

PHILIPPINE NATIONAL STANDARD

PNS/BAFS 40:2016

ORGANIC SOIL AMENDMENTS



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Foreword

The Philippine National Standard (PNS) for Organic Fertilizer was established and adopted in 2008 with substantial inputs from the Fertilizer and Pesticide Authority and advice from the Technical Working Group (TWG) created through Special Order 565 Series of 2004. It was revised in 2013 to reflect the results of the studies and advances related to organic fertilizers, compost / soil conditioner, microbial inoculants, and organic plant supplements.

In 2015, a call for the revision of the PNS/BAFPS 40:2013 was made in order to account for recent scientific and technological data from local and international studies on the specifications for organic fertilizer and compost / soil conditioner. During the course of the revision, the TWG considered changing the title of the PNS/BAFPS 40:2013 from “Organic Fertilizer” to “Organic Soil Amendments”. Technically, soil amendments are defined as materials which improve the physical condition of the soil. However, for the purpose of this Standard, soil amendments encompass all the products within the scope of the Standard, i.e. organic fertilizers, compost / soil conditioner, microbial inoculants, and organic plant supplements. Thus, the revised PNS/BAFPS 40:2013 adopted the title PNS/BAFS 40:2016 Organic Soil Amendments.

This Standard cancels and replaces PNS/BAFPS 40:2013.

1 Scope

This Standard applies to organic fertilizers, compost / soil conditioner, microbial inoculants, and organic plant supplements.

2 References

The titles of the standard publications referred to in this Standard are listed on the inside back cover.

3 Definition of terms

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

3.1 batch

organic fertilizer / compost / soil conditioner that is produced from the same type of organic materials, at the same time and location, by the same manufacturer/producer, or made during the same cycle or period of manufacture.

3.2 label

display of the written, printed, or graphic information on the immediate container of any product. Information on the label provides the sellers and the buyers with the safe and effective use of the product for which it is registered.

Label must 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.

3.3 organic soil amendment

includes all the products within the scope of the Standard, i.e. organic fertilizers, compost/soil conditioner, microbial inoculants, and organic plant supplements.

3.4 pathogens

organisms (microorganisms and infective parasites) that can cause negative effects on human health.

3.5 raw materials

naturally occurring materials used in the production of organic soil amendments. Raw materials that were mined or naturally extracted should comply with the Department of Environment and Natural Resources (DENR) regulations. The list of permitted raw materials for the production of organic soil amendments are listed in Annex A.

3.6 synthetic

substance that is formulated or manufactured by a chemical process or by a process that chemically changes a substance extracted from naturally occurring plant, animal, or mineral sources, except for those substances created by naturally occurring biological processes.

4 Product description

4.1 Organic Fertilizer - any product in solid or liquid form, of plant (except by-products from petroleum industries) or animal origin, that has undergone substantial

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decomposition that can supply available nutrients to plants with a total Nitrogen (N), Phosphorus (P_2O_5), and Potassium (K_2O) of five to ten percent (5-10%). This may be enriched by microbial inoculants and naturally occurring minerals but no chemical or inorganic fertilizer material has been used in the production or added to the finished product to affect the nutrient content.

4.2 Compost / Soil Conditioner - any product in solid or liquid form, of plant (except by-products from petroleum industries) or animal origin, that has undergone substantial decomposition that can supply available nutrients to plants with a total Nitrogen (N), Phosphorus (P_2O_5), and Potassium (K_2O) of 2.5 to less than five percent (2.5-5%). This may be enriched by microbial inoculants and naturally occurring minerals but no chemical or inorganic fertilizer material has been used in the production or added to the finished product to affect the nutrient content. Compost and soil conditioner are used interchangeably in this Standard.

4.3 Microbial Inoculant - biologically active products containing optimum population of one or a combination of active strains of bacteria, actinomycetes, algae, and fungi that are useful in different biological activities, such as, but not limited to: N-fixation, decomposition of organic residues, and enhancement of nutrient availability.

