
Organic fertilizer — Specification



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Introduction

Organic fertilizers are natural products used to provide plant nutrients. There are a number of organic fertilizers like farmyard manure, green manures, compost prepared from crop residues and other farm wastes, vermicompost, oil cakes, biological wastes—animal bones, slaughter house refuse and natural mineral deposits that include but not limited to phosphate rock, greensand, Epsom salt, calcium, limestone flour. The organic fertilizer standard has been revised to improve on the definitions, classifications, specifications, packaging and labelling.

This standard has been prepared to promote safe use of organic fertilizers, promote fair trade practices and ensure safety of consumers.

Draft African Standard for comments only — Not to be cited as African Standard

Organic fertilizer — Specification

1 Scope

This African Standard specifies the requirements, sampling and test methods of organic fertilizers.

2 Normative 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.

AOAC 2006.03, *Arsenic, cadmium, cobalt, chromium, lead, molybdenum, nickel, and selenium in fertilizers — Microwave digestion and inductively coupled plasma-optical emission spectrometry*

EN 13475, *Liming materials — Determination of calcium content — Oxalate method*

EN 16032, *Fertilizers — Extraction and determination of elemental sulfur*

EN 16197, *Fertilizers — Determination of magnesium by atomic absorption spectrometry*

EN 16198, *Fertilizers — Determination of magnesium by complexometry*

EN 16963, *Fertilizers — Determination of boron, cobalt, copper, iron, manganese, molybdenum and zinc using ICP-AES*

EN 16965, *Fertilizers — Determination of cobalt, copper, iron, manganese and zinc using flame atomic absorption spectrometry (FAAS)*

ISO 6579, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Salmonella spp.*

ISO 6598, *Fertilizers — Determination of phosphorus content — Quinoline phosphomolybdate gravimetric method*

ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

ISO 7409, *Fertilizers — Marking — Presentation and declarations*

ISO 8157, *Fertilizers and soil conditioners — Vocabulary*

ISO 8397, *Solid fertilizers and soil conditioners — Test sieving*

ISO 10390, *Soil quality — Determination of pH*

ISO 10694, *Soil quality — Determination of organic and total carbon after dry combustion (elementary analysis)*

ISO 11047, *Soil quality — Determination of cadmium, chromium, cobalt, copper, lead, manganese, nickel and zinc — Flame and electrothermal atomic absorption spectrometric methods*

ISO 11261, *Soil quality — Determination of total nitrogen — Modified Kjeldahl method*

ISO 11265, *Soil quality — Determination of the specific electrical conductivity*

ISO 11465, *Soil quality — Determination of dry matter and water content on a mass basis — Gravimetric method*

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ISO 14820-1, *Fertilizers and liming materials — Sampling and sample preparation — Part 1: Sampling*

ISO 14820-2, *Fertilizers and liming materials — Sampling and sample preparation — Part 2: Sample preparation*

ISO 15178, *Soil quality — Determination of total sulfur by dry combustion*

ISO 17318, *Fertilizers and soil conditioners — Determination of arsenic, cadmium, chromium, lead and mercury contents*

ISO 17184, *Soil quality — Determination of carbon and nitrogen by near-infrared spectrometry (NIRS)*

3 Terms and definitions

For the purpose of this standard, the terms and definitions in and the following apply.

3.1

biosolids

organic material from sewage and related materials recycled and treated for use as a fertilizer

3.2

blood meal

dried, powdered blood collected from livestock slaughter houses used as fertilizer.

3.3

bone meal

fertilizer made from degreased bone which may be degelatinized and has been ground or crushed

3.4

compost

well decomposed organic wastes like plant residues, animal slurry from livestock sheds

3.5

cottonseed meal

milled cotton seeds used as a fertilizer

3.6

farmyard manure

a decomposed mixture of livestock dung and urine with straws and litter used as bedding material and residues from the fodder fed to livestock

3.7

fertilizer

substance containing one or more recognized plant nutrient(s), which is used for its plant nutrient content and which is designed for use or claimed to have value in promoting plant growth

3.8

fish emulsion fertilizer

a partially decomposed blend of finely pulverized fish

3.9

green manure

crop that is incorporated into the soil for the purpose of soil improvement and which may include spontaneous crops, plants or weeds

3.10

guano

well decomposed accumulated and mined excrements of birds, bats and seals valued as fertilizers

3.11**manure**

mixture of litter and/or dung in process of biological change

3.12**natural mineral fertilizer**

Materials that are directly mined from mineral deposits and only subjected to physical processes such as crushing and drying. Examples of these materials may include: phosphate rock; gypsum; sulphate of potassium-magnesia and any other natural mineral deposits.

