

**PHILIPPINE  
NATIONAL  
STANDARD**

**PNS/BAFS 420:2025  
ICS 65.080**

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**Biostimulants — Product Standard — Specifications**



**BUREAU OF AGRICULTURE AND FISHERIES STANDARDS**

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## **Foreword**

In 2021, the Bureau of Agriculture and Fisheries Standard (BAFS)-Department of Agriculture (DA) received a formal concern regarding the increasing presence of microbial biostimulants as emerging new agricultural inputs in the domestic market. This concern, endorsed through the DA-Office of the Undersecretary-Designate and Chief-of-Staff, underscored the circulation of counterfeit microbial stimulant products being sold locally without scientific validation. In response, the DA-BAFS Organic Agriculture Division (OAD) proposed the development of a Philippine National Standard (PNS) on the specifications for biostimulants. The development of this standard aims to support the establishment of a regulatory framework that defines the minimum requirements and technical specifications for biostimulants.

Furthermore, a research study entitled “Comparative Evaluation of Guidelines and Regulations on Biostimulants among Europe (EU), the United States (US), India, and the Philippines” was conducted by the DA-BAFS Standards Research Division (SRD) in July 2024 to support the development of the Philippine National Standard (PNS) for Biostimulants. The study aimed to compare plant biostimulant guidelines and regulations from major producing countries and the Philippines. Based on the findings, several recommendations were proposed, including the adoption of minimum requirements aligned with international guidelines and regulatory practices from other countries.

A Technical Working Group (TWG) was established through the Special Orders (SO) No. 745, series of 2025 (Composition of the TWG and Project Management Team [PMT] for the Development of the PNS for Agricultural and Fishery Products and Machinery) and SO No. 1752, series of 2025 (Amendment to SO No. 745, series of 2025 (Recomposition of the TWG and PMT for the Development of PNS for Agricultural and Fishery Products and Machinery). The TWG was composed of relevant stakeholders from the government sector, academe/research institutions, private sector organizations, and Civil Society Organizations (CSO). The draft PNS underwent a series of TWG meetings and stakeholder consultations conducted via an online platform before its endorsement to the DA Secretary for approval.

This document was drafted in accordance with the editorial rules of the DA-BAFS- Standards Development Division (SDD) Standardization Guide (SG) No. 1: Writing the PNS.

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## 1 Scope

The Standard covers the minimum requirements for biostimulants used in crop production, specifically microbial and non-microbial biostimulants, with or without an organic claim. This Standard does not apply to fertilizers, soil additives, crop protectants, and biostimulants intended for use in livestock or aquaculture.

## 2 Normative References

The following documents are referred to in this PNS in such a way that some or all their contents constitute the requirements of this document. The latest edition of the referenced documents (including any amendments) applies:

An act providing for the development and promotion of organic agriculture in the Philippines and for other purposes. Republic Act (RA) No. 11511. (2020).

[https://lawphil.net/statutes/repacts/ra2020/ra\\_11511\\_2020.html](https://lawphil.net/statutes/repacts/ra2020/ra_11511_2020.html)

Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2023). Organic Bio-Control Agents (OBICA) — Product standard — Specifications. (PNS/BAFS 182:2023).

<https://bafs.da.gov.ph/index.php/approved-philippine-national-standards/>

Organic agriculture act of 2010, RA No. 10068. (2010).

[https://lawphil.net/statutes/repacts/ra2010/ra\\_10068\\_2010.html](https://lawphil.net/statutes/repacts/ra2010/ra_10068_2010.html)

## 3 Terms and Definitions

For the purpose of this Standard, the following definitions shall apply:

### 3.1

#### **biostimulants**

any substance, microorganism, or combination of both, that when applied to plants, seeds, soil, or other growth media, stimulates and enhances physiological processes (e.g. flower induction, shoot and root growth, etc.), nutrient uptake, nutrient use efficiency, water use efficiency, microbial activity, stress tolerance and/or crop quality traits regardless of its nutrient content (DA-Fertilizer and Pesticide Authority [FPA], 2019, *modified*)

### 3.2

#### **chitosan**

deacylated biopolymer forms of chitin derived from fungal cell walls, nematode eggshells, and the exoskeleton of insects and crustacean shells, including its natural and eco-friendly properties, and its ability to enhance

plant health and crop yields. It helps improve soil conditions and promotes plant growth (IMARC, 2024, *modified*)

### 3.3

#### **crop production**

system of management practices carried out for the cultivation of the following crops based on the Indicative Crop Classification: cereals, fruits and nuts, vegetables and melons, oilseed crops, root/tuber crops with high starch or inulin content, beverage and spice crops, leguminous crops, sugar crops, and other crops such as but not limited to fiber crops, grasses & fodder crops, medicinal crops, rubber, tobacco and flower crops with a focus on sustainability, food security, and economic viability (Food and Agriculture Organization [FAO], 2010, *modified*)

### 3.4

#### **humic substances**

naturally derived organic compounds from decomposed plant and animal materials that can improve soil physical, chemical, and biological properties that support plant growth and development (Ho et al., 2022, *modified*)

### 3.5

#### **inorganic compounds**

mineral-based and synthetic compounds that improve plant nutrition, stress tolerance, and nutrient use efficiency. They enhance natural plant processes, boosting growth and resilience to environmental stresses (Du Jardin, 2015, *modified*)

### 3.6

#### **protein hydrolysates**

mixtures of peptides and amino acids that are produced by enzymatic, chemical, or physical hydrolysis of proteins from animal-, plant-, or microbial-derived raw materials (FPA, 2019). These hydrolysates are utilized to stimulate natural processes in plants, enhancing nutrient uptake, nutrient use efficiency, and tolerance to abiotic stress (Malécange et al., 2023, *modified*)

### 3.7

#### **algal extracts**

polysaccharide-rich substances (Tuhy et al., 2015, *modified*) obtained from different algae that includes seaweed and freshwater that support plant growth, and stress tolerance by enhancing nutrient uptake and improving soil conditions (Deolu-Ajayi et al., 2022, *modified*)

## 4 **Product Description**

The following shall be the specified biostimulants in this Standard:

#### 4.1 Microbial biostimulants

products that contain living microorganisms such as bacteria, fungi, or algae, which, when applied to plants or soil, stimulate natural processes to enhance nutrient uptake, plant growth, and resilience to abiotic and biotic stress, without being fertilizers or pesticides. This may include single-strain solutions, microbial consortia, or naturally derived microbial communities.

