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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 38793-2020

**Technical specification of efficacy evaluation for degradation of
heterocyclic pesticides by biological products**

生物产品降解杂环类农药功效评价技术规范

(English Translation)

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1 Scope

This standard specifies the basic requirements, process requirements, and verification methods for the efficacy evaluation of the degradation of heterocyclic pesticides by biological products.

This standard is applicable to the effect evaluation for the degradation of heterocyclic pesticides by biological products.

2 Normative references

The following documents are essential to the application of this document. For the dated referenced documents, only the versions with the indicated dates are applicable to this document; for the undated referenced documents, only the latest version (including all the amendments) is applicable to this document.

GB/T 6682 Water for analytical laboratory use - Specification and test methods

GB 21523 Effluent standards of pollutants for pesticides industry heterocyclic pesticides

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

biological products

Products produced by biotechnology.

NOTE: Biological products in this standard specifically refer to microbial and enzyme products that have the function of degrading heterocyclic pesticides.

3.2

heterocyclic pesticides

An organic compound pesticide with a heterocyclic structure in its molecule.

NOTE: It includes atrazine, imidacloprid, triadimefon, carbendazim, paraquat, fipronil, etc.

4 Basic requirements

4.1

Biological products can be evaluated only if there are clear names of microbes and enzymes on their labels or instructions.

4.2

Efficacy evaluation shall be carried out scientifically and impartially, and the evaluation process and evaluation methods shall be scientific.

4.3

The evaluation results are accurate and reliable, scientific statistical methods shall be used for comparison, and inspection reports, data and results shall not be falsified or altered.

4.4 Receiving, storage, handover, preparation, recycling, and returning/disposal of

samples shall be carried out in accordance with relevant laws, regulations, and standards; corresponding management systems and procedures shall be formulated.

4.5 There shall be professional and technical personnel suitable for efficacy evaluation.

4.6 The environmental conditions of the laboratory shall meet the evaluation requirements, and the laboratory carrying out microbial evaluation shall meet the requirements of grade-I biosafety.

4.7 The type, quantity, performance, range, and accuracy of instruments and equipment

used in efficacy evaluation shall be able to meet the needs of efficacy evaluation. The utensil materials required for the efficacy evaluation of microbial products shall be aseptically treated.

4.8 The reagents used for efficacy evaluation shall be analytical grade, and the water shall comply with the grade II water specified in GB/T 6682.

4.9 The purity of the standard heterocyclic pesticides selected for efficacy evaluation

shall be greater than or equal to 95%; the culture medium shall be selected according to the type of microorganism.

4.10 After the experiment is over, the experimental materials shall be treated harmlessly to ensure the cleanliness and safety requirements of the experimental environment.

5.1 Experimental design

It shall meet the requirements of Table 1.

temperature, dissolved oxygen (shaking speed), and time, should be selected to determine the reaction system.

5.5.1 Microbial product degradation treatment

Take 9 Erlenmeyer flasks of 250 mL, including 3 blank samples, 3 test samples, and 3 inactivated samples. According to the substrate concentration and amount of microbe added determined by the optimal reaction system, a culture solution with a reaction system of 100 mL is prepared, and the degradation reaction is carried out under the conditions of the optimal reaction system.

5.5.2 Enzyme product degradation treatment

Take 9 centrifuge tubes of 50 mL, including 3 blank samples, 3 test samples, and 3 inactivated samples. According to the substrate concentration and the amount of enzyme added determined by the optimal reaction system, a reaction solution with a reaction system of 15 mL is prepared, and the degradation reaction is carried out under conditions of the optimal reaction system.

6.1 Determination of substrate concentration

After the degradation treatment is over, take 15 mL of the reaction solution, and determine the concentration of the substrate according to the provisions of GB 21523.

6.2 Calculation of degradation rate

It is calculated according to formula (1):

where:

R -- degradation rate, %;

Xi -- the original mass concentration of the substrate, in milligrams per liter (mg/L);

Xa -- the mass concentration of the substrate at the end point of the degradation reaction of the test sample, in milligrams per liter (mg/L);

Xb -- the mass concentration of the substrate at the end point of the degradation reaction of the inactivated sample, in milligrams per liter (mg/L);

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