



# **Green Label Product**

## **Fertilizers**

### **(TGL-31-02)**

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## TGL–31-02

### Fertilizers

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#### 1. Background

Agricultural sector has been playing an important role in Thailand's economy for a long period of time. Consequently, agricultural commodities are vital for various industries as well as domestic consumption and international export. Thus, ensuring high agricultural productivity had been one of the most important tasks of the state, henceforth arable land and fertilization are considered as two primary factors toward that tasks. At the present, high quality fertilizers are required to increase productivity since arable lands have been consistently deteriorated due to urbanization, economic growth, and industrial development. However, the growing demand for chemical fertilizer had increased fertilizer import especially ammonium sulphate and urea fertilizers, which may lead to trade deficit. Moreover, intensive chemical fertilization may damage soil structure and ecosystem if applied improperly.

Therefore, the Green Label Criteria for Fertilizers were developed in order to encourage the application of better-quality organic fertilizers and biofertilizers for higher productivity which may decrease the demand for chemical fertilizers, as well as to preserve ecosystem and soil for cultivation.

#### 2. Scope

These criteria shall apply to organic fertilizers and biofertilizers but exclude night soils and bio-fermented juice<sup>1</sup>.

#### 3. Definitions

- 3.1 **Fertilizer** refers to organic or inorganic materials derived from natural or synthetic origin, intended to supply essential nutrients for plants through various methods, or to adjust chemical properties of soil for plant fertility.
- 3.2 **Organic fertilizer** refers to a fertilizer derived from organic materials including manure and compost, but excluding chemical fertilizers and biofertilizers.
- 3.3 **Chemical fertilizer** refers to a fertilizer derived from inorganic or synthetic organic materials.
- 3.4 **Biofertilizer** refers to a fertilizer derived from living microorganisms intended to improve soil enrichment regarding its biological, physical and bio-chemical functions. This term also covers effective microorganisms.

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<sup>1</sup> Bio-fermented juice refers to a liquid solution produced from fermentation of plants or animals by a variety of production processes.

#### 4. General requirements

- 4.1 The products shall be in accordance with Fertilizer Act B.E. 2518 and its amendment.
- 4.2 Manufacturing process and transportation shall comply with national laws and regulations.

#### 5. Environmental requirements

The products shall meet requirements as described in Table 1.

**Table 1** Requirements for organic fertilizers and biofertilizers and test methods

No	Parameter	Criteria	Test method
<b>5.1 Organic fertilizers</b>			
<b>5.1.1 Compost specifications</b>			
1)	Organic materials	≥ 35% by weight	BS EN 13039, Walkley and Black, or equivalent standards
2)	Carbon to Nitrogen ratio	≤ 20 : 1	BS 7755-3.8 (ISO 10694)
3)	Electrical conductivity	≤ 3.5 dS/m	BS EN 13038, or equivalent standards
4)	pH	5.5-8.5	AOAC 973.04, BS EN 13037, or equivalent standards
5)	Primary nutrients: - total nitrogen (N) - total phosphorus (as P <sub>2</sub> O <sub>5</sub> ) - total potassium (as K <sub>2</sub> O)	≥ 1.0-0.5-0.5 by weight	AOAC 955.04, AOAC 993.31, AOAC 983.02, or equivalent standards
6)	Moisture content and evaporable substance	≤ 35% by weight	AOAC 950.01, BS EN 13040, or equivalent standards
7)	Particle size distribution measured by sieve analysis	10 x10 mm	CATM 01, or equivalent standards
8)	Unwanted materials, e.g. stone, gravel, sand, plastic waste	≤ 3% by weight	CATM 01, or visual inspection
9)	Dangerous materials, e.g. glass debris, sharp particles and other metal parts	Not found	CATM 01, or visual inspection
10)	Heavy metals - Cadmium - Lead - Mercury	≤ 5 mg/kg ≤ 500 mg/kg ≤ 2 mg/kg	USEPA 3050B, or equivalent standards
<b>5.1.2 Manure specifications</b>			
1)	Heavy metals - Cadmium - Lead - Mercury	≤ 5 mg/kg ≤ 500 mg/kg ≤ 2 mg/kg	USEPA 3050B, or equivalent standards
2)	Pathogenic microorganisms	Not detected	Dilution method, declaration letter
3)	Electrical conductivity	≤ 3.5 dS/m	BS EN 13038, or equivalent standards
4)	Primary nutrients:	≥ 1.0-0.5-0.5 by	AOAC 955.04,