#### 4.2 Non-microbial biostimulants

substances derived from natural sources that do not contain living microorganisms, such as humic substances, algal extracts, protein hydrolysates, chitosan, and other biopolymers, and inorganic compounds that are applied to plants or soil to enhance plant growth, nutrient efficiency, stress tolerance, and crop quality.

### 5 Minimum Requirements

#### 5.1 Active materials

Ingredients according to compositional categories:

##### 5.1.1 Microbial-based

- a) live microbial products containing
  - a.1) single-strain solutions;
  - a.2) microbial consortia; and
  - a.3) naturally derived microbial communities.

##### 5.1.2 Complex carbon-based

- a) mineral natural deposits such as humic acids, fulvic acids, humin, and other forms of humic substances; and
- b) other complex carbon-based residues and extracts (e.g., vermicompost, biochar), or liquid extracts derived from these materials (e.g., compost tea).

##### 5.1.3 Protein hydrolysates

- a) manufactured by chemical hydrolysis;
- b) manufactured by enzymatic hydrolysis; and
- c) manufactured by physical hydrolysis.

##### 5.1.4 Defined substances derived from minerals, plants, animals, microbes, or obtained by synthesis

- a) organic molecules (e.g., amino acids, chitin, chitosan);
- b) minerals not recognized as plant nutrients (e.g., silicon, selenium);
- c) synthetic substances;
- d) microbial metabolites;
- e) plant extracts; and
- f) algal extracts.

## **5.2 Product requirements**

### **5.2.1 Manufacturing process**

**5.2.1.1** The manufacturer shall declare the following minimum requirements related to the manufacturing process of biostimulants to ensure conformity, traceability, and assurance of product quality and safety:

- a) list of raw materials; and
  - a.1) name;
  - a.2) origin/source; and
  - a.3) description of the raw materials.
- b) production procedure.

**5.2.1.2** The product shall be uniform in appearance and shall conform to the declared physical form (e.g., liquid, powder, granule).

### **5.2.2 Product performance**

**5.2.2.1** The efficacy claims of biostimulant products shall be supported by relevant tests or assessments and shall be in conformance with the guidelines for product registration established by the competent authority/ies.

### **5.2.3 Toxicological**

**5.2.3.1** Results of analysis on the potential human health and environmental hazards from the exposure and use of the biostimulant product shall be provided to establish its safe use.

**5.2.3.2** The following toxicological tests may be required whenever applicable, but not limited to:

- a. oral toxicity;
- b. dermal toxicity;
- c. inhalation;
- d. ocular irritation test;
- e. dermal irritation test;
- f. allergy/sensitization test (for non-microbial biostimulants);

- g. Ames test;
- h. toxicity to earthworm; and
- i. toxicity to fish.

## 5.2.4 Environmental safety

**5.2.4.1** The behavior and the persistence of biostimulants in the environment, particularly in soil, water, and air, shall be evaluated when there is any indication of potential risks to human health or the environment. The ability of the biostimulants or their derivatives to survive, proliferate, and persist in the environment over extended periods shall be tested and analyzed.

**5.2.4.2** The residue data of the biostimulant shall be presented, when applicable.

**5.2.4.3** Other scientific studies, evidence, or rationale relevant to determining the safety of biostimulants to the environment may be presented.

## 5.2.5 Contaminants

**5.2.5.1** The levels of heavy metals in biostimulants shall not exceed the Maximum Level (ML) specified in Table 1.

**Table 1.** Maximum Level (ML) of heavy metals in biostimulants

Heavy Metals	Maximum Level (mg/kg)
Arsenic (As)	40 <sup>a</sup> (inorganic arsenic)
Lead (Pb)	100 <sup>a</sup>
Chromium (Cr)	50 <sup>a</sup>
Mercury (Hg)	1 <sup>a</sup>
Cadmium (Cd)	5 <sup>a</sup>
Copper (Cu)	300 <sup>b</sup>
<sup>a</sup> Bureau of Agriculture and Fisheries Standards (BAFS)- Department of Agriculture (DA). (2023). Organic Soil Amendments and Plant Supplements (OSAPS) — Product standard — Specifications. (PNS/BAFS 183:2023). <a href="https://bafs.da.gov.ph/index.php/approved-philippine-national-standards/">https://bafs.da.gov.ph/index.php/approved-philippine-national-standards/</a>	
<sup>b</sup> Bureau of Agriculture and Fisheries Standards (BAFS)- Department of Agriculture (DA). (2023). Organic Bio-Control Agents (OBICA) — Product standard — Specifications. (PNS/BAFS 182:2023). <a href="https://bafs.da.gov.ph/index.php/approved-philippine-national-standards/">https://bafs.da.gov.ph/index.php/approved-philippine-national-standards/</a>	

- 5.2.5.2 The microbiological limits in biostimulants shall not exceed those specified in Table 2.

