THAI AGRICULTURAL STANDARD

TAS 9503 – 2005

COMPOST

National Bureau of Agricultural Commodity and Food Standards

Ministry of Agriculture and Cooperatives

ICS 65.080 **ISBN 947-403-339**

UNOFFICIAL TRANSLATION

THAI AGRICULTURAL STANDARD

TAS 9503 – 2005

COMPOST

National Bureau of Agricultural Commodity and Food Standards

Ministry of Agriculture and Cooperatives

50 Phaholyothin Road, Ladyao, Chatuchak, Bangkok 10900

Telephone (662) 561 2277 www.acfs.go.th

Published in the Royal Gazette Vol.122 Section 114D,

dated 8 December B.E. 2548 (2005)

Ad hoc Sub-Committee on the Elaboration of Standard for Agricultural Input

1. Director of the Office of Science for Land Development,
   Chairperson Land Development Department
   Mr. Narong Chinnabutra

2. Representative of the Land Development Department
   Ms. Sieng-jaew Piriyaparon
   Ms. Jutharat Kumnuongkij (alternate)

3. Representative of the Department of Agriculture
   Mr. Somsak Khortpong
   Mr. Somboon Prapapannapong (alternate)
   Mr. Sompong Muenjaeng (alternate)

4. Representative of the Department of Agricultural Extension
   Mr. Raywat Rittaporn
   Mr. Somkid Pothipan (alternate)
   Mrs. Janjira Soonthornpat (alternate)

5. Representative of the Cooperative Promotion Department
   Mr. Suwit Luangyot-luechakul

6. Representative of the Faculty of Agriculture, Kasetsart University
   Asst. Prof. Chai-rerk Suwannarat

7. Representative of the Office of Commodity and System Standard,
   the National Bureau of Agricultural Commodity and Food Standards
   Ms. Methanee Sukhontharak
   Mr. Pisan Pongsapitch (alternate)

8. Representative of the Office of Commodity and System Standard Accreditation,
   the National Bureau of Agricultural Commodity and Food Standards
   Mr. Sanayh Kraokaw
   Mrs. Paowana Assawaprapa (alternate)
   Mrs. Penlawan Suwandit (alternate)

9. Representative of the National Science and Technology Research Institute
   Mr. Suriya Sassanarakkit

10. Representative of the Soil and Fertilizers Association of Thailand
    Mr. Prasart Ketsawapitak

11. Experts
    Mr. Somkiat Kham-iam
    Mr. Chob Kanalerk
    Mr. Sakkasem Soonthornpat
    Prof. Nantakorn Boonkerd
    Mr. Chaisupat Santadwoot

12. Representatives of the National Bureau of Agricultural Commodity and Food Standards
    Ms. Tassanee Pradyabumrung — Secretary
    Ms. Chutima Sornsamrarn — Assistant Secretary

Compost is a type of organic fertilizer which are basically made from plant and animal materials and widely known namely compost, manure, green manure, bio-fertilizer and bio-organic fertilizer. Organic fertilizer is an important agricultural input for Thai agriculture in order to improve the quality of poor soil and to continuously maintain soil fertility. The National Bureau of Agricultural Commodity and Food Standards, Ministry of Agriculture and Cooperatives has set a standard for compost in order to ensure that compost produced in Thailand meet the standard and safe for all concerned parties throughout the food chain.

The establishment of this standard is based on the information of the following documents:

Land Development Department. B.E. 2547 (2004). Land Development Department Regulations on the Use of Product Standard Certification for Agricultural Production Inputs 2004 (Volume 1). Bangkok. 68 p.

Land Development Department. B.E. 2545 (2002). Government Official Manual; Soil Improvement with Organic Matters. Bangkok 192 p.

Ministry of Industry. B.E. 2527 (1984). Industrial Product Standard; Fertilizer. (IPS 75-1984). Bangkok. 10 p.

Notification of the Committee for Labelling No. 14. B.E. 2545 2003. Declaring Bio-fertilisers as a label-controlled commodity. Published in the Royal Gazette No. 120, special part 111d, dated September 25, 2003.

Ministry of Agriculture and Cooperatives. B.E. 2526 (2003). Standards for Organic Fertilizers and Bio-fertilizers.

Meunchang, S., Panichsakpatana, S. and Weaver, R.W 2005. Co-composing of filter cake and bagasse; by-products from a sugar-mill. Bioresource Technology. 96: 437 – 442.

Wei, Y.S., Fan, Y.B., Wang, M.J. and Wang, J.S. 2002. Composting and compost application in China. Resources, Conservative and Recycling. 30: 277 – 330.

Wong, J.W.C., Mak, K.F., Chan, N.W., Lam, A., Fang, M., Zhou, L.X., Wu, Q.T., and Liao, X.D. 2001. Co-composting of soybean residues and leaves in Hong Kong. Bioresource Technology. 76: 99 – 106.

