



THAI AGRICULTURAL STANDARD

TAS 9000 PART 5-2010

ORGANIC AGRICULTURE
PART 5 : ORGANIC SNAKESKIN GOURAMI

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

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for Organic Agriculture part 5 : Organic Snakeskin Gourami**

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Nowadays, organic products especially organic snakeskin gourami is important in production and marketing. The Ministry of Agriculture and Cooperatives has already issued the Organic Agriculture Part 1 : The Production, Processing, Labelling and Marketing of Produce and Products from Organic Agriculture (TAS 9000 PART 1-2009). Hence, to improve the organic snakeskin gourami culture and quality of Thailand's product to meet the standard, the Agricultural Standards Committee deems it necessary to establish the Thai agricultural standard on Organic Agriculture Part 5 : Organic Snakeskin Gourami as guidelines for organic snakeskin gourami production and processing.

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

TAS 9000 PART 1-2009. Thai agricultural standard on 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.

Faculty of Fisheries, Kasetsart University. 2010. Study on auditing criteria and instruction in organic snakeskin gourami aquaculture.



NOTIFICATION OF THE MINISTRY OF AGRICULTURE AND COOPERATIVES

SUBJECT: THAI AGRICULTURAL STANDARD:

ORGANIC AGRICULTURE PART 5 : ORGANIC SNAKESKIN GOURAMI

Whereas the Agricultural Standards Committee deems it necessary to establish an agricultural standard on Organic Agriculture Part 5 : Organic Snakeskin Gourami as a voluntary standards in accordance with the Agricultural Standards Act B.E. 2551 (2008) to promote such agricultural commodity to meet its quality, standard 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 establishment of Thai Agricultural Standard: Organic Agriculture Part 5 : Organic Snakeskin Gourami (TAS 9000 PART 5-2010), established as voluntary standard, details of which are attached herewith.

Notified on 7 October B.E. 2553 (2010)

(Mr. Theera Wongsamut)

Minister of Agriculture and Cooperatives

**THAI AGRICULTURAL STANDARD
ORGANIC AGRICULTURE
PART 5 : ORGANIC SNAKESKIN GOURAMI**

1.SCOPE

1.1 This agricultural standard establishes the culture, management, storage, transportation, processing, labelling and marketing of snakeskin gourami produce and products from the organic culture.

1.2 This standard covers produce and products from the organic snakeskin gourami culture.

1.3 This standard is jointly implemented with 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) and Organic Agriculture Part 3 : Organic Aquatic Animal Feed (TAS 9000 PART 3-2009).

2.DEFINITION

For the purpose of this standard:

2.1 **Snakeskin gourami or Sepat siam** means freshwater fish with the scientific name of *Trichogaster pectoralis*.

2.2 **Organic aquaculture for snakeskin gourami** means a holistic culturing system the snakeskin gourami, to support the ecosystem, maintain biodiversity and biological cycle including the aquatic animal welfare, emphasize the use of natural materials, avoid using the synthetic raw materials, reject using plants or animals or microorganisms which are from genetically modification technology and manage farm produce carefully so as to retain the organic integrity and the important quality of the produce in all production steps.

2.3 **Organic snakeskin gourami produce** means snakeskin gourami produce that is cultured under the principle of organic agriculture which is not transformed or processed.

2.4 **Processing** means a physical or biological process of the organic culturing snakeskin gourami such as salting and drying to get the organic salted snakeskin gourami.

2.5 **Organic snakeskin gourami product** means the organic snakeskin gourami produce that is transformed or processed by using the ingredients which are allowed under the organic agriculture principles, such as dried snakeskin gourami, dry-salted snakeskin gourami.

3. CULTURE AND PROCESSING PRINCIPLES

Culture and processing principles should be in accordance with section 3 of TAS 9000 PART 1-2009 as follows:

- 3.1 The production system should be developed towards an integrated agricultural system with biological diversity of plants and animals;
- 3.2 The production system on-farm should be developed towards self-sufficient in organic materials and crop nutrients;
- 3.3 Soil fertility and water quality should be rehabilitated and preserved by constantly using organic materials such as manure, compost, and green manure, and recycling of on-farm resources for maximum benefit;
- 3.4 The ecological balance on farm and the sustainability of the ecosystem as a whole should be preserved;
- 3.5 The activities that cause environmental pollution should be prevented and avoided;
- 3.6 The post-harvest handlings and processing practices that are natural, conserving energy, and least affected on the environment should be used;
- 3.7 The biological diversity of the agricultural system and the surrounding ecosystem including the natural habitats of wild plants and animals should be conserved;
- 3.8 Organic integrity should be maintained along the production chain;
- 3.9 Application of synthetic chemicals should be avoided throughout the production chain;
- 3.10 Produce, products, and ingredients should not be derived from genetic modification;
- 3.11 Products or ingredients of products should not be irradiated.