**Table 2. Microbiological limits in biostimulants**

Microbial contaminants	Maximum Allowable Level
<i>Salmonella</i> spp.	absence in 25 g or 25 mL <sup>a</sup>
<i>Escherichia coli</i>	<10 cfu or MPN in 1 g or 1 mL <sup>a</sup>
<i>Vibrio</i> spp.	absence in 25 g or 25 mL <sup>a</sup>
<i>Shigella</i> spp.	absence in 25 g or 25 mL <sup>a</sup>
<i>Staphylococcus aureus</i>	absence in 25 g or 25 mL <sup>b</sup>
<i>Enterococci</i> spp.	<10 cfu or MPN in 1 g or 1 mL <sup>a</sup>
Yeast and mold count unless the microbial plant biostimulants is a fungus	1000 cfu/g or mL <sup>b</sup>
<p><sup>a</sup>Biological Products Industry Alliance (BPIA). (2022). United States biostimulant industry recommended guidelines to support efficacy, composition, and safety of plant biostimulant products. <a href="https://www.bpia.org/wp-content/uploads/2022/02/Biostimulant-Efficacy-Comp.-and-Safety-Claims-022822.pdf">https://www.bpia.org/wp-content/uploads/2022/02/Biostimulant-Efficacy-Comp.-and-Safety-Claims-022822.pdf</a></p> <p><sup>b</sup>European Union (EU). (2019). Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003. (Regulation (EU) 2019/1009). <a href="https://eur-lex.europa.eu/eli/reg/2019/1009/oj">https://eur-lex.europa.eu/eli/reg/2019/1009/oj</a></p>	

## 5.2.6 Tolerances for quantity

- 5.2.6.1 Laboratory results for each of the declared components shall not be less than 90% of the declared value.
- 5.2.6.2 For microbial-based biostimulants, the actual concentration of the microorganisms shall meet the minimum count as declared on the label and conform to Clause 5.2 Specifications in PNS/BAFS 183:2023 (OSAPS — Product standard — Specifications).

- 5.2.6.3** For non-microbial-based biostimulants products, the following tolerances shall be applied for the declared content of each active material as specified in Table 3.

**Table 3.** Permissible tolerances for declared concentration (FPA-DA, 2019)

<b>Declared concentration in g/kg or g/L</b>	<b>Permissible Tolerance</b>
More than 0 up to 25	±15% relative deviation
More than 25 up to 100	±10% relative deviation
More than 100 up to 250	±6% relative deviation
More than 250 up to 500	±5% relative deviation
More than 500	±25 g/kg or ±25g/L

### **5.3 Organic claim**

- 5.3.1** Biostimulants bearing an organic claim shall comply with relevant organic agriculture standards and certification requirements and shall consider the following:

- 5.3.1.1** Genetically modified organisms (GMO) or any of their derivatives shall not be used in the production and processing of the product as raw materials or ingredients.

- 5.3.1.2** The quality of the product shall be ensured in all parts of the production process. A protocol to monitor the quality of the organic biostimulant should be in place, documented, and shall be in accordance with relevant Code of Practice (COP) for the production of organic biostimulants when available.

## **6 Methods of analysis and sampling**

- 6.1** The methods of analysis and sampling used to test the microbial and non-microbial based biostimulants shall be in accordance with the methods listed in Annex A (Methods of sampling and analyses for microbial and non-microbial based biostimulants).

- 6.2** The methods of analysis and sampling for the microbial inoculants shall be in accordance with the methods listed in Annex B (Methods of analysis and sampling for the microbial inoculants).

**NOTE** For microorganisms and substances, including their methods of analysis, that are not listed in Annex B, shall be subjected to the review and approval of the national competent authority/ies for possible inclusion.

## **7 Packaging**

- 7.1** Packaging shall ensure the integrity of the biostimulant product. It shall protect the biostimulant product from contamination and any physical, microbial, and chemical changes that may occur during transport and storage.
- 7.2** The primary package of the biostimulant shall be specified.
- 7.3** When a secondary package is used to contain the biostimulant, the packaging material should be specified.
- 7.4** The bulk package used for non-microbial biostimulants during transport shall be specified.
- 7.5** Microbial biostimulants shall be packed in clean materials.
- 7.6** Proper disposal of empty biostimulant packaging materials shall be in accordance with the relevant country regulations.

## **8 Labeling**

- 8.1** The following information shall be indicated on the label of the biostimulant product:
- a) name of product;
  - b) physical form;
  - c) category of use;
  - d) formulation/contents of the product;
  - e) identity of microbe, including genus name (for microbial biostimulant only);
  - f) viable spore count and/or vegetative count (for microbial biostimulant only and shall be expressed as the number of active units per volume or weight, or in any other manner that is relevant to the microorganism, e.g., colony forming units per gram [cfu/g], colony forming units per milliliter [cfu/ml]; spores/gram, and spores/mL or /g (for mycorrhizal fungi);
  - g) active material (for non-microbial biostimulant);
  - h) batch/lot number;
  - i) manufacturing date;
  - j) expiry date;

- k) net weight/net content;
- l) name of manufacturer, trader, and/or distributor;
- m) address and contact number of distributors/manufacturers;
- n) safety precautions/warning phrases/pictograms;
- o) directions for use;
- p) storage conditions and disposal;
- q) recommended crop/commodity;
- r) effect claimed for each target plant;
- s) dosage rate;
- t) restrictions (if applicable);
- u) any relevant instructions related to the efficacy of the product, including soil management practices, chemical fertilization, incompatibility with plant protection products, recommended spraying nozzle size, sprayer pressure, and other anti-drift measures; and
- v) product registration number and validity.

**8.2** Label for biostimulant product shall be of such design and material that does not deteriorate easily, become illegible, or get separated from the container under the rigors of transport, storage, and use. It should withstand extreme weather conditions.

**8.3** Colors, font style, size, and other visual information presented on the label of a biostimulant product shall be identifiable and understandable.