Zucconi, F., Forte, M., Monac, A., and Beritodi, M. 1981. biological evaluation of compost maturity. Biocycle. 22: 27 – 29.

Remark:

The standard title has been revised from “Thai Agricultural Commodity and Food Standard (TACFS)” to “Thai Agricultural Standard (TAS)” in accordance with the enforcement of the Agricultural Standards Act B.E. 2551 (2008)

NOTIFICATION OF THE NATIONAL COMMITTEE ON AGRICULTURAL COMMODITY AND FOOD STANDARDS
SUBJECT: THAI AGRICULTURAL COMMODITY AND FOOD STANDARD: COMPOST
B.E. 2548 (2005)

The resolution of the 2/2548 session of the National Committee on Agricultural Commodity and Food Standards dated 29 August B.E.2548 (2005) endorsed the Thai Agriculture Commodity and Food Standard entitled Compost. This standard would be of benefits for quality improvement, facilitating trade and protecting consumers.

By virtue of the Cabinet Resolution on Appointment and Authorization of the National Committee on Agricultural Commodity and Food Standards dated 19 November B.E. 2548 (2005), the Notification on Thai Agricultural Commodity and Food Standard entitled Compost is hereby issued as voluntary standard, the details of which are attached herewith.

Notified on the 5 October B.E. 2548 (2005)

Khunying Sudarat Keyuraphan

Minister of Agriculture and Cooperatives

Chairperson of the National Committee on Agricultural Commodity and Food Standards

THAI AGRICULTURAL STANDARD

COMPOST

1 SCOPE

This standard defines required specifications, containers, labels, marks and sampling method as well as the criteria for compliance.

2 DEFINITIONS

For the purpose of this standard:

2.1 Compost means a type of solid organic fertilizer which is derived or made from organic materials. The materials have undergone a complete decomposition until they transform completely from the original state. The compost provides essential nutrients for plant growth.

2.2 Organic Fertilizer means a type of fertilizer derived or made from organic materials through various processes: moisturising, cutting, crushing, composting, extracting, sieving or others but neither chemical nor bio-fertilizer.

2.3 Organic Materials means those that have organic carbon as a main component such as plant parts, animal parts or droppings.

2.4 Complete Decomposition means a state where organic materials are completely decayed and can be used as compost without causing damage to plants.

2.5 Essential Nutrients means plant nutrients which include:

- Primary nutrients, i.e. total nitrogen (N), total phosphorus (as P_2O_5) and total potassium (as K_2O)
- Secondary nutrients, i.e. Calcium (Ca), Magnesium (Mg) and Sulphur (S)
- Supplementary nutrients, i.e. Ferrous (Fe), Manganese (Mn), Copper (Cu), Zinc (Zn), Boron (B), Molybdenum (Mo) and Chlorine (Cl).

3 SPECIFICATIONS

Compost specifications are according to Table 1:

Table 1 Compost Specifications

No.	Items	Criteria	Analysis and Testing Method
1.	Fertilizer particles	≤ 12.5 x 12.5 mm	CATM 01 or equivalent
2.	Moisture and evaporable substance	≤ 35 %	AOAC 950.01 or equivalent
3.	Rocks and gravels	≤ 2 % by weight	CATM 01 or equivalent
4.	Plastic, glass, sharp particles and other metal parts	≤ 0.01 % by weight	CATM 01 or equivalent
5.	Organic Matters (OM)	≥ 35 % by weight	AOAC 967.05 or equivalent
6.	pH	5.5 – 8.5	AOAC 973.04 or equivalent
7.	Carbon : Nitrogen ratio	≤ 20 : 1	BS 7755 – 3.8 or equivalent
8.	Electrical Conductivity	≤ 3.5 dS / m	BS EN 13038 or equivalent
9.	Primary nutrients:		
	- total nitrogen (N)	≥ 1.0 % by weight	AOAC 955.04 or equivalent
	- total phosphorus (as P_2O_5)	≥ 0.5 % by weight	AOAC 958.01 or equivalent
	- total potassium (as K_2O)	≥ 0.5 % by weight	AOAC 983.02 or equivalent
10.	Complete decomposition	≥ 80 %	Seed germination index (see Annex A)
11.	Toxic substances and heavy metals		
	- Arsenic	≤ 50 mg / kg	EPA Method 7061 A (1998) or equivalent
	- Cadmium	≤ 5 mg / kg	EPA Method 3050 B (1996) or equivalent
	- Chromium	≤ 300 mg / kg	EPA Method 3050 B (1996) or equivalent
	- Copper	≤ 500 mg / kg	EPA Method 3050 B (1996) or equivalent
	- Lead	≤ 500 mg / kg	EPA Method 3050 B (1996) or equivalent
	- Mercury	≤ 2 mg / kg	EPA Method 7471 B (1992) or equivalent

Remark : The weight yet to reach 100% is that of the fillers.

4 PACKAGING

Containers for compost shall be moisture-proof and durable for transportation.

