



THAI AGRICULTURAL STANDARD

TAS 9000 PART 4 - 2010

ORGANIC AGRICULTURE
PART 4 : ORGANIC RICE

National Bureau of Agricultural Commodity and Food Standards
Ministry of Agriculture and Cooperatives

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PART 4 : ORGANIC RICE

National Bureau of Agricultural Commodity and Food Standards

Ministry of Agriculture and Cooperatives

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Organic Rice**

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At present, organic agricultural commodity, especially organic rice plays a vital role in terms of production and marketing. The Agricultural Standards Committee of the Ministry of Agriculture and Cooperatives has already endorsed the Thai Agricultural Standard on Organic Agriculture Part 1: the Production, Processing, Labelling and Marketing of Produce and Products from Organic Agriculture (TAS 9000 Part 1 - 2009) published in the Royal Gazette. For further development, the Agricultural Standards Committee deems it necessary to establish an agricultural standard on Organic Agriculture Part 4: Organic Rice as guidance for production and processing of organic rice so as to obtain specific quality improvement of organic rice.

The standard is based on the information of the following document:

TAS 9000 PART 1- 2009, Thai Agricultural Standards entitled Organic Agriculture Part 1: The Production, Processing, Labelling and Marketing of Produce and Products from Organic Agriculture, National Bureau of Agricultural Commodity and Food Standards.

Bureau of Rice Research and Development, Rice Department, Ministry of Agriculture and Cooperatives, 2550. Production Practices for Organic Thai Hom Mali Rice.



NOTIFICATION OF THE MINISTRY OF AGRICULTURE AND COOPERATIVES
SUBJECT: THAI AGRICULTURAL STANDARD:
ORGANIC AGRICULTURE PART 4 : ORGANIC RICE
UNDER THE AGRICULTURAL STANDARDS ACT B.E. 2551 (2008)

Whereas the Agricultural Standards Committee deems it necessary to establish an agricultural standard for Organic Agriculture Part 4: Organic Rice as a voluntary standard in accordance with the Agricultural Standards Act B.E. 2551 (2008) to promote such agricultural commodity to meet its standard on quality and safety.

By virtue of Section 5, Section 15 and Section 16 of the Agricultural Standards Act B.E. 2551(2008), the Minister of Agriculture and Cooperatives hereby issues this Notification on the Establishment of Agricultural Standard: Organic Agriculture Part 4 : Organic Rice (TAS 9000 PART 4-2010) as a voluntary standard, details of which are attached herewith.

Notified on 4 October B.E. 2553 (2010)

(Mr. Theera Wongsamut)
Minister of Agriculture and Cooperatives

THAI AGRICULTURAL STANDARD
ORGANIC AGRICULTURE PART 4: ORGANIC RICE

1. SCOPE

This standard covers practices of production, processing, labelling and marketing of organic rice produce and products derived from organic rice production.

This agricultural standard shall be used in conjunction with Thai Agricultural Standard for Organic Agriculture part 1: the Production, Processing, Labelling and Marketing of Produce and Products from Organic Agriculture (TAS 9000 part 1).

2. DEFINITIONS

Referring to TAS 9000 part 1, as well as the followings:

2.1 Organic rice means the produce and products of rice derived from organic rice production system.

2.2 Organic rice production system means a system of rice production management that enhances the ecosystem, sustainable biodiversity and biological cycles. It emphasises the use of natural materials by opposing the use of synthetic raw materials, transgenic plants, animals or microorganisms or raw materials derived from genetic modification. It also covers the product management, which carefully emphasises on every processing step to maintain the organic integrity and quality of organic rice products.

2.3 Organic rice produce means organic paddy, which also include byproducts from organic rice farming, such as organic straw, wherever the case may be.

2.4 Processing means the processes of organic rice produce by milling organic paddy into organic brown rice or organic white rice, including the physical, biological and other processes of organic brown or white rice, organic rice bran or organic small broken rice.

2.5 Organic rice products mean products obtained from the processing of organic paddy, such as brown rice, white rice, husk, rice bran, small broken rice, rice germ, including the further processed products, without addition of any other ingredients, for example, rice bran oil, rice flour, germinated brown rice, parboiled rice, etc.