**8.4** Whenever a claim that a biostimulant is allowed for use under organic agriculture, the label of organic produce shall contain the name, logo, or seal of the Organic Certifying Body (OCB) and the accreditation number issued by the competent authority. The organic label/mark shall also include the trade name, as defined by pertinent domestic property rights laws, and the address of origin of the produce in accordance with Republic Act 11511 (An Act amending Republic Act No. 10068 or the Organic Agriculture Act of 2010, 2020).

## **9 Recordkeeping, Traceability, and Product Recall**

**9.1** Each biostimulant product shall be traceable to the source/manufacturer. The minimum documentation/records include but are not limited to the following:

- a) production and warehouse site map;
- b) purchases and inventory of biostimulant products and/or raw materials, including their source (for local manufacturers);
- c) production and distribution records;
- d) product disposal;
- e) results of laboratory analyses;
- f) importation records of biostimulant products;
- g) warehousing records;

- h) license/authorization records; and
- i) certification records.

**9.2** Product Recall shall be conducted to ensure the effective identification, notification, retrieval, and disposition. The procedures in Annex C (Process flow chart of product recall) define and describe the action and handling of notices for product recall.

**Annex A**  
(Normative)

**Methods of sampling and analysis for microbial and non-microbial-based biostimulants**

**Table A.1.** Methods of analysis for the specifications used in manufacturing microbial and non-microbial-based biostimulants

<b>Specifications</b>	<b>Method of Analysis</b>
Quantitation of microgram quantities of protein utilizing the principle of protein-dye binding	Bradford protein assay <sup>1</sup>
pH for liquid microbial plant biostimulants/microbial products	Using pH electrodes with a glass membrane <sup>2</sup>
Enterococci in microbial and non-microbial plant biostimulants	Colony-count technique on a selective medium (Slanetz Bartley agar) with confirmation on Bile Esculin Azide agar <sup>3</sup>
Humic and hydrophobic fulvic acids concentrations in fertilizer materials	Extraction <sup>4</sup> Determination of ash content <sup>4</sup> Separation of Hydrophobic Fulvic Acids (HFA) <sup>4</sup> Hydrogen ion exchange <sup>4</sup> Resin regeneration and column preparation <sup>4</sup>
Yeast and mold content	Colony count technique after aerobic incubation at 25°C ± 2,5 °C <sup>5</sup> Horizontal Method <sup>5</sup>
Microorganism concentration	Enumeration using a solid media <sup>6</sup> Enumeration and quantification using a liquid medium <sup>6</sup>

<sup>1</sup>Bradford, M. (1976). A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. *Analytical Biochemistry*, 72 (1-2), 248-254. [https://doi.org/10.1016/0003-2697\(76\)90527-3](https://doi.org/10.1016/0003-2697(76)90527-3)

<sup>2</sup>European Committee for Standardization (CEN). (2024j). Plant biostimulants – Determination of the pH for liquid microbial plant biostimulants/pH in microbial products – Determination of pH. (EN 17721:2024). <https://standards.iteh.ai/catalog/standards/cen/399c594e-040f-45b4-a424-ff558a80e773/en-17721-2024wEgY0q>

<sup>3</sup>European Committee for Standardization (CEN). (2024i). Plant biostimulants - Preparation of sample for microbial analysis. (EN 17708:2024). <https://standards.iteh.ai/catalog/standards/cen/a74a9493-0f33-4ff7-9898-d77b67104fa9/en-17708-2024>

<sup>4</sup>International Organization for Standardization (ISO). (2018). Fertilizers and soil

conditioners — Determination of humic and hydrophobic fulvic acids concentrations in fertilizer materials. (ISO 19822:2018).

<https://www.iso.org/obp/ui/en/#iso:std:iso:19822:ed-1:v1:en>

<sup>5</sup>European Committee for Standardization (CEN). (2024h). Plant biostimulants - Determination of the yeast and mould content. (EN 17707:2024).

<https://standards.iteh.ai/catalog/standards/cen/68013c30-8390-44da-a51b-aaaa3e3f4b8a/en-17707-2024>

<sup>6</sup>European Committee for Standardization (CEN). (2024e). Plant biostimulants - Determination of microorganisms' concentration. (EN 17714:2024).

<https://standards.iteh.ai/catalog/standards/cen/b21e9380-08d9-4bd3-8e47-0578d985df28/en-17714-2024>

**Table A.2** Methods of analysis and sampling for the determination and level of pathogens in microbial and non-microbial-based biostimulants

Pathogens	Methods of Analyses
<i>Escherichia coli</i>	Enrichment in a non-selective liquid medium <sup>1</sup> Isolation on a selective agar medium <sup>1</sup> Colony-count technique at 44°C <sup>1</sup>
<i>Salmonella</i> spp.	Selective enrichment <sup>2</sup> Isolation on chromogenic agar <sup>2</sup> Serological test <sup>2</sup>
<i>Vibrio</i> spp.	Selective enrichment through alkaline saline peptone water (ASPW) <sup>3</sup> Isolation through saline nutrient agar (SNA) <sup>3</sup> Biochemical tests <sup>3</sup> Polymerase chain reaction (PCR) testing <sup>3</sup>

<sup>1</sup>European Committee for Standardization (CEN). (2024d). Plant biostimulants - Determination of *Escherichia coli*. (EN 17716:2024).

<https://standards.iteh.ai/catalog/standards/cen/b8963577-0ab6-43d7-ad55-402d1d31763c/en-17716-2024>

<sup>2</sup>European Committee for Standardization (CEN). (2024a). Plant biostimulants - Detection of *Salmonella* spp. (EN 17717:2024).