4.4 Organic Plant Supplement - any compound of organic origin in liquid or solid form which in low concentration promotes or modifies physiological processes in plants. Total N- P_2O_5 - K_2O is not lower than 0.5% and not more than 5% (0.5-<5%) and may contain beneficial microorganisms and micronutrients. These plant supplements include, but are not limited to: FPJ (Fermented Plant Juice), FFJ (Fermented Fruit Juice), FAA (Fish Amino Acid), FE (Fish Emulsion), Seaweed Extracts, Vermi Tea, Compost Tea, and the like.

5 Minimum requirements

Table 1 - Specifications for solid organic fertilizer and compost / soil conditioner

Properties	Organic Fertilizer	Compost/Soil Conditioner
Total N- P_2O_5 - K_2O	5-10%	2.5-<5%
C:N	10:1 – 20:1	10:1 – 20:1
Organic Matter	≥ 20%	≥ 20%
Actual Moisture Content ^a	10-35%	10-35%
Color	brown to black	brown to black
Consistency	friable	friable
Odor	no foul odor	no foul odor

^a For pelletized fertilizer, moisture content should be ≤10%.

Table 2 - Specifications for liquid organic fertilizer

Properties	Organic Fertilizer
Total N- P_2O_5 - K_2O	5-10%

5.1 For organic plant food supplement products such as humin, seaweed extract, fermented products, blood meal, and bone meal, any claim should be verifiable, while products with at least 3% total (soluble) N will be subjected to other confirmatory test.

Table 3 - Minimum requirements for organic plant supplements

Main ingredient	Total N- P ₂ O ₅ - K ₂ O	Other Requirements
Animal origin (bone meal, blood meal)	5-10%	Products that contain high concentrations of nitrogen should also include P ₂ O ₅ and K ₂ O.
Fish Amino Acid (FAA), Fish Emulsion (FE)	0.5-<5%	All claims for contents of macro and micronutrients, microorganisms, and plant growth hormones should be verifiable. Heavy metal content should be within allowable levels as stated in Table 5.4 of this PNS.
Plant based [Fermented Plant Juice (FPJ), Fermented Fruit Juice (FFJ)]	0.5-<5%	
Seaweed extracts	0.5-<5%	
Vermi-tea, compost tea	0.5-<5%	
Humic and humic acids	0.5-<5%	
Wood vinegar	0.5-2.5%	
Biochar	0.5-2.5%	

5.2 For the minimum requirements of microbial inoculants, refer to Annex B.

5.3 For solid and liquid organic fertilizers, compost / soil conditioner, and organic plant supplements containing microbial inoculants, the Genus should be verifiable and be stated in the label.

Table 4 - Allowable level of pathogens for solid and liquid organic fertilizers, compost / soil conditioner, and organic plant supplements

Pathogens	Allowable Level
Fecal <i>Streptococci</i>	<5 x 10 ² cfu/g
Total coliforms	<5 x 10 ² cfu/g
<i>Salmonella</i>	Absent in 25 g

Table 5 - Maximum allowable level of heavy metals for solid and liquid organic fertilizers, compost / soil conditioner, and organic plant supplements

Heavy Metals	Maximum Allowable Level (mg/kg dry wt.) (PPM dry wt.)
Arsenic (As)	20
Lead (Pb)	50
Chromium (Cr)	150
Mercury (Hg)	2
Cadmium (Cd)	5

5.4 Absence of foreign materials

Plastics, aluminum, wrappers, stones, and other materials must be totally removed from the product.

6 Sampling methods

6.1 Sampling for laboratory analysis

All finished products should be subjected to lot sampling for laboratory analysis using the following procedure:

6.1.1 For composite sampling of solid products:

6.1.1.1 Present to the inspector the production documents containing the number of bags per batch number and bag number.

6.1.1.2 The inspector will randomly select the bag number.

6.1.1.3 The selected bags will be emptied into a clean area. All contents of the selected bags (maximum of 5 bags) will be thoroughly mixed.

6.1.1.4 Submit five kilograms (5 kg) of the composite sample to the laboratory.

6.1.1.5 Information relative to the sample taken must be accurate and complete to allow traceability of the sample back to the lot from which it was sampled.

