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भारत सरकार/**Government of India**

कृषि एवं किसान कल्याण मंत्रालय/**Ministry of Agriculture & Farmers Welfare**

कृषि एवं किसान कल्याण विभाग/**Department of Agriculture & FW**

वनस्पति संरक्षण, संगरोध एवं संग्रह निदेशालय

DIRECTORATE OF PLANT PROTECTION, QUARANTINE & STORAGE

केंद्रीय कीटनाशी बोर्ड एवम पंजीकरण समिति

Central Insecticides Board and Registration Committee

एन. एच. 4, फरीदाबाद (हरियाणा)-121001

N.H. IV, FARIDABAD (HARYANA)-121001

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Dated the 11th February, 2022

PUBLIC NOTICE

Subject: Public notice for inviting comments of stakeholders on the draft guidelines on bio-pesticides -reg.

Reference is invited to the decision taken by the Registration Committee at Agenda Item No. 10.4 in the 436th RC meeting held on 28.01.2022 wherein the Registration Committee accepted the sub-committee report on draft guidelines of Bio-pesticides along-with consortium of Bio-pesticides and also directed for inviting comments of the stakeholders on the draft guidelines within a period of 30 days.

Accordingly, as per the decision taken by the RC, the draft guidelines on bio-pesticides are uploaded herewith for inviting comments from stake holders within a period of 30 days from the date of uploading of this public notice. The comments may also be sent through email at cibsecy@nic.in .

Encl: Draft guidelines of bio-pesticides along with guidelines on consortium of bio-pesticides.

Ajay Kumar
11/2/22

(Ajay Kumar)
Sr. Administrative Officer

Copy to:

1. All Registered Pesticide Associations
2. Chairman, Registration Committee
3. PPS to JS(PP)/ PA to PPA
4. IT Cell Hqrs., Faridabad for uploading the same on the official website.

Annexure

DRAFT GUIDELINES ON BIO-PESTICIDES

A subcommittee was constituted in 427th RC meeting under the chairmanship of ADG (PP & B), ICAR for harmonization of data of Bio-pesticides. The guidelines for registration of Bio-pesticide have been prepared, discussed and comments of ICAR (NBAIR, NBAIM, NIBSM, IARI) have been received through ADG(PP). As per direction of 431st RC, the guidelines are finalized after discussion with toxicological experts for data requirement.

Bio-pesticides/ Microbial Pest Control Agents (MPCA)

1. Example of MPCA are Entomopathogenic/ Entomotoxic Bacteria, Antagonistic Bacteria, Entomopathogenic Fungi, Antagonistic Fungi, Nuclear Polyhedrosis Virus (NPV) & Granulosis virus (GV).

2. The applicant needs to submit MOU/license agreement between the applicant and the inventor (either own R&D Laboratory or outsourced Research Institute/Facility). MOU between Research Organization (who conducted independent trials/experiments for bio-efficacy, toxicology, chemical, packaging studies for data generation).

3. Updated Stakeholder list for all members in Association/Organization claiming for MOU/authorization for data/technology utilization for mass multiplication/commercialization of the strain.

4. If registration is granted to a strain from a particular source, then the subsequent applicants for the same strain from the same source may apply for registration under section 9(4) based on DNA finger-printing for the strain verification from Mau Bhanjan (ICAR Institute designated by the Registration Committee for maintaining repository), if the strain designation and accession number are same.

The Data Requirements for Microbial Pest Control Agents (MPCA) Pesticides

i) Entomopathogenic/ Entomotoxic Bacteria
ii) Antagonistic Bacteria
iii) Entomopathogenic Fungi
iv) Antagonistic Fungi
v) Nuclear Polyhedrosis Virus (NPV) & Granulosis Virus (GV)