4. REQUIREMENTS FOR ORGANIC SNAKESKIN GOURAMI CULTURE

The culture should be in accordance with Section 5 of TAS 9000 PART 1-2009 and additional principles as follows:

4.1 Transition to organic production

4.1.1 A transition period should be at least 1 production cycle from the pond preparation to harvesting. The transition period may be different depending on related data, such as previous land use history with an approval by the certification body.

4.1.2 Transition period should be started when the producer has already complied with this standard and applies for certification with the certification body.

4.2 Farm and farm location

4.2.1 Farm should be registered under the Aquaculturist or Fisheries Operator Registration.

4.2.2 Farm should not be located on the restricted area.

4.2.3 The location should be suitable for organic snakeskin gourami culture.

- 4.2.4 Farm should not be affected by pollution source or should have the preventive measure.
- 4.2.5 Farm should be located nearby good water source that suitable for organic snakeskin gourami culture and should have sufficient water quantity.
- 4.2.6 Farm should be easy access to facilitate farm operation and transportation.
- 4.2.7 The ecosystem and environment should be maintained by allocating at least 5 % of the area to plant.
- 4.2.8 The availability of a buffer zone to prevent the contaminations from the nearby area to organic snakeskin gourami farm.

4.3 General management

- 4.3.1 Farm lay out should be in accordance with organic culturing techniques.
- 4.3.2 Pond water quantity and quality should be suitable to organic snakeskin gourami culture as described in Appendix A.
- 4.3.3 The organic snakeskin gourami broodstocks or seedlings should be released in a suitable stocking density as described in Appendix A.

4.4 Culture management

- 4.4.1 The snakeskin gourami should be raised in organic system at least 2/3 of the life span of the culture period. The total snakeskin gourami life span of culturing period in the production system from larvae to marketable size is about 8-12 months.
- 4.4.2 Organic matter or agricultural by-product from organic production system or natural material should be mainly used. These organic substances or materials should not be contaminated with the followings :
- (1) Microorganisms and their products that are genetically modified.
 - (2) Natural contaminants such as heavy metals which cause negative impact to environment and human health.
 - (3) Municipal fertilizer or compost from city waste.
 - (4) Synthetic growth promotor.
- 4.4.3 Pond should be properly prepared and adjusted conditions of the bottom of the pond to be suitable for organic snakeskin culture by selecting the production inputs including fertilizer and aquaculture pond conditioners as described in Appendix B.
- 4.4.4 The pest should be controlled in accordance with the organic aquaculture principles as described in Appendix C.
- 4.4.5 The effluents from organic snakeskin gourami culture should meet the quality requirements promulgated by the law.

4.5 Production inputs

4.5.1 Breed

4.5.1.1 Use good breeders that come from the organic snakeskin gourami culture or wild capture. In case where breeders are purchased from outside, Movement Document (MD) should be required.

4.5.1.2 Use broods that come from the organic snakeskin gourami culture or wild capture. In case where broods are purchased from outside, Fry Movement Document (FMD) should be required.

4.5.2 Feed

4.5.2.1 Feed should be of quality that is suitable for the size of snakeskin gourami and the culture system.

4.5.2.2 In case where the natural feed and/or the natural raw materials are used, they should be complied with the requirements in Section 3.1 of TAS 9000 PART 3-2009.

4.5.2.3 In case where the formulated feed is used, it should be complied with the requirements in Section 3.3 of TAS 9000 PART 3-2009.

4.5.2.4 The availability of hygienic storage area should be provided and kept separately for the ingredients, feed and feed supplements. (if any)

4.5.3 Equipments and tools

4.5.3.1 Equipment and tools used in organic culture should not be contaminated with non-organic and also be kept separately under hygienic condition.

4.5.3.2 Natural manure used on farm should come from residues or by-product of organic agriculture or nature. Also, it should be properly decomposed or dried.

4.5.3.3 Microorganisms used on farm should not come from the genetic modification.

4.5.4 Chemical or synthetic substances

The use of chemicals or synthetic substances or antibiotic listed in Appendix D is prohibited.

4.6 Farm sanitation

4.6.1 Farm workers should be in good hygiene without contagious disease.

4.6.2 Effluent and waste from household should be separated from the culture pond.

4.6.3 Toilet should be separated from the culture pond. Waste should be hygienically managed to prevent contamination to culture pond.

4.6.4 Waste, carcasses, feed containers and production inputs including expired production inputs and its surplus should be properly disposed.

4.6.5 Farm garbage and sewage should be properly discarded and disposed.

4.6.6 Accommodation, feed preparation area and housing should be clean and under hygienic condition.

4.7 Health Management

4.7.1 Snakeskin gourami health should be regularly monitored and checked.

4.7.1.1 In case where the unusual condition occurred, the preliminary causes of the disorder should be diagnosed and the management practice should be considered prior to application of permitted chemical substances in the organic production.

4.7.1.2 In case where a large number of dead fish are found, the authorized officers should be notified and a proper disposal of carcasses and treatment of infected water should be carried out before discharging.

4.7.2 Disease Control and Treatment

4.7.2.1 Disease control and treatment should be carried out in accordance with the techniques and principles of organic agriculture. If necessary, the permitted substances in Appendix C should be used for the control and treatment of pest and disease.

