolerances, Section 4.3.2.

7.22.3 **Relevant impurities**

7.22.3.1 **By-products of manufacture or storage** (Note 4), if required

 Maximum: ......% of the …… [ISO common name] content found under 7.22.2.2.

7.22.4 **Physical properties**

 7.22.4.1 **Acidity** and/or **Alkalinity** (MT 191) or **pH range** (MT 75.3) (Note 5), if required

 Maximum acidity: ...... g/kg calculated as H2SO4.

 Maximum alkalinity: ...... g/kg calculated as NaOH.

 pH range: ...... to ......

 7.22.4.2 **Emulsion stability on dilution with water** (MT 36.3), if required

 The formulation, when diluted at 30 ± 2°C with CIPAC Standard Waters A and D (Note 6), shall comply with the following:

|  |  |
| --- | --- |
| Time after dilution | Limits of stability, MT 36.3 |
|  0 h | initial emulsification complete |
|  0.5 h | “cream”, maximum: ...... ml |
|  2.0 h | “cream”, maximum: ...... ml“free oil”, maximum: ...... ml |
|  24 h | re-emulsification complete |
|  24.5 h | “cream”, maximum: ...... ml “free oil”, maximum: ...... ml |
| Note: tests after 24 h are required only where results at 2 h are in doubt. |

 7.22.4.3 **Persistent foam** (MT 47.3) (Note 7), if required

 Maximum: ...... ml after 1 min.

7.22.4.4 **Adhesion to seeds** (MT 194)

" The manufacturer shall declare for a representative type of seeds for which the seed treatment formulation is recommended, the minimum percentage of the [ISO common name] remaining on the seeds after the test.

7.22.5 **Storage stability**

7.22.5.1 **Stability at 0** **°C** (MT 39.3)

 After storage at 0 ± 2 °C for 7 days, no separation of particulate or oily matter shall be visible after gentle agitation.

7.22.5.2 **Stability at elevated temperature** (MT 46.3)

 After storage at 54 ± 2 °C for 14 days (Note 8), the determined average active ingredient content must not be lower than ......% relative to the determined average content found before storage (Note 9) and the formulation shall continue to comply with the clauses for:

- by-products of manufacture or storage (7.22.3.1),

- acidity/alkalinity/pH range (7.22.4.1),

- emulsion stability on dilution with water (7.22.4.2),

- adhesion to seeds (7.22.4.4),

as required.

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Note 1 The influence of treatment on germination is of major importance but it is not the subject of a specification clause because no test method is applicable to all types of seeds. To avoid adverse effects, users should apply the formulation strictly according to the recommendations of the manufacturer and should not treat seeds for which effect on germination is not known. Treated seeds should be stored in a suitable container and should be protected from excessive temperature and moisture.

 The formulation is expected contain a dye or pigment that permanently colours the seed after treatment (red is recommended). For special purposes however, the dye/pigment can be added at a later stage. In some countries, there may be a legal requirement that a specific colour shall be used. The same colour should not be used for denaturing seeds intended as livestock feeding stuffs.

Note 2 Method(s) of analysis must be CIPAC, AOAC or equivalent. If the methods have not yet been published then full details, with appropriate method validation data, must be submitted to FAO/WHO by the proposer.

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

Note 4 This clause should include only relevant impurities and the title should be changed to reflect the name of the relevant impurity. Method(s) of analysis must be peer validated.

Note 5 The method to be used shall be stated. If several methods are available, a referee method shall be selected.

Note 6 As outlined in CIPAC MT 36.3, the test concentrations should be based on those in the recommendations for use provided they are within the scope of the method.

Note 7 The mass of sample to be used in the test should correspond to the highest rate of use recommended by the supplier provided it is within the scope of the method. Using MT 47.3, the initial volume of water may be reduced, to enable preparation of high concentrations. The test is to be conducted in CIPAC standard water D.

Note 8 Unless other temperatures and/or times are specified. Refer to Section 4.6.2 of this Manual for alternative storage conditions.

Note 9 Samples of the formulation taken before and after the storage stability test may be analyzed concurrently after the test in order to reduce the analytical error.