2.6 Rice pest means types and varieties of plants, animals or microorganisms which can cause damages to organic rice.

3. PRINCIPLES OF ORGANIC RICE PRODUCTION AND PROCESSING

This section shall be in compliance with Section 3 of TAS 9000 part 1.

4. REQUIREMENTS FOR ORGANIC RICE PRODUCTION

4.1 Transition period for organic rice shall start at the application date submitted by the grower to the certification body for the period of at least 12 months. The produce from such period shall not be named as organic rice.

4.2 In case where there is evidence showing that the area applied for certification has never been used the prohibited chemicals for longer than 12 months, the grower may request for shorter transition period, but not less than 6 months.

4.3 Apart from the above mentioned in 4.1, the transition period can be extended, shortened or waived by taking into consideration the land use history and analytical results of the chemical and/or heavy metal residues in soil, water and organic rice produce.

4.4 For the certification of partial production area, types and varieties of rice as well as the area and management practices between organic and conventional produce shall be clearly distinguished. Organic rice grains shall not be mixed with the conventional one under the organic rice production.

4.5 Converted area for organic rice and with the intention to continue for organic rice production shall not be switched back to use chemicals.

4.6 Synthetic chemicals are prohibited in organic rice production.

4.7 Preventive measures against contamination from adjacent farms or from polluted sources, i.e. soil, water, and air, shall be in place. Such measures are, for example, dike or cultivation of buffer zone, etc. If there is a risk of contamination, soil and water samples shall be taken for analyses.

4.8 Soil fertility and biological activities shall be maintained or improved as follows:

(1) Cultivation of legumes, green manures and deep rooting plants as crop rotation.

(2) Use organic byproducts obtained from organic agriculture under TAS 9000 part 1 or from livestock farming under TAS 9000 part 2, or completely decomposed organic materials from known source.

Note: In case that the methods indicated in 4.8(1) and 4.8(2) cannot provide adequate nutrient to rice, or inadequate quantity of organic material derived from practices in accordance with this standard the soil conditioning substances specified in Table A1, Appendix A of TAS 9000 part 1 may be applied.

(3) Acceleration of decomposition process, microorganism or appropriate plant derived materials may be used.

(4) Use biological fertilizer to increase soil nutrient.

4.9 Pest control shall be in place with one or combination of the following measures:

(1) Use the rice resistant variety against diseases, insects and other animal pests and suitable for the area.

(2) Select cultivation method or farm management such as crop rotation or cover crop.

(3) Use physical method, such as machinery for planting, traps, light traps, noise repellent, including traps but the pathogenic microorganism contamination from its excretion shall be prevented.

(4) Use biological method, such as natural enemies (predators and parasites), preservation of natural enemy of rice pest, and balance nature between natural enemy and rice pest.

(5) Use of microorganism, such as *Beauveria* fungi to control brown planthopper.

4.10 If the measures mentioned in 4.9 cannot protect rice from severe outbreak of diseases and pests, the substances mentioned in Table A3, Appendix A of TAS.9000 part 1 shall be applied.

4.11 Sprayer uses for applying pesticides and chemical substances for conventional production shall not be used for organic production.

4.12 Seeds used shall be from organic agriculture. If not available, conventional seeds may be used in the first crop of organic production with one condition that chemical treated seeds are not allowed. If, again, not available, appropriate measures to eliminate chemicals before use shall be recognised by a certification body.

4.13 Transition to organic agriculture production

4.13.1 Grower shall propose a clear production and management plan to the certification body for approval.

4.13.2 Grower shall record all of the production input use, by indicating sources and quantity applied.

4.13.3 For the application of certification, grower shall demonstrate the data and information to the certification body, as follows:

(1) Land use history

(2) Previous use of chemical and analytical results of pesticide residues in soil and water (optional).

- (3) Map and farm layout that need to be certified and the adjacent area.
- (4) Each step of production plan.
- (5) Record of the production inputs application.
- (6) Record of farm activities and other information.

4.14 In cases, organic rice farming has been certified regularly, there is no need to analyse the pesticide residue in organic rice produce or product, except the requirement is needed by trading partner, or relevant laws, or certification body.