3.13**night soil**

human urine and faeces collected separately from each other or mixed with flush water and amendments such as soil, ash other organic matter

3.14**organic based product**

product that contains at least 70% organic material

3.15**organic fertilizer**

material containing carbon or one or more elements other than hydrogen and oxygen, mainly of plant and/or animal origin added either directly to the plant or to the soil, specifically, for the nutrition of plants and that may improve soil structure

3.16**organic matter**

biomass of animals and plants. For this reason, only products that are solely derived from organic matter may be identified or described as "organic".

3.17**soil conditioner**

material (could be inorganic or organic) added to soils to improve the physical and/ or chemical properties, and/ or the biological activity of soils without a declarable content of nutrients

3.18**sewage sludge**

recycled product of sewage treatment plants

3.19**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.

3.20**vermicompost**

product or process of composting using various worms such as earthworms to create a heterogenous mixture of decomposing vegetable or food waste, bedding materials

4 Requirements**4.1 Product description****4.1.1 Organic Fertilizer**

Any product in solid or liquid form, of plant (except byproducts 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 five to ten percent (5-10%). This may be enriched by microbial inoculants and naturally occurring minerals but no chemical or inorganic

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fertilizer material has been used in the production or added to the finished product to affect the nutrient content.

4.1.2 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.

4.1.3 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_2 -fixation, decomposition of organic residues, and enhancement of nutrient availability.

4.1.4 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.

4.2 General requirements

4.2. organic fertilizer shall be dark in colour.

4.2.2 organic fertilizer shall be free from foul smell.

4.2.3 Organic fertilizer shall be homogenous in texture.

4.2.4 The organic fertilizer shall be free from contaminants which include but not limited to residual hormones, antibiotics, pesticides and disease organism.

4.2.5 A high-temperature aerobic composting shall be employed to make the compost.

4.3 Fresh/ or raw manures

4.3.1 All fresh manures should be composted. However, where they are used the following conditions shall apply:

4.3.1.1 Fresh manures shall not be used as preplant or side dress fertilizers on vegetables that are eaten raw.

4.3.1.2 Dog, cat or pig manures and those derived from equines (donkey and horse family) shall not be used as these species share many parasites with humans.

4.3.1.3 Raw manure may NOT be applied to food crops within 120 days of harvest where edible portions have soil contact.

4.3.1.4 Raw manure may NOT be applied to food crops within 90 days of harvest where edible portions do not have soil contact (i.e., grain crops, and most tree fruits.)

4.3.2 The manures shall be free from heavy metals and other chemical contaminants.

4.3.3 Untreated human wastes shall not be used as manure

4.4 Composted manures

A standard organic fertilizer shall be based on composted livestock and/or plant materials supplemented with only natural products.

4.5 Specific requirements

4.5.1 Organic fertilizers shall conform to the composition requirements set out in Table 1.

Table 1: specific requirements for organic fertilizers

| Parameter | Limit | Method of test |
|---|-----------|---------------------|
| pH | 6.5 – 7.5 | ISO 10390 |
| Carbon: Nitrogen ratio, | ≤ 20:1 | ISO 17184 |
| Moisture content, %, m/m | 10-35 | ISO 11465 |
| Temperature, °C | 20-30 | Method needed |
| Humus, %, m/m | 6-8 % | Method needed |
| Total Nitrogen, %, m/m, min. | >1 | ISO 11261 |
| Organic matter content (solid), %, m/m, min. | ≥70 | Method needed |
| Organic carbon, %, m/m, min. | 12 | ISO 10694 |
| Total primary nutrients — N-P ₂ O ₅ -K ₂ O (solid and liquid organic fertilizer),%, m/m, min | 5 | ISO 11261, ISO 6598 |
| Stones >5 mm, %, m/m, max. | 5 | ISO 8397 |
| Foreign matter > 2 mm, % m/m, max | 0.5 | ISO 8397 |
| Seed, number/kg, max | 5 | Method needed |
| Soluble salts (conductivity), mmhos, max. | 5 | ISO 11265 |

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

4.5.2 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.