<https://standards.iteh.ai/catalog/standards/cen/5913eed2-8d8c-4e00-abef-79a6619f4369/en-17717-2024>

<sup>3</sup>European Committee for Standardization (CEN). (2024b). Plant biostimulants - Detection of *Vibrio* spp. (EN 17711:2024).

<https://standards.iteh.ai/catalog/standards/cen/95df58a2-0a08-4da8-9d22->

[25f3e75385f1/en-17711-2024](https://standards.iteh.ai/catalog/standards/cen/674fd847-929f-494e-a0a4-f111825a7c2a/en-17711-2-2024)

**Table A.3** Methods of analysis for the determination and level of heavy metals

Heavy Metals	Methods of Analyses
Cadmium (Cd), Lead (Pb), Nickel (Ni), Arsenic (As), Chromium (Cr), Copper (Cu), and Zinc (Zn)	Using inductively coupled plasma atomic emission spectrometer <sup>1</sup> Preparation of test and blank solution, and calibration solutions <sup>1</sup>
<sup>1</sup> European Committee for Standardization (CEN). (2024g). Plant biostimulants - Determination of specific elements - Part 2: Determination of total content of Cd, Pb, Ni, As, Cr, Cu and Zn. (EN 17701-2:2024). <a href="https://standards.iteh.ai/catalog/standards/cen/674fd847-929f-494e-a0a4-f111825a7c2a/en-17701-2-2024">https://standards.iteh.ai/catalog/standards/cen/674fd847-929f-494e-a0a4-f111825a7c2a/en-17701-2-2024</a>	

**Annex B**  
(Normative)

**Methods of sampling and analysis for microbial inoculants**

Microbial Inoculant	Methods of Analysis
Mycorrhizal fungi	Spore isolation and counting MTT <sup>1</sup> Clearing and staining root samples and enumeration of vesicles in the stained root samples <sup>1</sup> Endomycorrhiza bioassay <sup>1</sup> Ectomycorrhiza and ericoid count <sup>1</sup>
<i>Rhizobium</i> sp.	Viable plate count and determination of phenotypic characteristics/Glucose-peptone test <sup>2</sup>
<i>Mesorhizobium</i> sp.	
<i>Ensifer</i> sp./ <i>Sinorhizobium</i> sp.	
<i>Bradyrhizobium</i> sp.	
<i>Azotobacter</i> spp.	Visible plate count and determination of phenotypic characteristics <sup>3</sup> Spread-plate counting with Ashby's Sucrose Agar <sup>3</sup>
<i>Azospirillum</i> spp.	Viable plate count and determination of phenotypic characteristics/Plating on nitrogen-free medium and Gram stain <sup>4</sup>
Phosphate solubilizer (Bacteria)	Viable plate count and determination of phenotypic characteristics <sup>5</sup> Quantification of phosphate-solubilizing microbes <sup>5</sup> Plating on Pikovskaya medium and Gram Stain <sup>6</sup>
Phosphate solubilizer (Fungi)-Spore forming	Viable plate count and determination of phenotypic characteristics <sup>5</sup> Quantification of phosphate-solubilizing microbes <sup>5</sup>
Decomposer and Microbial Inoculant ( <i>Trichoderma</i> )	Viable plate count and determination of phenotypic characteristics <sup>5</sup>