4.7.2.2 Preventive measure and corrective action should be available.

4.8 Harvest, Post-harvest handling and Marketing

4.8.1 Harvest

4.8.1.1 Harvesting and marketing should be planned in order to maintain the freshness. Harvest while snakeskin gourami in good health and maintain the organic integrity of produce.

4.8.1.2 In case where there is chemical contamination risk, snakeskin gourami should be sampled for chemical residue analysis prior to harvesting.

4.8.1.3 Management practices and care of snakeskin gourami should be carried out under hygienic condition during harvest.

4.8.2 Movement Document should be available.

4.9 Training

4.9.1 Farmers and workers should obtain knowledge or training on principles, culture techniques, harvesting and organic production system.

4.10 Records and record keeping

4.10.1 Record the information on the practices during transition to organic agriculture, culturing procedure and harvesting.

4.10.2 The data should be regularly updated.

5. MANAGEMENT, STORAGE, TRANSPORTATION, PROCESSING AND PACKAGING

5.1 During storage and transportation, snakeskin gourami produce from organic culture should be managed with the following precautions :

5.1.1 The organic snakeskin gourami produce should be separated to prevent contamination from the non-organic produce and products at all times.

5.1.2 The organic snakeskin gourami produce should be protected from contacting materials and substances that are not permitted to be used in organic culture and processing at all times.

5.2 In case where snakeskin gourami produce is certified in parts, they should be stored and managed separately from the non-organic produce with a clear identification.

5.3 Processing

5.3.1 The organic snakeskin gourami products should be processed by using physical or biological methods (such as salting/salting with ice, and drying). The use of non-agricultural ingredients should be reduced and the synthetic substances should not be used in exception with the main ingredients obtained from agricultural origin, the permitted processing aids as indicated in Tables E.1 and E.2 of Appendix E, other substances complied with the requirements under Section 7 and Table A.5 of Appendix A of TAS 9000 PART 1-2009. Production and processing of organic snakeskin gourami such as dried organic snakeskin gourami are as described in Appendix A Guidelines for culturing and processing organic snakeskin gourami.

5.4 Packaging

5.4.1 The biodegradable and environmental friendly materials or the reusable package should be selected.

5.5 Storage and Transportation

5.5.1 The integrity of the produce and/or product of organic snakeskin gourami should be maintained during the storage and transportation with the following precautions:

5.5.1.1 The organic snakeskin gourami produce and/or products should be prevented from co-mingling with non-organic snakeskin gourami produces and products at all times.

5.5.1.2 The organic snakeskin gourami produce and/or products should be prevented from contacting with materials and substances that are not permitted to be used in organic agriculture.

5.5.2 In case where the snakeskin gourami produce and/or products are partly certified, it should be stored and managed separately from the non-organic produce and/or products with a clear identification.

6. LABELLING AND CLAIMS

Labelling and claims should be in accordance with Section 8 in TAS 9000 PART 1-2009 as the followings:

6.1 Organic snakeskin gourami produce and products should have the following details on the label and should be legible, clearly stated, and truthful, or not deceptive as follows :

6.1.1 Name of the produce or product.

6.1.2 The list of ingredients except for a single ingredient produce or product;

6.1.3 Food or feed additives (if any);

6.1.4 Net content and drained weight should be declared. In the case that the product is packed in a liquid medium, it should carry a declaration of drained weight of that product;

6.1.5 The name and address of the producer, manufacturer, packer or distributor should be declared. The registered trademark should also be declared;

6.1.6 The country of origin of the produce or product which is produced for export;

6.1.7 Day, month and/or year of manufacture and expiration;

6.1.8 Storage instruction. (if any)

6.2 Labelling or claims of organic snakeskin gourami produce or product (or organic) can be made only where:

6.2.1 Produce should come from organic snakeskin gourami culture that conforms to the requirements of this standard;

6.2.2 All the ingredients of the product from agricultural origin are derived from organic production in accordance with the requirements of Sections 3 – 5;

6.2.3 Only the ingredients from non-agricultural origin listed in Tables E.1 and E.2 of Appendix E and Table A.5 in Appendix A of TAS 9000 PART 1-2009 are allowed to be used;

6.2.4 The same ingredients should not be derived from organic and non-organic origin;

6.2.5 The operator who imports produce or product is subject to regular system inspection as set out in Section 8 of this standard;

6.2.6 Produce or product which has been certified by the certification body should have the label with name and/or the code number of the certification body;

6.3 Products labelled with certification mark as “organic” should have no less than 95% by weight of all ingredients in final products excluding water and salt. The non-organic ingredients should not be genetically modified or irradiated or treated with processing aid not being listed in Table E.2 in Appendix E and Tables A.5 and A.6 in Appendix A of TAS 9000 PART 1-2009.