5. HANDLINGS, STORAGE, TRANSPORTATION, PROCESSING AND PACKAGING

This section shall be in compliance with Section 7, TAS.9000 part 1. In case a grower needs the certification for processing and packaging of organic rice, the additional application shall be submitted to the certification body.

6. LABELLING AND CLAIMS

This section shall be in compliance with Section 8, TAS.9000 part 1.

7. REQUIREMENTS ON PERMISSION OF OTHER SUBSTANCES NOT SPECIFIED IN APPENDIX A IN ORGANIC RICE PRODUCTION SYSTEM

This section shall be in compliance with Section 9, TAS.9000 part 1.

8. INSPECTION AND CERTIFICATION SYSTEMS

This section shall be in compliance with Section 10, TAS.9000 part 1.

9. DESCRIPTION OF PRODUCTION AND PROCESSING METHODS

Details of production and processing methods for organic rice are aimed to provide grower and processor to produce quality organic rice according to this standard. The details are explained in Appendix B.

APPENDIX A
PERMITTED SUBSTANCES FOR THE PRODUCTION OF ORGANIC RICE

Permitted substances shall be in compliance with requirements specified in Appendix A, TAS 9000 Part 1 with the add-ons as follows:

Substances	Details/ specific conditions
1. Neem (<i>Azadirachta indica</i> A.), Dried long pepper flower (<i>Piper retrofragum</i> Vahl.), Dried powder of myrtle grass or sweet flag (<i>Acorus calamus</i> L.)	To be mixed with rice seed for pest control
2. Azolla or mosquito fern or water fern (<i>Azolla pinnata</i>)	To improve soil fertility, increase nitrogen
3. Blue green algae	To improve soil fertility, increase nitrogen
4. Dried animal blood	To improve soil fertility, increase nitrogen
5. Ground bone	To improve soil fertility, increase nitrogen, phosphorus and calcium
6. Grain meal	To improve soil fertility, increase phosphorus

APPENDIX B

DESCRIPTION OF PRODUCTION AND PROCESSING METHODS FOR ORGANIC RICE

(Section 9)

The following detailed recommendations under this standard are for growers and general public to guide through the processes of production and processing to produce organic rice to ensure consumers' confidence.

B.1 Organic rice production

B.1.1 Soil fertility management

Since application of chemical fertilizer is prohibited in organic rice cultivation, it is suggested growers select a natural fertile land for cultivation. This initial selection provides an advantage in maintaining leverage of quantity and quality. In addition, growers should understand the proper soil management and maintenance of soil fertility for sustainable production of organic rice. The recommendations for soil fertility management are described as follows:

B.1.1.1 Soil management

- (1) No burning of remaining tillers and straws, as well as any other organic materials in rice field. This will cause the losses of organic matters and beneficial microorganism.
- (2) Growers may apply organic matters into rice field for soil improvement regularly. Make use of organic materials available in the field and do not move any plant debris from the rice field. Do not bring in any organic materials tainted with chemical substances to rice field.
- (3) Increase organic matters to soil by growing leguminous crop on the idle area in the rice field. The organic matters from such doing so will be beneficial to the soil.
- (4) The rice field shall not be left idle before planting and after harvesting rice. The area should be covered with leguminous crops and other, such as, Cow pea (*Vigna unguiculata*), Sword bean or Jack bean (*Cavalia ensifor*, *Cavalia gladiate*), Indian hemp (*Crotalaria juncea*) and *Sesbania ristrata*.
- (5) Soil analysis should be done annually. Adjust the soil pH to 5.5-6.5. In case of high acidic soil, it is recommended to use marl or wood ash.
- (6) Tillage of rice stubs and green manures during land preparation is recommended in order to increase organic matters and beneficial microorganism to soil.

In case rice is a mono-crop in the rain-fed area, after harvesting, keep the stubs and straws in the rice field as mulching materials or plough them into the soil, and sow leguminous crops. From the early rainy season, at the late of April or the early May, apply biofertilizer at the rate of 5 litres/100 litres of water per Rai. Pour the solution into a tank, and install it on the straw cutting machine. The solution will be dripped onto straws and stubs or sprinkled evenly over the field, and run over by a tractor. Let the plant debris to be decomposed for 10 to 15 days before puddle the field for further land preparation and planting.