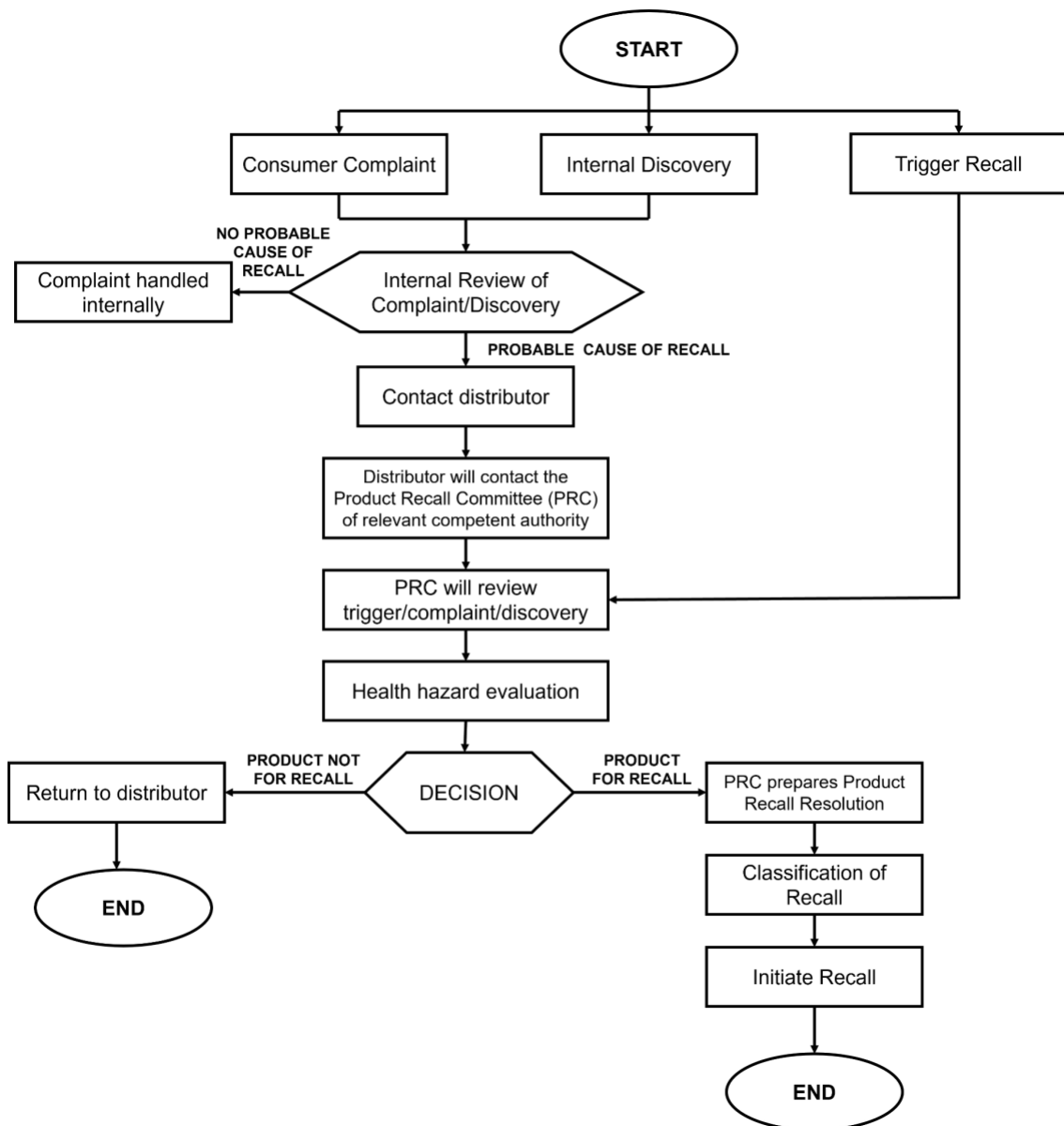
Microbial Inoculant	Methods of Analysis
Vesicular Arbuscular Mycorrhizal (VAM) Fungi	Wet sieving, decanting method and microscopic determination <sup>7</sup>
<p><sup>1</sup>European Committee for Standardization (CEN). (2024f). Plant biostimulants - Determination of mycorrhizal fungi. (EN 17722:2024).  <a href="https://standards.iteh.ai/catalog/standards/cen/27752434-d2c2-4f69-aa7a-819b03966852/en-17722-2024">https://standards.iteh.ai/catalog/standards/cen/27752434-d2c2-4f69-aa7a-819b03966852/en-17722-2024</a></p> <p><sup>2</sup>Olsen, P., Sande, E., &amp; Keyser, H. (1996). The enumeration and identification of rhizobial bacteria in legume inoculant quality control procedures.  <a href="https://www.ctahr.hawaii.edu/bnf/Downloads/Inoculant/Perry%27s%20QC%20Manual.PDF">https://www.ctahr.hawaii.edu/bnf/Downloads/Inoculant/Perry%27s%20QC%20Manual.PDF</a></p> <p><sup>3</sup>European Committee for Standardization (CEN). (2024c). Plant biostimulants - Determination of <i>Azotobacter</i> spp. (EN 17709:2024).  <a href="https://standards.iteh.ai/catalog/standards/cen/743e4567-59b0-474a-965b-5a4216a99abc/en-17709-2024">https://standards.iteh.ai/catalog/standards/cen/743e4567-59b0-474a-965b-5a4216a99abc/en-17709-2024</a></p>	

Annex C

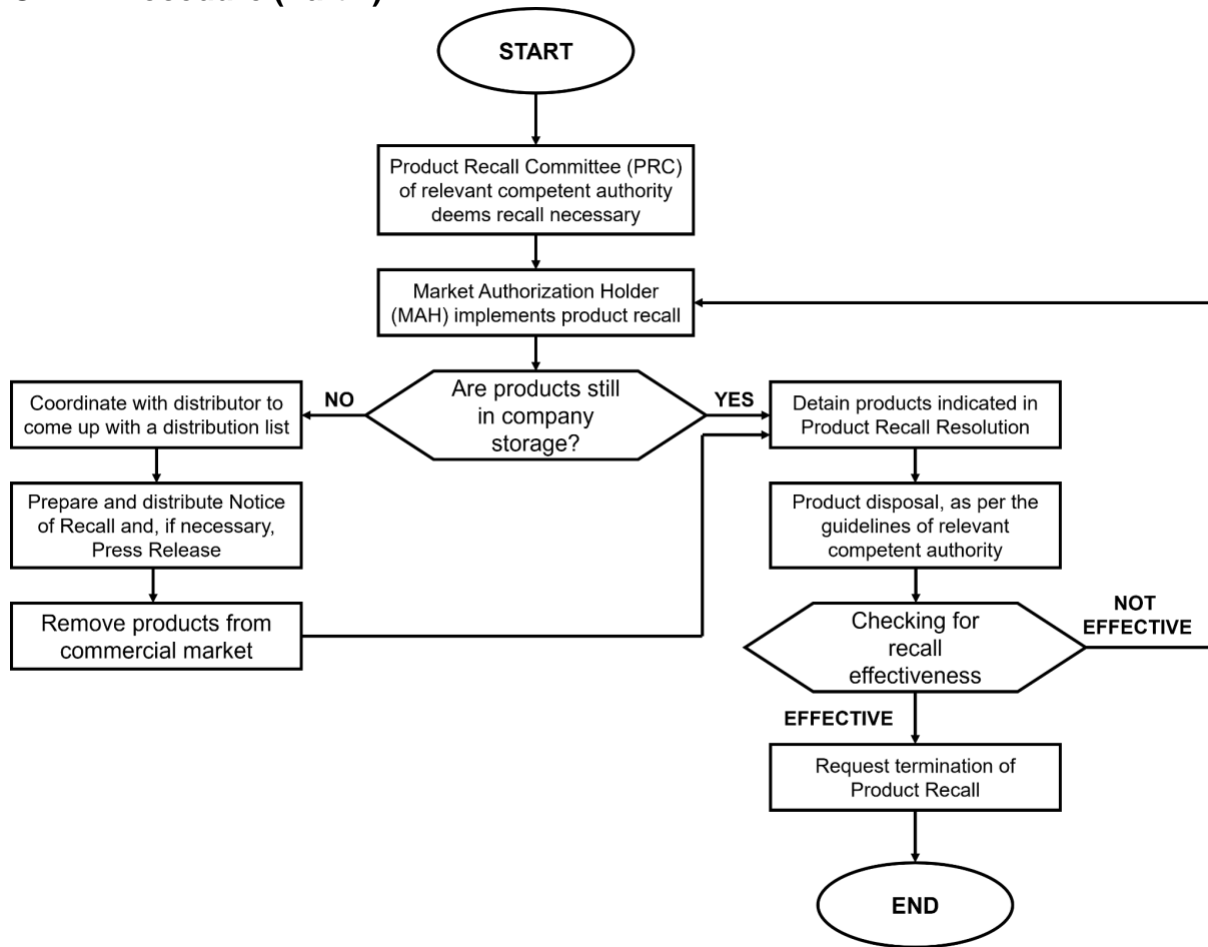
(Informative)