Table 6 - Required number of samples for solid products

Number of bags ^a per batch	Bags to be sampled
≤50	2
51 to 100	3
101 to 300	8
301 to 500	15
501 to 1000	20
More than 1000	Multiples of 20

^a 1 bag = 50 kg

NOTE: If the samples analyzed do not conform to the standards, the inspecting Certifying Body (CB) should review the production process which may include bulk sampling.

6.1.2 For composite sampling of liquid products:

6.1.2.1 Present to the inspector the production documents containing the number of containers per batch number and container number.

6.1.2.2 The inspector will randomly select the container number and subject the selected containers for analysis.

6.1.2.3 Information relative to the sample taken must be accurate and complete to allow traceability of the sample back to the lot from which it was sampled.

Table 7- Required number of samples for liquid products

Number of containers ^a per batch	Containers to be sampled
≤50	1
51 to 100	2
101 to 300	3
301 to 500	4
More than 500	5

^a 1 container should be at least 1 L

6.2 Laboratory Sampling (Sample preparation for laboratory analysis)

6.2.1 For samples with uniform fineness

Place sample on a clean piece of paper and mix thoroughly. Reduce sample to a quantity sufficient for analysis by quartering. Mix and store in air-tight container.

6.2.2 For organic liquid fertilizers

For liquid fertilizers without suspended particles, stir the sample until it is thoroughly mixed before taking a sample.

For liquid fertilizers with suspended particles, take a sample while mixing the material in order to obtain a representative sample.

7 Labeling

7.1 For the sample layout for labeling of bottles and cartons, refer to Figure 1.

<p>TRADE NAME DESCRIPTIVE STATEMENT</p> <hr/> <p>ART WORK</p> <hr/> <p>Registered by the Bureau of Agriculture and Fisheries Standards Pursuant to RA 10068 BAFS Registration No. _____ Valid until: <u>(month and year)</u></p> <p>Net Content: _____</p> <p>ORGANIC MARK LOGO OF OCB Accreditation No. of OCB</p>	<p>Storage & Disposal</p> <p>Prohibition</p> <p>Warranty</p>	<p>DIRECTION FOR USE</p> <table border="1"> <thead> <tr> <th>Crops</th> <th>Rate (Optional)</th> <th>Frequency of application (based on growth stage)</th> <th>Time of application</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>WARNING/PRECAUTIONS:</p> <p>KEEP OUT OF REACH OF CHILDREN</p>	Crops	Rate (Optional)	Frequency of application (based on growth stage)	Time of application																	<p>Product Information *Raw materials used</p> <p>Nutrient Content Nitrogen (N) %: ____ Phosphorous (P₂O₅) %: ____ Potassium (K₂O) %: ____</p> <p>Product Description and type:</p> <p>*Claims *Compatibility with Bio-pesticides</p> <p>Lot/Batch No. _____ Expiry Date: _____</p> <p>NAME OF MANUFACTURER/ DISTRIBUTOR & ADDRESS Contact Number:</p>
Crops	Rate (Optional)	Frequency of application (based on growth stage)	Time of application																				

Figure 1 - Sample 4-panel layout for labeling bottles and cartons

7.2 For the sample layout for labeling of bags and sachets, refer to Figure 2.

<p><u>BRAND NAME</u> (with logo)</p> <p>Artwork</p> <p>Nutrient Content:</p> <p>Nitrogen (N) %: _____</p> <p>Phosphorous (P₂O₅) %: _____</p> <p>Potassium (K₂O) %: _____</p> <p>C:N Ratio: _____</p> <p>Moisture Content: _____</p> <p>Trace and secondary nutrients (ppm for each nutrient, if any)</p> <p>*Claims *Compatibility with Bio-pesticides</p> <p style="text-align: center;">Name and Address of Local Manufacturer/Importer/Distributor</p> <p>BAFS (Category of Product) Registration No. _____</p> <p>Valid until: <u>(month and year)</u></p>	<p>ORGANIC MARK</p> <p>Logo of OCB</p> <p>Accreditation No. of OCB</p> <p>DIRECTION FOR USE</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 15%;">Crops</th> <th style="width: 15%;">Rate (Optional)</th> <th style="width: 40%;">Frequency of application (based on growth stage)</th> <th style="width: 30%;">Time of application</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>WARNING/PRECAUTIONS:</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px auto; width: 80%;"> <p>KEEP OUT OF REACH OF CHILDREN</p> </div> <p>Batch number: Lot number/code: Date of manufacture or importation (if applicable):</p>	Crops	Rate (Optional)	Frequency of application (based on growth stage)	Time of application												
Crops	Rate (Optional)	Frequency of application (based on growth stage)	Time of application														