Chemistry

Sl. No.	**Characteristics**	**Microbial (Antagonistic bacteria, Entomopathogenic/Entomotoxic bacteria, Entomopathogenic fungi, Antagonistic fungi, and Baculovirus**			
		Primary culture/mother culture		Formulated product	
		9(3B)	**9(3)**	**9(3B)**	**9(3)**
1.	Systematic name (Genus and species)	R	R	R	R
1.1	Strain name	R	R	R	R
2.	Common name, if any	R	R	R	R
3.	Source of origin	R	R	R	R
4.	Specification of the product Habitat, Physical appearance and morphological description, pH, particle size, suspensibility, miscibility	R	R	R	R
5.	Manufacturing process.	R	R	R	R
6.	Methods of analysis including Quantitative analysis	R*	R*	R*	R*
7.	Shelf life claims	R	R	R	R

7.1	Data on storage stability as per shelf life claims	R	R	R	R
8.	Composition of the product	R	R	R	R
8.1	Potency of product by bioassay method (LC 50 (Beta,Delta , Cry toxin endotoxin content,classificatio n (delta endotoxin)	NR#	NR#	NR#	NR#
8.2	CFU/g or ml	R	R	R	R
8.3	POB/Capsule count pr ml/g of the product	R%	R%	R%	R%
8.4	Adjuvants	R	R	R	R
8.5	Human pathogens (culture method)	R	R	R	R
8.6	Percent content of the Bio-control organism in the formulation & nature of biomass.	R	R	R	R
8.7	Percentage of carrier/filler, wetting/ dispending agent, stabilizers/ emulsifiers, contaminants/ impurities etc.	R	R	R	R
8.8	Water content	R	R	R	R
9.	Contaminants: Pathogenic contaminants such as Salmonella, Shigella, Vibrio and such other microbials, not exceed 1 x 10^4 count	R	R	R	R

9.1	per ml or per g of formulation Chemical and botanical pesticide contaminants	R	R	R	R
10.	Natural occurrence of the organism	NR	NR	NR	NR
11.	Immunology assays: Elisa	NR	NR	NR	NR
12.	Separation and purification of crystals	NR	NR	NR	NR
13.	A sample for verification (500 g or 500mL as the case may be) DNA fingerprinting for the strain verification from Mau Bhanjan. Pre-registration verification at Central Insecticide laboratory (CIL)	R R R	R R R	R R R	R R R

* Test procedure and criteria used for identification – morphology, biochemistry, serology/ Immunology for Entomotoxic bacteria.

these parameters are required for Entomotoxic bacteria.

% these parameters are required for Virus.

- POB/Capsule count per ml/g of the product only for NPV.
- Viral unit: NPVs $1x10^9$ POB/ml or gm. minimum, GVs: $5x10^9$ capsules /ml or gm. minimum.
- Dual culture to attain at least 50% reduction in target organism (35% for antagonistic bacteria). Bioassay: based on diseased severity and root colonization.
- Natural occurrence of the organism, Immunology assays: Elisa and Separation and purification of crystals are required for Entomotoxic bacteria.
- Test procedure and criteria used for identification by DNA test (Restriction enzymes analysis test).
- Biological assays for determining the LC_{50} / LD_{50} of the formulation for Entomopathogenic Viruses. Production of Entomopathogenic Viruses at commercial-scale was done exclusively *in-vivo* by culturing large number of larvae of host insect

and subsequently feeding them with semi-synthetic diet contaminated with virus inoculums in laboratory. Viruses production *in-vitro* by culturing insect cells in bioreactors was a substitute for labour intensive maintenance of the massive host-insect colony.

- Manufacturing process including type of fermentation and biological end products. The microbial cultures are multiplied by liquid solid fermentation. Information pertaining to use of entire mycelia mats with spores separated must be provided in terms of biomass.

Documents to be mandatorily furnished by applicant applying u/s 9 (3)/ 9(3b) for all categories of bio pesticides

1. Verification of the Authorization letter submitted by the applicant via e mail by Secretariat from the original inventor/source of the strain for data utilization for mass multiplication.

2. MOU /license agreement between the applicant and the inventor (either own R & D Laboratory or outsourced Research Institute / Facility). MOU between Research Organization (who conducted independent trials/experiments for bioefficacy, toxicology, chemical, packaging studies for data generation)

3. Updated Stakeholder list for all members in Association/ Organization claiming for MOU/authorization for data /technology utilization for mass multiplication/commercialization of the strain.