Process flow chart of Product Recall

C.1 Procedure (Part 1)



C.2 Procedure (Part 2)



## References

- An Act Providing for the Development and Promotion of Organic Agriculture in the Philippines and for Other Purposes, Republic Act No. 11511. (2020). [https://lawphil.net/statutes/repacts/ra2020/ra\\_11511\\_2020.html](https://lawphil.net/statutes/repacts/ra2020/ra_11511_2020.html)
- Bertea, C., Mannino, G., Castiglione, A.M., Contartese, V., & Ertani, A. (2021). Microbial biostimulants. <https://encyclopedia.pub/entry/14368>
- Biological Products Industry Alliance (BPIA). (2022). United States biostimulant industry recommended guidelines to support efficacy, composition, and safety of plant biostimulant products. <https://www.bpia.org/wp-content/uploads/2022/02/Biostimulant-Efficacy-Comp.-and-Safety-Claims-022822.pdf>
- Bradford, M. M. (1976). A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. *Analytical Biochemistry*, 72(1–2), 248–254. [https://doi.org/10.1016/0003-2697\(76\)90527-3](https://doi.org/10.1016/0003-2697(76)90527-3)
- Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2023). Organic Bio-Control Agents (OBICA) — Product Standard — Specifications (PNS/BAFS 182:2023). <https://bafs.da.gov.ph/index.php/approved-philippine-national-standards/>
- Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2023). Organic Soil Amendments and Plant Supplements (OSAPS) — Product standard — Specifications (PNS/BAFS 183:2023). <https://bafs.da.gov.ph/index.php/approved-philippine-national-standards/>
- Bureau of Agriculture and Fisheries Standards (BAFS)-Department of Agriculture (DA). (2024). Comparative evaluation of guidelines and regulations on biostimulants among the European Union, United States, India, and the Philippines. [Unpublished].
- Deolu-Ajayi, A. O., van der Meer, I. M., van der Werf, A., & Karlova, R. (2022). The power of seaweeds as plant biostimulants to boost crop production under abiotic stress. *Plant, Cell & Environment*, 45(9), 2537-2553. <https://doi.org/10.1111/pce.14391>
- Du Jardin, P. (2015). Plant biostimulants: Definition, concept, main categories, and regulation. *Science Horticulturae*, 196, 3-14. <https://doi.org/10.1016/j.scienta.2015.09.021>
- European Committee for Standardization (CEN). (2024a). Plant biostimulants – Detection of *Salmonella* spp. (EN 17717:2024). <https://standards.iteh.ai/catalog/standards/cen/5913eed2-8d8c-4e00-abef-79a6619f4369/en-17717-2024>

- European Committee for Standardization (CEN). (2024b). Plant biostimulants – Detection of *Vibrio* spp. (EN 17711:2024).  
<https://standards.iteh.ai/catalog/standards/cen/95df58a2-0a08-4da8-9d22-25f3e75385f1/en-17711-2024>
- European Committee for Standardization (CEN). (2024c). Plant biostimulants – Determination of *Azotobacter* spp. (EN 17709:2024).  
<https://standards.iteh.ai/catalog/standards/cen/743e4567-59b0-474a-965b-5a4216a99abc/en-17709-2024>
- European Committee for Standardization (CEN). (2024d). Plant biostimulants – Determination of *Escherichia coli*. (EN 17716:2024).  
<https://standards.iteh.ai/catalog/standards/cen/b8963577-0ab6-43d7-ad55-402d1d31763c/en-17716-2024>
- European Committee for Standardization (CEN). (2024e). Plant biostimulants – Determination of microorganisms' concentration. (EN 17714:2024).  
<https://standards.iteh.ai/catalog/standards/cen/b21e9380-08d9-4bd3-8e47-0578d985df28/en-17714-2024>
- European Committee for Standardization (CEN). (2024f). Plant biostimulants – Determination of mycorrhizal fungi. (EN 17722:2024).  
<https://standards.iteh.ai/catalog/standards/cen/27752434-d2c2-4f69-aa7a-819b03966852/en-17722-2024>(<https://standards.iteh.ai/catalog/standards/cen/27752434-d2c2-4f69-aa7a-819b03966852/en-17722-2024>)
- European Committee for Standardization (CEN). (2024g). Plant biostimulants – Determination of specific elements – Part 2: Determination of total content of Cd, Pb, Ni, As, Cr, Cu and Zn. (EN 17701-2:2024).  
<https://standards.iteh.ai/catalog/standards/cen/674fd847-929f-494e-a0a4-f111825a7c2a/en-17701-2-2024>
- European Committee for Standardization (CEN). (2024h). Plant biostimulants – Determination of the yeast and mould content. (EN 17707:2024).  
<https://standards.iteh.ai/catalog/standards/cen/68013c30-8390-44da-a51b-aaaa3e3f4b8a/en-17707-2024>
- European Committee for Standardization (CEN). (2024i). Plant biostimulants – Preparation of sample for microbial analysis. (EN 17708:2024).  
<https://standards.iteh.ai/catalog/standards/cen/a74a9493-0f33-4ff7-9898-d77b67104fa9/en-17708-2024>
- European Committee for Standardization (CEN). (2024j). Plant biostimulants – Determination of the pH for liquid microbial plant biostimulants/pH in microbial products – Determination of pH. (EN 17721:2024).