No	Parameter	Criteria	Test method
	- total nitrogen (N) - total phosphorus (as P <sub>2</sub> O <sub>5</sub> ) - total potassium (as K <sub>2</sub> O)	weight	AOAC 993.31, AOAC 983.02, or equivalent standards
5)	Organic materials	≥ 35% by weight	BS EN 13039, Walkley and Black, or equivalent standards
6)	Moisture and evaporable substance	≤ 35% by weight	AOAC 950.01, BS EN 13040, or equivalent standards
<b>5.2 Biofertilizers</b>			
<b>5.2.1 Specifications for blue-green algae biofertilizer</b>			
1)	Contain blue-green algae capable of fixing nitrogen	-	Visual inspection
2)	Specify species of blue-green algae contained in the product	-	Visual inspection, declaration letter
3)	Specify a number of blue-green algae	≥ 10 <sup>5</sup> cells/g product (dry basis)	Visual inspection, declaration letter
4)	Specify type of carrier	-	Visual inspection
5)	Moisture content	≤ 20%	AOAC 950.01, BS EN 13040, or equivalent standards
6)	Granularity	Diameter not less than 2 mm	CATM 01, or equivalent standards
7)	Heavy metals - Cadmium - Lead - Mercury	≤ 5 mg/kg ≤ 500 mg/kg ≤ 2 mg/kg	USEPA 3050B, or equivalent standards
8)	Pathogenic microorganisms	Not detected	Dilution method, declaration letter
9)	Contained in 2-layer sack having inner plastic-coated layer, tightly sealed, moisture-proof and printed with expiration date on the container	-	Visual inspection
<b>5.2.2 Specifications for Rhizobium biofertilizer</b>			
<b>5.2.2.1 Rhizobium biofertilizer in powder form (Unsterilized carrier)</b>			
1)	Specify species of Rhizobium .....	Specify type of legumes having root nodules formed by Rhizobium	Visual inspection
2)	Specify a number of Rhizobium	≥ 10 <sup>7</sup> cells/g product (dry basis)	Visual inspection, declaration letter
3)	Contain carrier	pass through a 80-mesh sieve	CATM 01, or equivalent standards
4)	pH	6.5-7.0	AOAC 973.04, BS EN 13037, or equivalent standards
5)	Moisture content	40-50% by weight	AOAC 950.01, BS EN 13040, or equivalent standards
6)	Contained in moisture-proof container with ventilation ability	-	Visual inspection
7)	Heavy metals		