4. Relevant Affidavit/Undertakings: -
   (a) Affidavit on bio-pesticide composition on NJSP duly notarized.
   (b) Notarized copy of depositing microbial bio-pesticides strain sample in National Repository with reference code number.
   (c) Undertaking on NJSP duly notarized that product do not contain any genetically modified organism in the prescribed format.
   (d) Undertaking on NJSP duly notarized that product is free from chemical / botanical pesticides / other agro-chemicals.
   (e) Affidavit of strain Innovator
   (f) Copy of 9(3B) Registration certificate, if relevant

5. Guidelines for minimum infrastructure facilities to be created by the manufacturers of microbial bio-pesticides as per **Annexure, B&C.**

Note:

1. Applicants are required to submit an undertaking that strain is indigenous, naturally occurring, not exotic in origin, and not genetically modified as per **Annexure -A**

2. Bt products should be labelled with biopotency and (or) toxin content. In addition, the labels will have to contain a measurement of toxin protein as percent protein, referring to the Lepidopteran-active toxin(s) present in the crystal.

3. The presently used Bt var. kurstaki standard is HD-1-S-1980 and its potency was calculated at 16,000 IUs per milligram of powder (Beegle et al. 1986. Standardization of HD-1-S-1980: US Standard for Lepidopterous-active

Bacillus thuringiensis. Bulletin Ent. Soc. America 32: 44-45.). This standard strain is now available with PDBC, Bangalore and DOR, Hyderabad.

4. Defined potency and toxin concentration – Bioassay would require the use of an insect species. Normally manufacturers could select *Trichoplusia ni* / *Helicoverpa armigera* for Lepidopteran specific Bt formulations. *Spodoptera* Units (SPU), *Leptinotarsa* Units (LTUs) or International Toxin Units (ITUs) are to be used for denoting a specific insect.

5. No test for beta exotoxin is required for *Bacillus sphaericus*, because this species is not known to produce exotoxins.

6. The biopotency of products based on *B. thuringiensis* subsp. *israelensis* (*Bti*) is compared against a reference strain IPS82, 1884 using early fourth-instar larvae of Aedes aegypti (strain Bora Bora). The toxicity of IPS82 has an arbitrarily assigned toxicity of 15,000 ITU/mg powder.

7. The biopotency of products based on *B. sphaericus* (*Bsh*) is determined against a reference standard SPH88, strain 2362 using early fourth-instar larvae of Culex pipiens pipiens (strain Montpellier). The toxicity of SPH88 has an arbitrarily assigned toxicity of 1,700 ITU/mg of the powder (Guidelines for laboratory and field testing of mosquito larvicides, WHO 2005 pp 45).

8. The use of alternative bacterial reference powders and / or strains must be approached cautiously. Such alternatives must be the subject of careful cross-calibraation against the reference powders and should be conducted by recognized laboratories and should be made available to anyone who wishes to use, or check, the test with the alternative powders/strains.

9. Water content should not exceed 8 %, to preclude premature degradation of the product.

Annexure-.A

UNDERTAKING BY MANUFACTURERS OF MICROBIAL PESTICIDES

I,----------,aged-------years, s/o----------,
R/o----------and----------of M/s.----------Registered Office at----------do hereby undertake as follows:

(a) That the product----------based on----------, Strain----------, manufactured by M/s.----------and /or imported by M/s.....does not contains any genetically modified organism (GMO) .

(b) That I/We shall abide by the provisions contained in the International Plant Protection Convention with regard to the import of this product.

(c) That I/We shall abide by the provisions in context of International Standards for Phyto-Sanitary Measures-Code of Conduct for the import and release of exotic bio-pesticides of the International Plant Protection Convention (IPPC), FAO, Rome. /Plant Quarantine (regulation of Import into India) order,2003.

(d) That I/We shall provide the samples of our product as and when desired by the competent authorities of Government of India for verification.