4.5.4 For microbial inoculants, please refer to Annex B.

Table 2 — 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. |
| 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% | |
| Humin and humic acids | 0.5-<5% | |
| Wood vinegar | 0.5-2.5% | |
| Biochar | 0.5-2.5% | |

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4.5.5 Absence of foreign materials

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

4.6 Minimum percentage for guarantee

Secondary plant nutrients must not be identified and guaranteed if they are not present in at least the following minimum concentrations:

Table 3: Minimum nutrient percentage guarantee

| S/No. | Element | Limit | Method of test |
|-------|---------------------------------|-----------|---------------------|
| i | Calcium, as Ca, %, m/m, maximum | ≥1.0000 | EN 13475 |
| ii | Magnesium (%) | ≥0.5000 | EN 16197/ EN 16198 |
| iii | Sulphur (%) | ≥1.0000 | ISO 15178/ EN 16032 |
| iv | Boron mg/kg | 20-140 | EN 16963/ EN 16965 |
| v | Cobalt (mg/kg) | 0.5-1.0 | ISO 11047 |
| vi | Copper (mg/kg) | 8-300 | ISO 11047 |
| vii | Iron (mg/kg) | 1000-2500 | EN 16963/ EN 16965 |
| viii | Manganese (mg/kg) | 200-800 | ISO 11047 |
| ix | Molybdenum (mg/kg) | 0.5-1.0 | AOAC 2006.03 |
| x | Zinc (mg/kg) | 40-1000 | ISO 11047 |

4.7 Heavy metal contaminants

Metal contaminants if present shall conform to the following limits.

Table 4 — Heavy metal contaminant limits for solid and liquid organic fertilizers, compost / soil conditioner, and organic plant supplements

| S/N | Properties | Allowable maximum level (mg/kg, dry weight) | Test method |
|-----|---------------|---|-------------|
| i | Arsenic (As) | 10 | ISO 17318 |
| ii | Lead (Pb) | 30 | ISO 17318 |
| iii | Chromium (Cr) | 50 | ISO 17318 |
| iv | Nickel (Ni) | 50 | ISO 11047 |
| v | Mercury (Hg) | 2 | ISO 17318 |
| vi | Cadmium (Cd) | 5 | ISO 17318 |

4.8 Hygiene

The fertilizer shall be free from pathogenic organisms. Where applicable, the product shall also comply with microbiological limits in the following table:

Table 5 — Microbiological limits for organic fertilizers

| Microorganisms | Allowable level | Method of test |
|---------------------|---------------------------|--------------------|
| <i>E. coli</i> | 1000 cfu/g | ISO 7251 |
| Salmonella spp | Absent in 25 g fresh mass | ISO 6579 |
| Faecal streptococci | <500 cfu/g | Test method needed |
| Total coliforms | Nil | Test method needed |

5 Sampling

5.1 Sampling for laboratory analysis

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

For composite sampling of solid products:

- (1) Present to the inspector the production documents containing the number of bags per batch number and bag number.
- (2) The inspector will randomly select the bag number.
- (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.
- (4) Submit five kilograms (5 kg) of the composite sample to the laboratory.
- (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.

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.

Table 6 — Required Number of Samples for Solid Products

| Number of bags* 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 |
| * NOTE 1 bag = 50 kg | |

For composite sampling of liquid products:

- (1) Present to the inspector the production documents containing the number of containers per batch number and container number.
- (2) The inspector will randomly select the container number and subject the selected containers for analysis.

- (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* per batch | Containers to be sampled |
|---------------------------------|--------------------------|
| ≤ 50 | 1 |
| 51 to 100 | 2 |
| 101 to 300 | 3 |
| 301 to 500 | 4 |
| More than 500 | 5 |

*NOTE: 1 container should be at least 1 L

5.2 Laboratory sampling (sample preparation for laboratory analysis)

(a) 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.

(b) 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.

6 Tests

6.1 Methods of test

Samples of the fertilizer shall be prepared in accordance with Clause 5 and tested in accordance with the methods of test indicated in Clause 4.

6.2 Inspection

From the bulk samples, inspect the lot for the characteristics relating to the packing and marking of the product.

7 Compliance

The lot shall be deemed to comply with the standard if after inspection and testing it complies with the requirements of this standard.

8 Packaging and labelling

8.1 Packaging

The fertiliser shall be packed in clean, non-defective and strong containers. The material for which the container is made shall be such as to protect the contents from moisture and also not lead to easy rupture during handling, transportation and storage.

8.2 Labelling

8.2.1 Each container of the fertiliser shall bear a label in indelible marking in accordance with ISO 7409, the Globally Harmonized System (GHS) and with the following particulars:

- (i) Nutrient content(NKP)
- (ii) Carbon/Nitrogen ratio
- (iii) Organic matter content
- (iv) Moisture content
- (v) Batch number
- (vi) Percentage foreign matter (gravel, plastic etc.)
- (vii) Name of the manufacturer/packer/importer
- (viii) Date of manufacture
- (ix) Best before date
- (x) Instructions for use
- (xi) Precautions /warnings

NOTE Sample designs for labels are provided in Annex C.