6.4 The product containing ingredients from organic agriculture less than 95% but no less than 70% by weight of all ingredients in final product excluding water and salt should not be labelled and claimed as organic product. However, the other phrases such as “product containing ingredients of organic origin” may be used on the label provided that the following criteria should be followed:

6.4.1 The term “organic” should be legible on the label. Organic ingredients should be declared by expressing in the estimated percentage of all ingredients including food additives but excluding salt and water.

6.4.2 The type and the amount of ingredients should be percentage by weight in descending order.

6.4.3 List of all ingredients on the label should be same color with identical font style and size.

6.5 When organic snakeskin gourami produce or products inspected by certification body is in accordance with organic agriculture requirements specified in this standard and complied with the requirements in Section 8.2, the phrase “Produce or product in transition to organic” may be allowed on the label of the produce or product. However, certification mark which cause misleading as certified organic produce or product should not be used.

6.6 In relation with the labelling of non-retail containers of organic snakeskin gourami produce or product including repacked produce or product for retail sale, the operator should allow the certification body to access the storage, production and agricultural area as well as the accounting system of agricultural inputs, produce and products and supporting documents for inspection purposes. The operator should provide the necessary information to the certification body for inspection.

6.7 Organic snakeskin gourami produce and products certified in accordance with this standard should be complied with relevant laws.

6.8 The indication of any certification mark of organic produce or product should be used in accordance with the criteria and rules of the certification body recognized by the Ministry of Agriculture and Cooperatives.

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

The permission of other substances should be in accordance with Section 9 of TAS 9000 PART 1-2009 as follows:

7.1 To consider using substances other than those specified in Appendix A, the criteria to evaluate these substances are as follows:

7.1.1 They are consistent with principles of organic production as outlined in Section 3;

7.1.2 The use of the substance is necessary/essential for its intended use;

7.1.3 The use and disposal of the substance does not result in, or contribute to, harmful effects on the environment;

7.1.4 Substances should not have negative impact on human or animal health; 7.1.5 Approved alternatives are not available in sufficient quantity and/or quality.

7.2 The criteria in Section 7.1.1 to Section 7.1.5 are intended to be evaluated as a whole in order to protect the integrity of organic production. In addition, the following criteria are applied in the evaluation process:

7.2.1 If the substances are used for fertilizing or soil conditioning purposes, they should be essential for obtaining or maintaining the fertility of the soil or to provide specific nutrient requirements of crops, or specific soil conditioning which cannot be satisfied by the practices specified in Section 4 to Section 7, or addition of other substances included in Appendix A, Table A.1 of TAS 9000 PART 1-2009. The substances should come from plant, animal, microbial, or mineral origin that may undergo the following processes such as physical process (e.g., mechanical, thermal), enzymatic and/or microbial process. Their usage for the above purposes should not have harmful impact on the living organisms of the soil and/or the physical characteristics of the soil;

7.2.2 If the substances are used for controlling plant disease or pest and weed, they should be able to control of a harmful organism or a particular disease for which other biological, physical, or plant breeding alternatives and/or effective management practices are not available; and the substances should be of plant, animal, microbial, or mineral origin and may undergo the physical (e.g. mechanical, thermal), enzymatic and microbial processes. In addition, synthetic substances such as pheromones may be considered for addition to the lists if the substances in their natural form are not available in sufficient quantities, provided that the conditions for their use do not directly or indirectly result in the residues present in the edible parts of the produce;

7.2.3 If the substances are used as food and/or feed additives or processing aids in preparation or preservation of the food, these substances should come from natural origin and may have undergone mechanical or physical processes (e.g. extraction, precipitation), biological/enzymatic processes and microbial processes (e.g. fermentation). If the mentioned substances from such methods and technologies are insufficient but needed in preparation, the synthetic substances may be considered for inclusion in exceptional circumstances. However, the use should not cause misunderstanding to consumers concerning the nature of the substance and quality of the food;

7.3 In the evaluation process of substances for inclusion on the lists, all stakeholders should have the opportunity to involve.

7.4 The proposal to add new substances into Appendix A of TAS 9000 PART 1-2009 should include the following information/details:

7.4.1 Details of product, method and condition of usage.

7.4.2 Information demonstrating that the requirements under Section 7.1 are satisfied.

8. INSPECTION AND CERTIFICATION SYSTEM

Inspection and certification system should be in accordance with the Section 10 of TAS 9000 PART 1-2009 as follows:

8.1 Inspection and certification systems are used to verify the production systems, processing, labelling, and marketing system of organic produce and/or products that produced in accordance with the organic agriculture.

8.2 The inspection and certification bodies can provide organic inspection and certification services on produce and/or products under the accreditation system by the Ministry of Agriculture and Cooperatives.

8.3 The inspection and certification bodies should ensure that at least the inspection measures and other precautions specified in Appendix G are applied in their systems.

9. DETAILS IN CULTURE AND PROCESSING ORGANIC SNAKESKIN GOURAMI

The organic snakeskin gourami culture and processing practices are to provide farmers, producers and operators with recommendations so as to produce in accordance with organic snakeskin gourami standard. The details are described in Appendix A.