No	Parameter	Criteria	Test method
	- Cadmium - Lead - Mercury	$\leq 5$ mg/kg $\leq 500$ mg/kg $\leq 2$ mg/kg	USEPA 3050B, or equivalent standards
8)	Pathogenic microorganisms	Not detected	Dilution method, declaration letter
<b>5.2.2.2</b>	<b>Rhizobium biofertilizer in powder form (Sterilized carrier)</b>		
1)	Specify species of Rhizobium .....	Specify type of legumes having root nodules formed by Rhizobium	Visual inspection
2)	Specify a number of Rhizobium	$\geq 10^7$ cells/g product (dry basis)	Visual inspection, declaration letter
3)	Contain carrier	pass through a 80-mesh sieve	CATM 01, or equivalent standards
4)	pH	6.5-7.0	AOAC 973.04, BS EN 13037, or equivalent standards
5)	Moisture content	40-50% by weight	AOAC 950.01, BS EN 13040, or equivalent standards
6)	Contained in moisture-proof container with ventilation ability	-	Visual inspection
7)	Heavy metals - Cadmium - Lead - Mercury	$\leq 5$ mg/kg $\leq 500$ mg/kg $\leq 2$ mg/kg	USEPA 3050B, or equivalent standards
8)	Pathogenic microorganisms	Not detected	Dilution method, declaration letter
<b>5.2.2.3</b>	<b>Rhizobium biofertilizer in liquid form</b>		
1)	Specify species of Rhizobium .....	Specify type of legumes having root nodules formed by Rhizobium	Visual inspection
2)	Specify a number of Rhizobium	$\geq 10^7$ cells/ml	Visual inspection, declaration letter
3)	Contained in a non-damaged container	-	Visual inspection
4)	Heavy metals - Cadmium - Lead - Mercury	$\leq 5$ mg/kg $\leq 500$ mg/kg $\leq 2$ mg/kg	USEPA 3050B, or equivalent standards
5)	Pathogenic microorganisms	Not detected	Dilution method, declaration letter
<b>5.2.3</b>	<b>Specifications for mycorrhizal biofertilizer</b>		
1)	Specify a product title contained mycorrhizal fungi	-	Visual inspection
2)	Specify species of mycorrhizal fungi	-	Visual inspection
3)	Specify plant species to be applied with the product	-	Visual inspection
4)	Specify a number of mycorrhizal fungi	$\geq 25\%$ spores/ g product	Visual inspection, declaration letter
5)	Specify type of carrier	-	Visual inspection
6)	Moisture content	$\leq 20\%$ by weight	AOAC 950.01,

No	Parameter	Criteria	Test method
			BS EN 13040, or equivalent standards
7)	- Particle size in powder form - Particle size in granular form	- $\geq 60$ -mesh sieve - Diameter 2-6 mm	CATM 01, or equivalent standards
8)	pH	5.5-9.0	AOAC 973.04, BS EN 13037, or equivalent standards
9)	Heavy metals - Cadmium - Lead - Mercury	$\leq 5$ mg/kg $\leq 500$ mg/kg $\leq 2$ mg/kg	USEPA 3050B, or equivalent standards
10)	Pathogenic microorganisms	Not detected	Dilution method, declaration letter
<b>5.2.4</b>	<b>Specifications for phosphate-solubilizing bacteria biofertilizer</b>		
1)	Contain phosphate-solubilizing bacteria	-	Visual inspection , declaration letter
2)	Specify species of phosphate-solubilizing bacteria	-	Visual inspection , declaration letter
3)	Specify a number of spores or living microorganisms	$\geq 10^7$ cells/g product (dry basis) or ml product	Visual inspection , declaration letter
4)	Specify type of carrier	-	Visual inspection
5)	Moisture content (for granular or powder fertilizers)	$\leq 20\%$ by weight	AOAC 950.01, BS EN 13040, or equivalent standards
6)	Heavy metals - Cadmium - Lead - Mercury	$\leq 5$ mg/kg $\leq 500$ mg/kg $\leq 2$ mg/kg	USEPA 3050B, or equivalent standards
7)	Pathogenic microorganisms	Not detected	Dilution method, declaration letter

Notes: AOAC = Official Methods of Analysis of AOAC International  
BSI = British Standard Institution

## 6. Testing and certification

The tests shall be performed in laboratories as follows;

- 1) Laboratories under governmental agencies or state enterprises or
- 2) Laboratories under private companies or educational institutions accredited to the Thai Industrial Standard on General Requirements for the Competence of Testing and Calibration Laboratories, TIS 17025 (ISO/IEC 17025)
- 3) Analysis of pathogenic microorganisms is available at Division of Plant Pathology Research, Department of Agriculture.
- 4) In the case where visual inspection is required, a declaration letter shall be submitted and signed by authorized personnel of the manufacturer.

Test reports used to apply for the Green Label shall not exceed 6-month duration following the application date.