(e) That I/We further undertake that in the event of the above product having proved otherwise by any competent authority and resulting in environmental damage, I/We shall inform to Plant Protection Adviser, Dte. of PPQ&S, Sectt. of Central Insecticides Board and Registration Committee, and other relevant authorities for Manufacturing Licensing, Pollution Control and of appropriate District/State/National Level and shall comply with the directions from them.

(f) That my/our above undertaking is true, and no portion is false and I have concealed nothing relevant to the above matter.

Signature:----------

Date-------

Name--------- ----------

Place:----------

Designation----------Seal of the Company- ----

Bio-efficacy

Sr. No.	Particulars	Primary culture/mother culture		Formulated product	
		9(3B)	9(3)	9(3B)	9(3)
1	**Field studies:** Data on bio-effectiveness and phytotoxicity generated at ICAR, SAUs, CSIR / ICMR institutes. The data should be certified either by the Director or Head of the Institute.	NR	NR	R **	R***
2	**Laboratory studies:** The product should be tested at a laboratory under ICAR/ SAU/ CSIR/ICMR. **2.1)** LC50 values for each insect species under laboratory conditions should be generated at least at two institutes of ICAR, SAUs, CSIR and ICMR. **2.2)** Data on LC50 values for each target insect species should be generated at a laboratory under ICAR/ SAU/ CSIR/ICMR	R	R	R	R
3	Data on non-target organism: One season/one year on effect on product against natural parasites/ predators .	NR	NR	R	R

R - Two seasons/years data on bio-effectiveness from two agro-climatic Zones**

R * - Two seasons/years data on bio-effectiveness from minimum three agro climatic Zones.**

2.1) - Applicable for Entomotoxic Bacteria
2.2 – Applicable for NPV & GV.
Sr. No. 3 - Required in case of Entomopathogenic fungi, Antagonistic Bacteria.

Note: No bio-efficacy data required for already registered strains of Bio-pesticides. Certificate of Registration will be granted as per approved formulation u/s 9(3)

Toxicity

S. No.	Parameters	Microbial (Antagonistic bacteria, Entomopathogenic/Entomotoxic bacteria, Entomopathogenic fungi, Antagonistic fungi, and Baculovirus			
		Primary culture/mother culture		Formulated product	
		9(3b)	9(3)	9(3b)	9(3)
	Single Dose Oral – Rat (Toxicity/Infectivity/Pathogenicity)	R	R	R	R
	Single Dose Dermal – Rabbit (Toxicity/Infectivity/Pathogenicity)	R	R	R	R
	Acute Inhalation (a)	R	R	R	R
	Single Dose Pulmonary – Rat (b) (Toxicity/Infectivity/Pathogenicity)	R	R	R	R
	Single Dose Intraperitoneal – Rat (c) (Toxicity/Infectivity/Pathogenicity)	R	R	R	R
	Single dose intravenous (d)	R	R	R	R
	Primary Skin Irritation - Rabbit	R	R	R	R
	Primary Eye Irritation - Rabbit	R	R	R	R
	Skin Sensitization - Guinea pig	R	R	R	R
	Cell culture (d)	R	R	R	R
	Human Safety Records (Effect/Lack of effects)	NR	R	NR	R
	Toxicity to bird (2 species) (Toxicity/Infectivity/Pathogenicity)	NR	NR	NR	R
	Toxicity to Fresh water Fish (Toxicity/Infectivity/Pathogenicity)	NR	NR	NR	R
	Toxicity to Honey bees (e)	NR	NR	NR	R
	Toxicity to Silkworm (f)	NR	NR	NR	R
	Toxicity to Earthworm (g)	NR	NR	NR	R

Note:

a - Inhalation toxicity study required for registration of entomopathogenic/entomotoxic bacteria

b - Pulmonary toxicity study required for registration of antagonistic bacteria, antagonistic fungi, entomopathogenic fungi, baculovirus

c - Intraperitoneal toxicity study required for registration of antagonistic fungi, entomopathogenic fungi, antagonistic bacteria

d - Cell culture and Intravenous study required for registration of baculovirus.

e and f – required for all except antagonistic fungi

g- required for all except entomopathogenic/entomotoxic bacteria

Note: No data required for already registered strain from the same source with same strain designation and accession number

Note: If genome sequence of conserved region of the microbial strains/microbes used as microbial pest control agent is identical with already registered strain then data is not required from toxicity angle.