Green manure plants can be grown after rice crop is harvested. Sow Sward bean on the paddy field, and plow over rice straws and stubbles into soil. Harvest Sward bean as seeds for next season. In addition, it is suggested to sow Cow pea or Indian hemp as green manure by plowing over such crops at the beginning of flowering stage, plow the field to incorporate all plants materials into soil and let them decompose for 7 days, after that sow the rice seeds. In case no continuous cultivation, the rice straws and stubbles should be cut and left to cover the field in order to minimise erosion of soil surface, increase organic matter and some plant nutrients for the next crop. For the slopping upland paddy field, soil covering is strongly recommended. After rice crop is harvested, it is suggested to leave rice stubbles and straws to cover the field until next cultivation.

B.1.1.2 Recommendation for organic fertilizer and naturally produced organic fertilizer are as follows:

(1) Animal manure: animal dung on farm, or complete decomposition of animal manure from outside. Additionally, after rice harvesting in rural farm, while cattle are allowed to graze in the paddy field, their dropping or dung will be mixed with plant materials to increase organic matter into the soil.

(2) Compost: compost should be produced in the field or nearby. To accelerate decomposition process, appropriate microorganisms can be added. The compost should be kept under shade to prevent nutrient losses caused by sunlight and rain.

(3) Green manure: the popular legumes to be grown in paddy field are Sesbania (*Sesbania rostrata*), Indian hemp (*Crotalaria juncea*), Cow pea or Southern pea (*Vigna unguiculata*) and Sward bean (*Canavalia gladiate*). Two months before growing rice, legume planting should be started in order to produce sufficient bio-mass and nitrogen. After 45 to 60 days of planting or at the beginning of flowering stage, plow the field to incorporate plant materials into soil. Leave it to decompose for 7 days before planting rice. If the legume is not growing well, may be resulting in inadequate bio-mass and nutrients, apply compost and/or manure that are free from chemical and antibiotic. The source of legume seeds, compost, manure and other additive substances, including the amount used and the soil fertility management monitoring, shall be checked and recorded. The agricultural machinery used for organic fertilizer preparation and land plowing with the date of operations shall also be recorded.

B.1.1.3 Biofertilizer should be prepared by using debris from farm and garbage from household, fermented with molasses or a solution of raw sugar. To accelerate fermentation process and improve the quality of biofertilizer, appropriate microorganisms should be added,

by having the basic composition, e.g. L.D. 2 (Land Development No. 2). Biofertilizer can be classified by composition into 2 groups as follows:

(1) Biofertilizer from plants such as vegetables and fruits: the composition comprises of 40 kilograms of vegetables and fruits, 10 kilogram of molasses, 10 litres of water (or adding water until all the solid materials are submerged). Then, add an extra water to make a total volume of 50 litres. Add microorganisms to accelerate the process. The fermentation process takes 7 days.

(2) Biofertilizer from animals such as fishes or Golden applesnails: the composition comprises of 30 kilogram of fishes or Golden applesnails, 10 kilogram of fruits, 10 kilogram of molasses, 10 litres of water (or adding water until all the solid materials are submerge). Then add an extra water to make a total volume of 50 litres. Add microorganisms to accelerate the process. The fermentation process takes 15 to 20 days.

B.1.1.3.1 Bio-extract preparation

(1) Cut or chop the materials from plants or animal to small pieces, then mix with molasses in a fermenting tank.

(2) Add microorganisms into 10 liters of water, and stir for 5 minutes.

(3) Transfer the microorganism solution into the fermenting tank and mix thoroughly. Cover the tank loosely and leave it ferment under shade.

(4) During fermentation process, stir the solution once or twice a day to release carbon dioxide gas and incorporate all materials more evenly.

B.1.1.3.2 The use of Biofertilizer

(1) Soak 20 kg of the rice seed in the biofertilizer solution with the rate of 20 ml of biofertilizer per 20 L of water for 12 hours, and then take it out from solution and incubate for 24 hours before planting.