5 MARKING AND LABELING

All units of the compost containers shall be labelled legibly which at least provide numbers, letters, marks, and actual details of the content:

(1) The word 'Compost'.
(2) Trade name and trade mark.
(3) List of organic materials used.
(4) Net weight (kg).
(5) Production date (d/m/y).
(6) Name of product
(7) Location where the compost was produced.
(8) Actual quantity of organic matters, but shall not be less than 35%.

6 SAMPLING

6.1 Terms

- Lot means the compost that is produced from the same type of organic materials, at the same time, by the same producer at the same location, or made, delivered or sale during the same period.
- Lot size means the number of containers used for compost produced at each lot.
- Sample size means the number of samples drawn from each lot of compost to be analyzed.

6.2 Sample shall be drawn from containers of each compost lot to best represent the product. Table 2 presents a sampling plan, which may be used against other similar available plans.

Table 2 Sampling Plan

Lot Size (number of containers)	Sample Size (number of containers)
≤ 21 to 60	2
61 to 200	3
201 to 500	8
501 to 1,000	15
1,001 to 10,000	20 (but not more than 30)

6.3 Samples drawn from Table 2 above are mixed thoroughly on a clean floor before pooling into a cone shape. After that, flap down the tip of the cone and divide the compost samples into 4 parts. Re-mix the two parts on the opposite to make another cone. Follow the same process by flapping the tip of the cone down and divide it into 4 parts. Repeat the process until the mixture reaches 3 kgs for laboratory analysis.

6.4 Each sample shall follow the specifications outlined in 3, 4, and 5 above in order to be certified.

ANNEX A

Germination Index

A complete decomposition of compost can be tested through germination index , a method to test for remaining phytotoxic substances in the compost, e.g. Ammonia gas and other forms of organic acids which occur in the incomplete decomposition. Measurement unit is percentage (%).

A.1 Equipment and materials

(1) Vegetable seeds of a germination rate of not less than 75%, e.g. lettuce, green beans, corn, radish, and etc.
(2) Distilled water
(3) A germination plate (9 cm in diameter)
(4) Filter paper No. 42 (9 cm in diameter)
(5) Compost samples.

A.2 Methodology

(1) Extracting a compost solution by mixing a compost sample with distilled water at the ratio (compost: distilled water) of 1 : 10. Shake the mixture at about 180 times per minutes for one hour before filtering it with filter paper.
(2) Draw a 10-boxes table onto the filter paper.
(3) Place a vegetable seed to each box on the filter paper, which is placed on a germination plate (10 seeds each), make at least 4 replications.
(4) Drop 3 ml. of compost solution onto each germination plates.
(5) Drop 3 ml. of distilled water onto a control plate.
(6) Keep the plates incubated in 2.4 and 2.5 in a dark room at the temperature of 28 ºC to 30 ºC for 48 hours.
(7) Collect the following data;
  (7.1) An average germination rate per plate (unit: %)
  (7.2) Root lengths of all germinated seeds and average them.
(8) Calculate the germination index of plant seeds by using the following formulae

Germination Index (%) =

$$\frac{\text{\% of germination in compost solution x root length in compost solution x 100}}{\text{\% of germination in distilled water x root length in distilled water}}$$

ANNEX B

Analysis methods used in this Standard include the following;

B.1 AOAC refers to the latest Official Methods of Analysis of AOAC International;

AOAC 950.01	Water (Total) in Fertilizers
AOAC 967.05	Organic Matter in Peat
AOAC 973.04	pH of Peat
AOAC 955.04	Nitrogen (Total) in Fertilizers
AOAC 958.01	Phosphorus (Total) in Fertilizers
AOAC 983.02	Potassium (Total) in Fertilizers

B.2 CATM 01 A Method to Determine Particle Size Distribution of Physical Contaminants in Composted Organic Materials. (2000) by the Compost Association

B.3 BS 7755-3.8 Soil Quality. Chemical Methods. Determination of Organic and Total Carbon after Dry Combustion (Elementary Analysis). (1995) by British Standards Institution.

B.4 BS EN 13038 Soil Improvers and Growing Media, Determination of Electrical Conductivity. (2000) by British Standards Institution.

B.5 EPA Methods 7061. Arsenic Quantity Analysis Method (Atomic Absorption, Gaseous Hydride). (1998) by United States Environmental Protection Agency.

B.6 EPA Methods 7471B. Mercury in Solid or Semisolid Waste Quantity Analysis Method (Manual Cold – Vapor Technique). (1992) by United States Environmental Protection Agency.

B.7 EPA Method 3050B Acid Digestion of Sediments, Sledges and Soils. (1996) by United States Environmental Protection Agency.

ANNEX C

Symbols used in this Standard;

≤	means	less than or equal to
≥	means	more than or equal to
dS/m	means	deci-semen per metre
mm	means	millimetre
cm	means	centimetre
mg/kg	means	milligram per kilogram
ml	means	millilitre
ºC	means	degree Celsius
%	means	percentage