Figure 2 - Sample layout for labeling bags and sachets

Annex A
List of Permitted Raw Materials for the Production of Organic Soil Amendments

Table A.1 – Permitted raw materials for the production of organic soil amendments

Substances Description, Compositional Requirements	Remarks
i. Plant and Animal Origin	
Animal manure (including dried), slurry, urine, compost	The use of factory farm manure is only permitted if it undergoes full decomposition (e.g. composting/fermentation) and needs recognition from the competent authority. However, the use of pig and poultry (raised in battery cages) manure shall be subjected to the competent authority's regulation.
Guano	Rate of extraction is subject to DENR regulations
Blood meal, bone, and other meal brought in from other sources and without preservatives	Preferably origin of materials should be disease-free
Hoof and horn meal, feather meal, wool, fur, hair, dairy products	
Fish and fish products	Without synthetic additives
Biodegradable processing by-products, plant or animal origin, e.g. by-products of food, feed, oilseed, brewery, distillery, or textile processing	By-products should not come from GM sources (Not treated with synthetic additives) Without synthetic additives and residues
Crop residues / by-products (from oil, palm, coconut and cocoa (including empty fruit bunch, coir, husks), palm oil mill effluent (pome), cocoa peat, empty cocoa pods, straw, peanut hulls, sugar cane trash, straw, mud press, etc.)	
Green manure / leguminous crops	
Azolla	
Wood, bark, sawdust, wood shavings, wood ash, wood charcoal	Should not be treated by synthetic chemical
Calcium lignosulfate	Recognized by the competent authority
Seaweed and seaweed products and by-products, algae	Subject to BFAR regulations
Peat	Should not be extracted or treated using inorganic chemicals; permitted for seed, potting module composts.
Plant preparations and extracts	
Compost made from ingredients listed in	

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Substances Description, Compositional Requirements	Remarks
this appendix, spent mushroom waste, humus from worms and insects and vermiculture substrate	
Kitchen waste	
Segregated biodegradable market waste	Has undergone proper segregation, and does not contain hazardous materials
Naturally occurring biological organisms e.g. worms	
ii. Mineral Origin	
Basic slag	Recognized by the competent authority
Calcareous and magnesium amendments	Recognized by the competent authority
Limestone (dolomite, calcite), marl, chalk, lime	Recognized by the competent authority
Calcium chloride	
Chloride of lime	Only from natural sources/origin
Gypsum (calcium sulphate)	Only from natural sources/origin
Magnesium rock, kieserite and Epsom salt (magnesium sulfate)	Only from natural sources/origin
Rock potash, mined potassium salts (e.g. kainite, sylvinite)	Less than 60% chlorine
Patenkali (sulphate of potash)	Obtained by physical procedures but not enriched by chemical processes to increase its solution
Sulfur	Allowed if from natural source
Rock phosphate	Cadmium should not exceed 90mg/kg P ₂ O ₅ May contain elevated levels of trace elements. Detailed chemical analysis is necessary. Their widespread extraction can also deplete the natural deposits and may cause negative environmental impact. Rate of extraction is subject to DENR regulations.
Pulverized rock, stone meal	May contain elevated levels of trace elements. Detailed chemical analysis is necessary. Their widespread extraction can also deplete the natural deposits and may cause negative environmental impact. Rate of extraction is subject to DENR regulations.
Clay (e.g. bentonite, perlite, vermiculite, zeolite)	

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Substances Description, Compositional Requirements	Remarks
Sodium chloride	Only mined salt
Trace elements (e.g. boron, copper, iron, manganese, molybdenum, zinc)	
Stillage and stillage extract	Ammonium stillage excluded
Aluminum calcium phosphate	Cadmium should not exceed 90mg/kg P ₂ O ₅
iii. Microbiological	
Biodegradable processing by-products of microbial origin, e.g. by-products of brewery or distillery processing	
Microbial preparations (i.e. <i>Trichoderma</i> , <i>Rhizobia</i> , <i>Mychorrizae</i> , others) of non-GMO origin	
iv. others	
Biodynamic and Agnihotra preparations	

Annex B
Minimum Requirements for Microbial Inoculants

For multistrain inoculants or inoculants containing a consortium of microorganisms, claims should be verifiable.