: Formulations developed from similar already registered mother culture using similar ingredient and process of manufacture then no data is required from toxicity.

PACKAGING

Chapter V of the Insecticides Rules 1971 in the Insecticides Act, 1968, the rule 16 to 20 of the said chapter deals with the Packaging and Labelling.

Sl. No.	Parameter	Primary culture/mother culture		Formulated product	
		9(3B)	9(3)	9(3B)	9(3)
1.	**Labels and Leaflets as per IR-1971, all fields (as applicable) and as amended from time to time**	R	R	R	R
2.	**Manner of labeling and Leaflet**	R	R	R	R
3.	**Type of packaging (Ultra small, small or Big whichever is applicable)**	R	R	R	R
4.	**Manner of packaging**	R	R	R	R
5.	**Specification for primary, Secondary and Transport packages (whichever is applicable)**	R	R	R	R
6.	**Details of packaging material and its compatibility with content**	R	R	R	R
7.	**Performance of container with content during storage stability test(Shelf life Study)**	R*	R	R*	R
8.	**Transport worthiness test**	R*	R	R*	R

R*- Before Commercialization the data will be required.

Note:

1. In case of additional packaging endorsement applications, the data at Sl. No. 05, 06, 07& 08, are not required if similar packaging (material) is being sought by the applicant as has been granted to earlier 9(3) registrant.
2. Specification of Bureau of Indian Standard (BIS) must be followed for all the packaging requirements (Wherever available and applicable).
3. All Packaging tests must be carried out with the product of same batch and in its commercial package preferably in Indian condition.
4. The duration of the test and the conditions including geographical conditions must be mentioned.
5. Storage stability data should be generated keeping at least the following parameters in test protocol such as test temperature, test duration, test packaging material, content of active ingredient (a.i.) and relevant impurities in the product during and after storage, test humidity, exposure to light, physical and chemical properties of the product during and after storage etc.
6. The testing protocols must have their basis in the WHO/FAO/ CIPAC/ASTM recommendations or other validated methodology of GLP/ NABL accredited laboratory having packaging testing (chemical / mechanical as applicable etc.) in the scope.
7. The Accelerated storage study (ASS) test must be conducted at 54± 2°C (wherever applicable) for 14 days as per FAO/ WHO manual for claiming appropriate shelf life of the product which can be maximum two years, subject to the condition of providing the ambient storage stability study data of thirty months or as the case may be within thirty months from the date of application for the registration.

As per the recommendation of Expert Group Constituted by RC in the 354th RC held on 31st March,2015 under the chairmanship of Dr. S.N Sushil, PPA on Harmonization of data on bio-pesticides of already registered strain for grant of registration of Bio-pesticides u/s 9(4) category, it was suggested that under section 9(4) of Insecticides Act, 1968, establishment of equivalence is the basic criteria. As the bio-pesticides manufacturing is done under in situ process, its equivalence may not be assured. Therefore, registration u/s 9(4) may not be feasible.

Besides this the sub-committee also propose the draft Guidelines on consortium of Bio-pesticides.

Draft Guidelines on Consortium of Bio-pesticides.

Efficiency of biocontrol agents could be increased by the development of mixture of compatible strains of different biocontrol organisms by considering the following norms. While developing a consortia formulation, the following needs to be addressed:

1. Compatible strains combination that differs in pattern of plant/site of colonization.
2. Compatible strains combination is broad spectrum of action against different plant pathogens.
3. Compatible strains combination with different modes of action under similar conditions.

4. Compatible strains combination of genetically diverse group to adapt to different pH, moisture, temperature and relative humidity.