8.2.2 Bulk containers

Where the fertilizer is distributed in bulk, the marking information shall accompany the delivery notice to the purchaser.

8.3 Other labelling guidelines

- a) **Testimonials/endorsements:** The public has no way of evaluating the status of the endorser in relation to a product. For this reason, testimonials and endorsements will be viewed as claims and evaluated accordingly.
- b) **Other claims:** Any reference to the activity of a product containing plant nutrients that is not generally associated with its nutritional value must be substantiated with statistically significant efficacy data derived from field trials.
- c) **Nutrient guarantees:** Any product represented as a source of plant nutrients must carry a guaranteed analysis.
- d) **Directions for use:** All specialty fertilizers must carry instructions for use. These instructions must specify both the rate and frequency of application. Suggested rates of application must provide an adequate quantity of nutrients to the plants concerned.
- e) Where the product does not contain all 3 major plant nutrients, the label should carry a statement indicating that some plants may require an additional source of the nutrient(s) that are lacking.
- f) Any product containing composted materials or plant nutrients may represent a potential hazard when misused. In order to avoid giving the impression that reasonable precautions are unnecessary, blanket statements suggesting that the product is completely safe and non-toxic to humans, animals or the environment must not appear on the label.

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- g) **Miscellaneous terms:** Words, such as balanced and healthy, should be avoided as they are often misunderstood and consequently misleading. Also objectionable are comparatives such as best, superior, and greener, as they imply a comparison without indicating the basis of this comparison
- h) **Environmentally beneficial:** Any product represented as "environmentally sound", etc. must identify the rationale for the claim and list all ingredients in order to allow the consumer to determine the validity of the statement.
- i) **Slowly available plant nutrients:** Only products providing at least 70% of a plant nutrient in a slowly available form may indicate this on the label. Such a claim must be accompanied by the associated guarantee.
- j) **Low leaching potential:** Only products containing at least 70% of a nutrient in a slowly available form may indicate that nutrient will be slowly available and thus unlikely to leach when used in accordance with label instructions.
- k) **Improving soil structure:** In order to suggest that the use of an organic or organic based product will improve the structure of a soil, it must be recommended for use at rates that could be expected to significantly increase the organic matter level of the soil. Such as 1kg per square metre or 10 metric tonnes per hectare
- l) Any fertilizer shall only be labelled as organic if it conforms to this standard.

9 Certificate of analysis

A certificate of analysis stating the minimum percentage levels of plant nutrient elements shall accompany every lot or consignment of the fertilizer.

10 Material safety

Each container must be accompanied by a Material Safety Data Sheet (MSDS) and Technical Data Sheet (TDS).

Annex A
(informative)

Substances that may be used as fertilizers or soil conditioners

| Substance | Description; Compositional requirements; Conditions of use |
|---|--|
| Plant and animal origin | |
| Farmyard and poultry manure | <p>Products comprising a mixture of animal excrements and vegetable matter (animal bedding).</p> <p>Indication of animal species.</p> <p>Coming from extensive farming, but if sourced from intensive farming or not sourced from organic production systems, need recognition by the approved certifying organisation and shall be composted.</p> |
| Slurry or urine (not from human origin) | <p>If not from organic farming sources, need recognition by the approved certifying organisation.</p> <p>Use after controlled fermentation and/or appropriate dilution.</p> <p>Factory farming sources not permitted.</p> <p>Indication of animal species.</p> |
| Composted animal excrements, including poultry manure | <p>Need recognition by the approved certifying organisation.</p> <p>Indication of animal species.</p> |
| Dried farmyard manure and dehydrated poultry manure | <p>Need recognition by the approved certifying organisation.</p> <p>Indication of animal species.</p> <p>Coming from extensive farming, but if from intensive farming sources it must be composted.</p> |
| Guano | Need recognition by the approved certifying organisation. |
| Straw | Need recognition by the approved certifying organisation. |
| Composts from spent mushroom and dejecta of worms and insects (vermiculture substrates) | The initial composition limited to products on this list. |
| Composted or fermented organic household refuse | <p>Organic vegetable and animal waste separated from household waste, which has been subjected to composting or anaerobic fermentation for biogas production.</p> <p>Need recognition by the approved certifying organisation.</p> <p>Maximum concentrations in mg/kg of dry matter: Cadmium: 0.7; Copper: 70; Nickel: 25; Lead: 45; Zinc: 200; Mercury: 0.4; Chromium (total): 70; Chromium (VI): 0(*).</p> <p>(*) = limit of determination.</p> |
| Composted or fermented plant residues | <p>Need recognition by the approved certifying organisation.</p> <p>Mixtures of plant matter which has been subjected to composting or anaerobic fermentation for biogas production.</p> |
| Products and by-products of | Need recognition by the approved certifying organisation. |