(2) Land preparation; spray or spread bio-extract at the rate of 5 L per Rai during land preparation or before plowing to incorporate rice stubble into soil.

(3) Rice growing; apply biofertilizer into the paddy field at the rate of 5 L per Rai, three times at 30, 50 and 60 days after sowing or transplanting.

B.1.1.4 Production inputs used as fertilizers and soil conditioners

If the recommendations concerning soil fertility mentioned above are still insufficient, it is suggested to use other types of soil conditioners described in the Appendix A, Table A.1 of TAS 9000 Part 1. Otherwise, the following natural organic materials are also allowed to substitute some types of chemical fertilizers.

- (1) Nitrogen source such as Azolla, Blue green algae, Neem seed meal and dried blood meal.
- (2) Phosphorus source such as rock phosphate, bone meal, chicken manure, bat manure, seed meals, wood ash and sea weed.
- (3) Potassium source such as rice husk ash and some types of limestone.
- (4) Calcium source such as dolomite (natural), oyster shell meal and bone meal.

B.1.2 Weed control

Weed control recommendations should be based on physical methods such as proper land preparation, growing practices to reduce weeding (in case of heavy weed infestation, it is recommended to use transplanting technique), the use of water level maintained in the paddy field for weed control, hand weeding, and other cultural practices such as the uses of rotary plough, appropriate growing season, leaf cutting technique, crop rotation and weeding the paddy field including dike areas.

B.1.3 Pest control

Diseases, insects and animals shall be controlled where necessary. The balance of natural enemies against pest population and plant health is the key criteria before applying naturally produced substances or allowable substances for pest control described in the Appendix A, Table A.3 of TAS 9000 Part 1.

Principles for pest control in the production of organic rice are as follows:

B.1.3.1 Use rice varieties resistant to diseases, insects and other pests, and appropriate to the particular rice growing area.

B.1.3.2 Apply appropriate cultural practices, such as land preparation, planting date of the season, seed rate and spacing, crop rotation to cut life cycle of diseases, insects and other pests, the maintenance of soil fertility and the balance of nutrient as well as water management for the growth of healthy rice plants. Such cultural practices thus reduce the damage caused by diseases, insects and other pests.

B.1.3.3 Manage the environmental setting of the field unfavorable for pest infestation such as weeding, disposing of infected plant debris by using non chemical treated sulphur powder.

(1) Animal pests

Crabs and golden apple snails should be managed by lowering the water level in the paddy field and collecting by trap or hand catching to feed animals and to use as raw materials to produce biological fertilizer. If it is necessary to control such animal pests, the extract of Chiangda leaf (*Gymnema inodorum* (Lour.) or tobacco leaves can be applied. In case of birds and farm rats, the means of trapping, chasing, and fencing are the physical removal methods of animal pests. The conservation of natural enemies such as hawks, snakes and small Asian mongooses is the other measure to control animal pests. In case the protective tools are used,

it is recommended to check the source and to record the kind of pests and severity of infestation, including the population of natural enemies.

(2) Insect pests

The water level in the field should be appropriately maintained according to the water requirement of plant so as to provide healthy rice and to conserve the population of natural enemies and insect pests in balance. In case of severe infestation, the allowable substances as described in the Appendix A, Table A.3 of TAS 9000 Part1 shall be applied. Assessment of such incident and control methods (if any) shall be identified, including the use of allowable substances and sources are also checked and recorded.

(3) Diseases

The crop should be provided with nutrients in line with the balance of its nutritional requirements to obtain healthy rice plant. Excess application of nitrogen source, in particular, is not recommended. In case of severe infection, the allowable substances as described in the Appendix A, Table A.3 of TAS 9000 Part1 shall be applied. Assessment of such incident, land preparation and planting techniques shall be identified, including weed density and hand weeding or any use of weeding tools are also recorded.

The natural ecological balance should be maintained by increasing the population of beneficial insects (natural enemies) such as predators and parasites to control pests at the economic threshold level.

B.1.3.5 The insect repellent plants should be grown along the dike of paddy field such as citronella grass (*Cymbopogon nardus* Rendle).