Appendix A

Guidance for organic snakeskin gourami culture and processing (Sections 4 and 5)

The objectives of organic snakeskin provide farmers who have registered under the Aquaculturist or Fisheries Operator Registration with the competent authority, farmers, processors and interested people as guidance in accordance with the standard to be certified and to build up the trust to consumers. Principle of production, management, storage, transportation, processing, packaging and labelling for organic snakeskin gourami are as followings :

A.1 ORGANIC SNAKESKIN GOURAMI CULTURE

A.1.1 Transition to organic production

A.1.1.1 The transition period should be at least one production cycle from pond preparation to harvest. The transition period may be different depending on the previous land use history with an approval by the certification body.

A.1.2 Farm and farm location

A.1.2.1 Farm should be registered under the Aquaculturist or Fisheries Operator Registration..

Farmers should register in the Aquaculturist or Fisheries Operator Registration with the competent authority, the Department of Fisheries by contacting the designated local competent authority for such registration for the purpose of the national aquaculture information management. Farmers should have the legal rights on land use, ownership or rent.

A.1.2.2 Farm should not be located on the restricted area.

Farmers should culture the snakeskin gourami in the legal area. Farm should not be located in the conservation and protected areas such as forest conservation, mangrove, and national park as well as they should have the legal rights on land use, ownership or rent.

A.1.2.3 Suitability of location for organic snakeskin gourami culture.

The location should have suitable soil quality and ability to store water or be able to improve the condition for safe culture. The soil characteristics should be as follows:

Soil parameters	Tolerant values	Suitable values
pH (soil: water=1:1)	6.0 - 8.5	7.0 - 8.0
total phosphorus	50 mg/kg - 2,000 mg/kg	500 mg/kg - 1,000 mg/kg
potassium	10 mg/kg - 500 mg/kg	100 mg/kg - 300 mg/kg
organic carbon	0.5 % - 3.0 %	1.0 % - 2.0 %

Source : C. E. Boyd, 1995. *Bottom Soils Sediment and Pond Aquaculture*.

A.1.2.4 Farm location should be at distance or not be affected by pollution source or have a suitable preventive measure. The location should have a good drainage system. In case there is any doubt of risk involved, the soil and water should be analysed for parameters of such risk.

A.1.2.5 Farm location should be close to good water source and suitable for snakeskin gourami culture. Water should be sufficient for culture with good drainage system. Farm should not be in an area prone to flood or have good preventive measure, if necessary.

A.1.2.6 The location is accessible to facilitate the transportation of fry, feed, and production inputs as well as of farm produce to market place or processing plant in order to keep the freshness of snakeskin gourami. In addition, farm should have a suitable and sufficient infrastructures such as electricity, water supply system etc.

A.1.2.7 Environment and ecosystem should be conserved by tree planting of at least 5 % of total farm area.

A.1.2.8 Buffer zone should be provided to prevent the non-organic contaminations to organic snakeskin gourami culture.

The buffer zone between organic and non-organic snakeskin gourami culture pond should have a width of at least 3 meters (measuring from the upper edges) depending upon the risk level whereas buffer zone should be extended if high contamination risk from non-organic snakeskin gourami culture pond. If the risk is originated from water, the water holding pond should be provided before draining the water into organic culture pond in order to improve the water quality suitable for snakeskin gourami culture.

A.1.3 General management

A.1.3.1 Availability of organic aquaculture farm lay out

Farmer should have farm lay out and practices according to the organic aquaculture or organic agriculture manual of the competent authority such as the Department of Fisheries or other accepted techniques. Farm location map should be made available.

A.1.3.2 Culture pond water

A.1.3.2.1 Pond water quantity and quality should be suitable for organic snakeskin gourami culture.

(1) Culture pond

Organic snakeskin gourami culture pond or field should have ditches surrounded the pond or at least 2 sides. Common size of the ditch is at least 2 m. in width and at least 50-70 cm. in depth as shown in Figure A 1. The height of the dike should protect flood as shown in Figure A1 (a). Pond size should be bigger than 1.6 hectare for better production. Water drain should be provided for the convenience of harvest.