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| Substance | Description; Compositional requirements; Conditions of use |
|--|--|
| animal origin from slaughterhouses & fish industries: — blood meal — hoof meal — horn meal — bone meal or degelatinized bone meal — fish meal — meat meal — feather, hair and "chiquette" meal — wool — fur — hair — dairy products | — — — Heavy metal contamination monitoring necessary — — maximum concentration in mg/kg of dry matter of Chromium (VI):0 (*) (*) = limit of determination — — |
| By-products of food & textile industries | Not treated with synthetic additives. Need recognition by the approved certifying organisation. |
| Seaweeds and seaweeds products | Need recognition by the approved certifying organisation. Directly obtained by — physical processes; extraction with water or acid and/or alkaline solution; and fermentation. |
| Sawdust, bark and wood waste | From wood not chemically treated after felling. |
| Wood ash | From wood not chemically treated after felling. |
| 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 | |
| <i>Azolla</i> (mosquito fern, duckweed fern, fairy moss, water fern) | |
| Plant preparations and extracts | |
| Segregated biodegradable market waste | |
| Calcium lignosulfate | Recognized by the competent authority |
| Naturally occurring biological organisms e.g. worms | |
| Peat | Should not be extracted or treated using inorganic chemicals; |

| Substance | Description; Compositional requirements; Conditions of use |
|---|---|
| | permitted for seed, potting module composts. |
| By-products of industries processing ingredients from organic agriculture | Need recognition by the approved certifying organisation. |
| Night soil-faeces and material containing faecal matter | Subjected to either of the following treatments: composting, incineration/drying, anaerobic digestion and ammonia treatment |
| Sewage Sludge | Subjected to anaerobic digestion/fermentation, composting or long time treatments |
| Human urine | Proper storage (based on the action of ammonia in combination with temperature. |
| Stillage and stillage extract | Ammonium stillage excluded. |
| ii. Mineral origin | |
| Natural phosphate rock | Need recognition by the approved certifying organisation. 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 regulations. |
| Basic slag | Need recognition by the approved certifying organisation. |
| Rock potash, mined potassium salts (e.g. kainite, sylvinite) | Need recognition by the approved certifying organisation. |
| 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 |
| Sulphate of potash | Obtained by physical procedures but not enriched by chemical processes to increase its solution |
| Sulfur | Allowed if from natural source |
| 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 regulations. |
| Clay (e.g. bentonite, perlite, vermiculite, zeolite) | |
| Sodium chloride | Only mined salt |
| Trace elements (e.g. boron, | |

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| Substance | Description; Compositional requirements; Conditions of use |
|--|---|
| 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 | |

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Annex B
(normative)

Minimum requirements for microbial inoculants

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*

| B | 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)

| B | 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 |

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

Annex C
(informative)

Sample label designs

| <p align="center">TRADE NAME DESCRIPTIVE STATEMENT</p> <hr/> <p align="center">ART WORK</p> <hr/> <p>Registration No. _____ Valid until: <u>(month and year)</u></p> <p>Net Content: _____</p> <p align="center">ORGANIC MARK LOGO OF CB Accreditation No. of CB</p> | <p>Storage & Disposal</p> <p>Prohibition</p> <p>Warranty</p> | <p align="center">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 align="center">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 align="center">NAME OF MANUFACTURER/ DISTRIBUTOR & ADDRESS Contact Number:</p> |
|---|--|---|---------------------|-----------------|--|---------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Crops | Rate (Optional) | Frequency of application (based on growth stage) | Time of application | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |

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

| <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</p> <p>*Compatibility with Bio-pesticides</p> <p style="text-align: center;">Name and Address of Local Manufacturer/Importer/Distributor</p> <p>Category of Product Registration No. _____</p> <p>Valid until: <u>(month and year)</u></p> | <p>ORGANIC MARK</p> <p>Logo of CB</p> <p>Accreditation No. of CB</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: fit-content;"> <p>KEEP OUT OF REACH OF CHILDREN</p> </div> <p>Batch number:</p> <p>Lot number/code:</p> <p>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 C.2 — Sample layout for labeling bags and sachets

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