B.1.3.6 The use of physical means to control pests namely agricultural tools, light trap, trap and sticky trap.

B.2 Management, Storage, Transportation, Processing and Packaging

B.2. Transportation

Containers and sacks used for packing, as well as vehicle for transporting organic rice, should be clean and free from any contamination of hazardous substances and other rice. Carrier or vehicle should appropriate to handle organic rice. It is not recommended to use vehicle that has been loaded with soil, animals, manures, fertilizers or chemicals that may cause contamination of pathogenic and toxic substances, unless such vehicle has been properly cleaned before use. Organic rice shall not be comingled with non-organic commodity and other prohibited materials or substances for organic agriculture during transportation from production site to distribution center.

B.2.2 Storage

Storage of organic rice shall be segregated, clean and hygienic. It shall be able to prevent adulteration from general rice products. The storage shall be provided with good ventilation with mechanical pest management. Check the storage and record the amount of paddy stored.

B.2.3 Storage pest management

B.2.3.1 Stored insect pests are classified into 2 groups as follows:

(1) Insect pest of paddy such as Angoumois grain moth (*Sitotroga cerealella* Olovier.), Lesser grain borer (*Rhyzopertha dominica* F.), Rice weevil (*Sitophilus oryzae* L.), Corn weevil (*Sitophilus Zeamais* Moschusky), Red flour beetle (*Tribolium castaneum* Hbst.), Siamese grain beetle (*Lophocateres pusellus* Klug.)

(2) Insect pest of white rice such as Corn weevil, Rice weevil, Rice moth (*Corcyra cephalonica* Stainton), Red flour beetle and Saw-toothed grain beetle (*Oryzaephilus ruginamensis* L.).

Pest management and control:

- Clean rice barn, warehouse or storehouse before storing the produce. The regular cleaning of the storage is recommended.
- Spray plant extract, such as Bitter bush or Siam weed (*Eupatorium odoratum* L.) to kill insects on the floor, wall and vacant space in the storage.
- Mix seeds with plant extracts such as Neem (*Azadirachta indica* A.), dried Long pepper flower (*Piper retrofractum* Vahl) and Sweet flag or Myrtle grass (*Acorus calamus* L.)
- Fumigate the storage with carbon dioxide gas.

B.2.3.2 Other problems of rice in storage: damaged grain.

Cause: High moisture and grain infected by fungus

Symptom: White rice is changed to yellowish colour with some black spot on the surface. Infected paddy is easily broken when milled.

Prevention:

- Paddy shall be dried to not more than 14% moisture content before storage.
- Storage should be clean and provided with ventilation.

B.2.3.3 Rat in storage

There are many kinds of rats in the storage, such as House rat (*Rattus norvegicus*), Roof rat (*Rattus rattus*) and Polynesian rat or Pacific rat (*Rattus exulans*). Rats not only cause direct loss to the produce, but also stain to the produce with their excrements, urine, saliva and hairs that deteriorate the quality of organic rice, and cause pathogenic infection to consumers.

Preventive control

- Keep storage clean, remove trees or branches leaning on the storage.
- Use rat traps.
- In case rodenticidal baits are used, *the allowable substances as described in the Appendix A, Table A.3 of TAS 9000 Part1 shall be applied.* Such rat poisons shall be set in a wooden cage, a carton, or a plastic box with 2 holes. The size of these holes shall be big

enough for rats to run in and out. Check the rat traps everyday. The rat poisons and the dead rat shall be carefully discarded out of the storage to prevent any contamination to rice. Rat management and control shall be subject to the vacant storage. If it is unavoidable, the withdrawal period shall be twice of the time indicated on the label.

B.2.4 Harvest, threshing and milling

In case the mechanical equipment and tools for harvesting, milling and processing are used, for example, rice harvester and rice threshing machines are used for both non-organic and organic rice production, such equipment or tools shall be cleaned properly before bringing into the operation for organic rice.

APPENDIX C
UNITS

The units and symbols used in this standard and the units recognized by the International System of units (*Le Système International d' Unités*) or SI are as follows:

Type of Measurement	Name of Unit	Symbol
Mass	Kilogram	kg
Volume	Litre	L
	Millilitre	ml