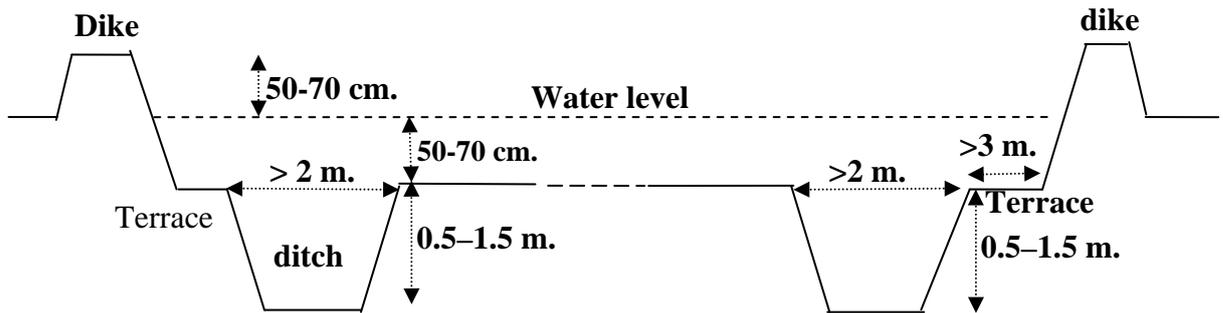


Figure A1(a) Cross Section Diagram

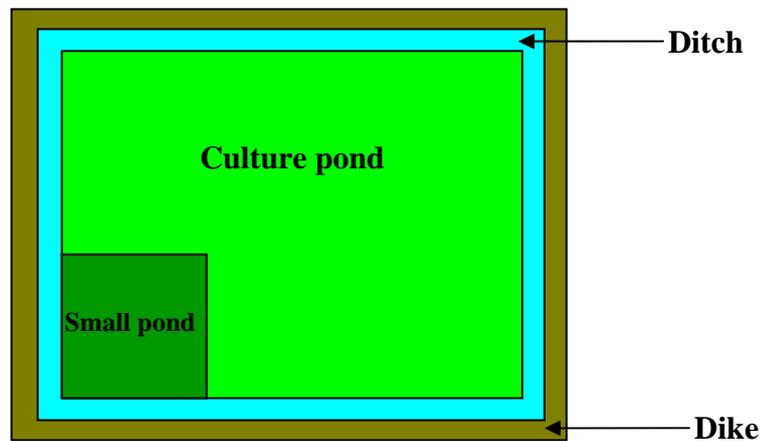


Figure A1 : snakeskin gourami culture pond

Note : For small pond see A.1.3.3.2

(2) The water quality for snakeskin gourami culture is as follows:

Parameters	Tolerant values	Suitable values
pH	6.5 – 9.0	7.0 – 8.0
Dissolved oxygen	3 mg/l	5 mg/l – saturated
Alkalinity	50 mg/l – 400 mg/l	75 mg/l – 150 mg/l
Hardness	50 mg/l – 400 mg/l	75 mg/l – 150 mg/l
Ammonia (NH ₃)	<0.1 mg/l	0.01 mg/l – 0.05 mg/l

Source : C. E. Boyd, 1990. *Water Quality and Pond for Aquaculture*.

By nature, snakeskin gourami feeds on plankton especially zooplankton which lives on water plants or decomposed grass, water insect larva and algae. When the fries are 20 days old, grass should be cut every other row and allowed to decompose as a source of plankton for snakeskin gourami feed. Grass should be cut again every other row in every 15 days to prevent water pollution that causes oxygen depletion and allow the cut grass to grow for the next round. During the culture, farmer should regularly observe the water colour by using Secchi disc, dipped into the water till the difference between white and black on Secchi disc cannot be seen. The suitable depth should be 30–40 cm. If such tool is not available, there is a simple alternative method by dipping hand into the water and observe the palm. When the water level reach the elbow (30–40 cm in depth) and the palm cannot be seen, meaning that the natural feed is sufficient.

If the depth of Secchi disc exceeds 40 cm or the palm can be seen deeper than elbow level meaning that natural feed is not sufficient. It is time to cut grass in the pond and pile up at the corner or spread over the pond as appropriate. The cut grass should be decomposed to give nutrients for increasing the plankton. If the previous practice does not provide sufficient plankton, the decomposed manure or by-product fertilizer from non-chemical agro-industry should be applied to at 100-200 kg/0.16 hectare. In this case, the lack of dissolved oxygen should be cautious due to the fact that a large amount of oxygen is utilized in the manure decomposition process thereby causing oxygen depletion and fish death. If the transparency level is less than 30 cm or palm cannot be seen at less than elbow level, meaning that there is too much amount of natural feed in pond. Water exchange should be done and fertilizer application should be stopped temporarily.

A.1.3.3 Broodstock and seedling release

A.1.3.3.1 Suitable stocking density of the organic snakeskin gourami broodstock or seedling is as follows:

(1) The quality of fry is an important factor for successful organic culture. Fry should be derived from organic snakeskin gourami broodstock and produced by the natural method. Hormone application to induce spawning should be strictly prohibited. Fry should be healthy, free from disease, good quality and well adapted to the environment.

(2) In case where the snakeskin gourami fry self-produced by farmers is not enough, organic snakeskin gourami broodstock or fry can be introduced or bought from other

sources. Either Movement Document (MD) or Fry Movement Document (FMD) should be provided to farmers and relevant stakeholders in order to know the origin of such source.