The guidelines of Chemistry, Bio-efficacy, packaging for registration of consortia of Bio-pesticides are similar with the guidelines of Bio-pesticides except the following points.

1. Guidelines of mother culture/Primary culture of already registered bio-pesticides u/s 9(3) category are not required for registration of consortium Bio-pesticides. Only the guidelines of formulated product (Consortium) will be required. **Ratio of each strain in the formulation is required.**

2. Following toxicology guidelines for consortia of Bio –pesticides is required.

Note: a - Inhalation toxicity study required for registration of entomopathogenic/entomotoxic bacteria

b - Pulmonary toxicity study required for registration of antagonistic bacteria, antagonistic fungi, entomopathogenic fungi, baculovirus

c - Intraperitoneal toxicity study required for registration of antagonistic fungi, entomopathogenic fungi, antagonistic bacteria

d - Cell culture and Intravenous study required for registration of baculovirus.

e and f – required for all except antagonistic fungi

g- required for all except entomopathogenic/entomotoxic bacteria

Note:

- If genome sequence of conserved region of the microbial strains/microbes which are used in consortia of Bio-pesticides to be used as microbial pest control agent is identical with already registered strain, then data is not required for mother culture but data is required for combination/consortia from toxicity angle.
- If any new formulation of microbes is made by using new ingredients with different processes of manufacture than data is required for the formulation.
- If any new combination/consortia /mixture of microbial strains/microbe developed from already registered microbial strain than data is not required for the mixture.
- If any new combination/consortia /Mixture of microbial strains/microbe developed from already registered microbial strain than data is required only for the mixture and not for mother cultures from toxicity angle.

List of Fungi, Bacteria and Viruses for Consortia

1. Sl. No 591.*Trichoderma* spp .*(T. viride /T. asperellum, T. harzianum, T. virens)*
2. Sl. No 589. *Gliocladium virens*,
3. Sl. No 679. *Ampyliomyces quisqualis,*
4. Sl. No 683. *Coniotyrium minitans,*
5. Sl. No 692. *Chaetomium globosum* and
6. Sl.No 693. *Aspergillus niger.*
7. Sl. No 588. *Bacillus subtilis*,
8. Sl. No 590 *Pseudomonas fluorescens, P. protegens, P. entomophila,*
9. Sl. No 677, *Spreptomyces griseoviridis,*
10. Sl. No 678 *Streptomyces lidicus,*

11. Sl. No 684 *Agrobacterium radiobacter* K84.
12. Sl. No 592. *Beauveria bassiana*,
13. Sl. No 593. *Metarrhizium anisopliae*
14. Sl. No 594. *Nomuraea rileyi*, (New name: *Metarhizium rileyi*)
15. Sl. No 595. *Verticillium lecanii,* (New name: *Lecanicillium lecanii*)
16. Sl. No 675. *Verticilium chlamydosporium*, (New name: *Pochonia chlamydosporium*)
17. Sl.No.689. *Paecilomyces lilacinus,* (New name: *Purpureocillium lilacinum*)
18. Sl.No.718. *Myrothecium verrucaria-nematicide*
19. Request to include *Isaria fumosorosea* (Old name: *Paecilomyces fumosoroseus*) or *Isaria* spp. including species like *farinosus* or *javanica* for the management of invasive whiteflies.
20. Sl. No 326. *Bacillus species* (includes *Bacillus sphaericus (syn: Lysinibacillus sphaericus)*, *Bacillus thuringiensis var. galleriae, Bacillus thuringiensis var. israelensis, Bacillus thuringiensis var. kurstaki, Bacillus thuringiensis var. tenebrionsis, Bacillus thuringiensis var. sandiego*, *Bacillus thuringiensis* var. *tolworthi* and *Bacillus albus*.
21. Sl. No 596 Granulosis Viruses (GV)
22. Sl. No 597 Nuclear Polyhedrosis Viruses (NPV) (includes *Spodoptera litura* NPV, *Spodoptera frugiperda* NPV, *Heicoverpa armigera* NPV, *Spodoptera mauritia* NPV, *Mythimna separata* NPV,

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