<https://standards.iteh.ai/catalog/standards/cen/399c594e-040f-45b4-a424-ff558a80e773/en-17721-2024wEgY0g>

European Union (EU). (2019). Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003. (Regulation (EU) 2019/1009). <https://eur-lex.europa.eu/eli/reg/2019/1009/oj>

Fertilizer and Pesticide Authority (FPA). (2019). Fertilizer regulatory policies and implementing guidelines (2nd ed.). [https://fpa.da.gov.ph/fpa-blue-book/#flipbook-df\\_5035/19/](https://fpa.da.gov.ph/fpa-blue-book/#flipbook-df_5035/19/)

Food and Agriculture Organization (FAO). (2010). World Programme for the Census of Agriculture (WCA) 2010. 142–146. [https://www.fao.org/fileadmin/templates/ess/documents/world\\_census\\_of\\_agriculture/appendix3\\_r7.pdf](https://www.fao.org/fileadmin/templates/ess/documents/world_census_of_agriculture/appendix3_r7.pdf)

Gitau, M. M., Farkas, A., Ördög, V., & Maróti, G. (2022). Evaluation of the biostimulant effects of two Chlorophyta microalgae on tomato (*Solanum lycopersicum*). *Journal of Cleaner Production*, 364, 132689. <https://doi.org/10.1016/j.jclepro.2022.132689>

Ho, T. T. K., Tra, V. T., Le, T. H., Nguyen, N., Tran, C., Nguyen, P., Vo, T., Thai, V., & Bui, X. (2022). Compost to improve sustainable soil cultivation and crop productivity. *Case Studies in Chemical and Environmental Engineering*, 6. <https://doi.org/10.1016/j.cscee.2022.100211>

ICL Group. (2024). Understanding non-microbial biostimulants use in turf management. <https://icl-growingsolutions.com/en-gb/turf-landscape/knowledge-hub/what-are-non-microbial-plant-biostimulants/#:~:text=Non%2Dmicrobial%20biostimulants%2C%20as%20implied%20by%20the%20name%2C,acids%2C%20humic%20substances%2C%20seaweed%20extracts%20and%20surfactants.>

IMARC Group. (2025). Japan chitosan market report by grade (industrial grade, food grade, pharmaceutical grade), source (shrimp, crab, squid, krill, and others), application (water treatment, food and beverages, cosmetics, medical and pharmaceuticals, agrochemicals, and others), and region 2025-2033. <https://www.imarcgroup.com/japan-chitosan-market>

Indian Ministry of Agriculture & Farmers Welfare. (2021). Notification No. S.O. 882(E) dated 23 February 2021 — Inclusion of biostimulants under the fertiliser (inorganic, organic or mixed) control order, 1985. (S.O. 882(E) 23-02-2021). <https://www.wealthywaste.com/wp-content/uploads/2021/04/S.O.-882-E.-23022021-biostimulant.pdf>

- International Organization for Standardization (ISO). (2018). Fertilizers and soil conditioners — Determination of humic and hydrophobic fulvic acids concentrations in fertilizer materials. (ISO 19822:2018).  
<https://www.iso.org/obp/ui/en/#iso:std:iso:19822:ed-1:v1:en>
- Malécange, M., Sergheraert, R., Teulat, B., Mounier, E., Lothier, J., & Sakr, S. (2023). Biostimulant properties of protein hydrolysates: recent advances and future challenges. *International journal of molecular sciences*, 24(11).  
<https://doi.org/10.3390/ijms24119714>
- Nogueira, J. C., Jefferson, Veronica, C., Callou, E., Silva, Ferraz, R., Luiz, Silva, Freire, R., Dias, T. J., & Genival Barros Júnior. (2025). Freshwater algae biostimulant in mitigating impacts of saline irrigation on onions. *Plants*, 14(10), 1559. <https://doi.org/10.3390/plants14101559>
- Olsen, P., Sande, E., & Keyser, H. (1996). The enumeration and identification of rhizobial bacteria in legume inoculant quality control procedures.  
<https://www.ctahr.hawaii.edu/bnf/Downloads/Inoculant/Perry%27s%20QC%20Manual.PDF>
- Organic Agriculture Act of 2010, Republic Act (RA) No. 10068. (2010).  
[https://lawphil.net/statutes/repacts/ra2010/ra\\_10068\\_2010.html](https://lawphil.net/statutes/repacts/ra2010/ra_10068_2010.html)
- Organisation for Economic Co-operation and Development (OECD). (2020). Test no. 471: Bacterial reverse mutation test.  
[https://www.oecd.org/content/dam/oecd/en/publications/reports/2020/06/test-no-471-bacterial-reverse-mutation-test\\_g1gh295b/9789264071247-en.pdf](https://www.oecd.org/content/dam/oecd/en/publications/reports/2020/06/test-no-471-bacterial-reverse-mutation-test_g1gh295b/9789264071247-en.pdf)
- Tuhy L., Chojnacka K., Michalak I., & Witek-Krowiak, A. (2015). Algal extracts as a carrier of Micronutrients – Utilitarian properties of new formulations. 465-488.  
<https://doi.org/10.1002/9783527679577.ch28>

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