Table B.1 - Minimum requirements for *Rhizobia*

Base	Solid or Liquid
Viable Cell Count Solid Liquid	Minimum 10 ⁸ cfu/g Minimum 10 ⁸ cfu/ml
Contaminants	No contaminants at 10 ⁻⁵ dilution
pH	6.0-7.5
Particle size (solid inoculants)	All materials should pass through a sieve mesh no. 80 (0.177 mm opening size)
Moisture content by weight (solid inoculants)	30-40%
Distinguishing characteristic(s)	Should show effective nodulation on all legume species listed in the packet using plant infection technique under genotobiotic condition
NOTE: Claims on odor – removal on odor should be verifiable	

Table B.2 - Minimum requirements for *Azospirillum*

Base	Solid
Viable Cell Count	Minimum 10 ⁸ cfu/g
Contaminants	No contaminants at 10 ⁻⁵ dilution
pH	6.0-7.5
Particle size	All materials should pass through a sieve mesh no. 80 (0.177 mm opening size)
Moisture content by weight	30-40%
Distinguishing characteristic(s)	Formation of white pellicle in semi-solid nitrogen-free media

Table B.3 - Minimum requirements for Phosphate Solubilizer (Bacteria)

Base	Solid
Viable Cell Count	Minimum 10 ⁸ cfu/g
Contaminants	No contaminants at 10 ⁻⁵ dilution
pH	6.0-7.5
Particle size	All materials should pass through a sieve mesh no. 80 (0.177 mm opening size)
Moisture content by weight	30-40%
Distinguishing characteristic(s)	Minimum 5 mm solubilization zone in prescribed media

Table B.4 - Minimum requirements for Phosphate Solubilizer (Fungi)

Base	Solid
Spore Count	Minimum 10^5 cfu/g
Contaminants	No contaminants at 10^{-5} dilution
pH	4.5-6.0
Particle size	1.1 mm
Moisture content by weight	30-40%
Distinguishing characteristic(s)	Minimum 5 mm solubilization zone in prescribed media

Table B.5 - Minimum requirements for Endophytic Bacteria

Base	Solid
Viable Cell Count	Minimum 10^6 cfu/g
Contaminants	No contaminants at 10^{-5} dilution
pH	6.0-7.0
Particle size	0.1 to 0.8 microns
Moisture content by weight	30-40%

Table B.6 - Minimum requirements for Decomposer and Microbial Inoculant (*Trichoderma*)

Base	Solid
Viable Spore Count	Minimum 10^8 cfu of <i>Trichoderma</i> /g
Contaminants	No contaminants at 10^{-5} dilution
pH	5.0-6.5
Particle size	98% of materials should pass through a 2 mm diameter sieve
Moisture content by weight	10-15%

Table B.7 - Minimum requirements for Mycorrhizae (VAM)

Base	Solid
Most probable number (MPN)	
Solid inoculant	10 spores/g
Root inoculant	2,300 Infective Propagules (IP)/g
Contamination level	Nematode-free
pH	4.5-5.5
Particle size	0.13-1.1 mm
Moisture content by weight	Minimum 10%

Table B.8 - Minimum requirements for Ectomycorrhizae

Base	Solid (Tablet/Powder)
Spore Count	Minimum 10^8 cfu/g

Table B.9 - Minimum requirements for *Azotobacter*

Base	Solid
Viable Cell Count	Minimum 10^8 cfu/g
Contaminants	No contaminants at 10^{-5} dilution
pH	6.0-7.0
Particle size	95% of materials should pass through a 2 mm diameter sieve
Moisture content by weight	25-30%
Distinguishing characteristic(s)	Watery colonies on Burks medium

References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASEAN Standard for Organic Agriculture.

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