(3) Snakeskin gourami should be released at suitable stocking density because stocking density depends on the different culture and seedling stages as follows :

Type of culture systems	Sizes of broodstock /seedling	Stocking densities
Cutting grass to produce natural feed for fry	2-3 cm	5,000-8,000 tails/0.16 ha
	5-7 cm	3,000-5,000 tails/0.16 ha
Larvae producing from broodstock	>10 cm or >100 g	5 kg - 10 kg/0.16 ha (ratio of male to female = 1 : 1) If fries in the pond are unsufficiently produced , the additional fries should be released up to 2,000 - 3,000 tails/0.16 ha (€The size of the fry should be close to those in the pond and come from organic system)

(4) Snakeskin gourami production in the pond

Type of culture or culturing system	Fish weight in any culture period
No feeding	300 kg/0.16 ha
With Feeding	1,000 kg/0.16 ha

A.1.3.3.2 Natural snakeskin gourami breeding in organic system

(1) After snakeskin gourami reaches the market size, it is time to harvest snakeskin gourami by draining or using treadmill to drain water out of the culture pond. When fish are gathering into a cage or net or bag net at pond edge, the broodstock are carefully selected without losing scale, bleeding and tearing fins and kept them temporarily in the cage outside the culture pond. Normally, the size of 7-10 tails/kg is selected as broodstock and the remainings will be sold. After the pond is empty, prepare the broodstock pond within such harvested pond, which is usually 0.08-0.32 ha, by sun drying approximately 1-1.5 months. Eliminate all weeds and fish pest. Then, spread marl and dry compost from organic agriculture or natural agriculture. Subsequently, drain water through a one mm mesh size screen into the broodstock pond and transfer such broodstock into the prepared culture pond till the breeding season (April to August). At this period, increase the water level to flood the

prepared broodstock pond. The new water will motivate the broodstock into the culture pond where they will be ready for breeding.

(2) Before laying eggs, male will select the breeding ground and build up the nest which are made of bubbles among water plants that are not too dense. Normally, female prefers laying eggs in the shade to the out-shade. When the nest is already finished, fish will begin to mate. Male will chase female to beneath the nest and squeeze the female belly to release eggs and sperms will be ejected for fertilization process. Then male will keep the eggs in the mouth and spit them out beneath the nest. Eggs will adhere to the nest and hatch within a few days.

A.1.4 Culture management

A.1.4.1 Culture management plan should be available showing that snakeskin gourami are cultured in organic system at least two thirds of the life span in the total culture system.

A.1.4.2 Mainly use organic matter or agricultural by-product from organic production system or natural material without the prohibited materials contamination as specified in Appendix B.

A.1.4.3 Pond should be properly prepared and adjusted conditions of the bottom of the pond to be suitable for organic snakeskin culture. To culture organic snakeskin gourami in the earth pond, the process of proper pond preparation and improvement of the bottom of the pond are as follows :

(1) New pond. The pond should be dried. In case where the soil is acidic by observing the red-orange rust, flood and maintain the water for 7 days. Later on, the water is pumped out and the process is repeated until the the required pH of the soil is reached. In case where the water is insufficient to correct the acidic soil, calcite (marl) or dolomite is mutually applied throughout the area. The bottom of the pond should not be allowed to crack with long exposure to weather. In such case, the soil will be acid again.

(2) Old pond. After harvest, if there is a large amount of sludge, it should be dredged up and dried the pond bottom. Sludge or mud should not be placed on the pond dike or to public water. The sludge or mud should be gathered to the designated pond or ploughing the pond bottom 2 - 3 times to expose the bottom soil to oxygen and subsequently dried for about 2 weeks to change sludge to the fertile soil. Level the dike and bottom to be ready to use. In case where old pond with long culture time or having history of disease infection, calcite (marl) or dolomite at the rate of 100 – 200 kg/0.16 ha should be treated.

A.1.4.4 Abolishing snakeskin gourami enemies in accordance with organic principles.

In Snakeskin gourami culture, its enemies such as snake-head fish, climbing perch, freshwater eel, etc., probably entering the pond with pumped water, should be abolished before using the water in culture. After preparing the pond, pump water in through the filter so as to prevent fish enemies entering the prepared pond. For example, two fold 24-26 mesh filter net or a fine filter net may be used. In case there are a large number of fish enemies, the natural substances for abolishing the fish enemy can be applied if necessary. The recommended natural abolishing substances are as follows:

(1) Tea seed cake (tea seed cake in the market contains saponin about 10-20 %)

To abolish the snakeskin gourami enemies, tea seed cake should be used at the concentration of 15-25 mg/l depending on tea seed cake quality, water temperature, salinity, type and size of the fish enemy. Tea seed cake is toxic to fish and alter the quality of pond water such as reduction of dissolved oxygen and pH. It should be used carefully as it may cause snakeskin gourami's death in case that there is high concentration of saponin residues in the pond.

(2) Derris root

Concentration of derris root at 20-40 g/m³ of pond water should be used by pounding derris root and soak in the container overnight and then spreading over the pond. This root contains rotenone which is less toxic to homeothermic animal (warm-blooded animal) but more toxic to poikilothermic animal (cold-blooded animal) e.g. fish and insect. In case powder rotenone or 5% concentrated liquid rotenone is used, the concentration of 1-2 g or 1-2 cm³/m³ pond water should be used, respectively, by dissolving the powder or concentrated liquid in the water and spreading over the pond.

After filtration and abolishment, compost or compost fertilizer from agricultural industry by-product should be applied. The grass should be cut and scattered over the pond to allow the grass to decompose and release nutrients for plankton which will be increased and turn the water green or tea-color (light brown) suitable for culturing snakeskin gourami.

A.1.4.5 Effluent management

A.1.4.5.1 Effluent from organic production system should have quality as being prescribed by law.

Snakeskin gourami culture pond is defined as "Freshwater aquaculture pond type A" under the notification of Ministry of Natural Resources and Environment entitled Freshwater aquaculture discharge controlling standard. It is also prescribed that the type A pond larger than 10 Rai (1.6 hectare) from which the effluent discharge to public water sources or environment should be controlled. Discharge from the culture pond should not exceed the water quality standard prescribed by law as follows:

(1) BOD (Biochemical Oxygen Demand) not exceed 20 mg/l.

(2) Suspended solids not exceed 80 mg/l

A.1.4.5.2 Discharge should not cause any negative impact to the natural water sources and environment. Farmer should have at least 5% of the total culture area for storingsludge or sediment.

A.1.5 Production inputs.

A.1.5.1 Organic snakeskin gourami breeder and seedling

(1) Using broodstock from organic production system or nature with the good properties such as maturation, proper age, good health and growth, long stripes along the body, tolerance to environment and disease, giving a large amount of eggs or fries, and good breeding history. Also, the broodstock should have good physical properties such as complete organs, no deformity or abnormal shape, wound, broken fin and tail, disease or carrier. The broodstock should be ready to spawn at the age of 6-7 months with the weight of 100 g or above (at 7 months old, the size is 7 inch in length and the weight is 130 g or above). The size of mature snakeskin gourami's length should be above 10 cm but not more than 20 cm as the agility of larger fish are less.

In case of buying broodstock from outside, movement document (MD) issued by the Department of Fisheries should be provided. To avoid inbreeding, broodstock from other organic sources may be used together with the farm broodstock.

(2) Seedlings coming from organic breeding and nursing with good properties such as proper age, good health, and agility shall be used. Also, the seedlings shall have good physical properties such as complete organs and fins, bright eyes and scale, without wound, white puff, internal or external parasites, no deformity or abnormal shape, no paler/darker colour, no disease or carrier etc.

In case of buying fry from outside, fry movement document (FMD) issued by the Department of Fisheries should be provided.

A.1.5.2 Organic snakeskin gourami feed

Organic snakeskin gourami feed means complete feed, feed supplement or farm-made feed in accordance with TAS 9000 PART 3-2009.

A.1.5.2.1 Organic snakeskin gourami feed should have suitable quality to the size of snakeskin gourami and culture system.

A.1.5.2.2 In case of using the natural feed and/or the natural raw material, they should be complied with the requirements of TAS 9000 PART 3-2009 as the followings:

(1) originated from nature or organic agricultural production as stipulated in the TAS 9000 PART 1-2009: Production, Processing, Labelling and Marketing Organic Agriculture.

(2) should not be genetic engineering and modification.

(3) should not be through irradiation and solvent extraction process (except for the substances permitted under the TAS 9000 PART 1-2009).

(4)

Raw materials from nature should be derived from catching, harvesting and gathering with concerns on responsibility and sustainability of environment.

(5) to utilize the natural raw materials meaningfully, they should be from remains or other materials not used for human food.

(6) waste or by-product should be from the organic food production process.

(7) raw materials from aquatic animals or any part thereof should not be the same species of culture fish.

A.1.5.2.3 In case of on-farm production feed, the nutritional value should be suitable to the size and culture system of snakeskin gourami and should be complied with the requirements in Section 3.2 of TAS 9000 PART 3-2009 as follows:

(1) the properties of organic aquatic animal feed ingredients should be complied with Section A.1.4.2.1

(2) the ingredients from plant origin should be certified as organic. If necessary, the non-organic ingredients are allowed but not exceed 10 % of the total plant ingredients.

(3) all ingredients should come from the organic production. If necessary, synthetic ingredients can be used not exceed 5 % of total feed.

(4) the prohibited chemicals or synthetic materials under the Feed Quality Control Act B.E. 2525 (1982) and its amendments are not allowed.

(5) organic aquatic animal feed production

The on-farm organic aquatic animal feed production and storage should be in accordance with the organic agriculture principles and hygienic practices to reduce the cross contamination of aquatic animal feed and feed composition which may affect food safety.

(6) Record and record keeping

On-farm organic aquatic animal feed producer should collect and maintain the records on ingredients and all organic aquatic animal production procedures for traceability. All records, receiving dates and feed production data of each lot should be kept for at least 2 years.

A.1.5.2.4 In case complete feed is used, it should be complied with Section 3.3 of TAS 9000 PART 3-2009 as follows:

1) Production plant and management

Production plant should be certified with 'Good Manufacturing Practices' (GMP) and/or 'Hazard Analysis and Critical Control Point' (HACCP) by competent authority. The additional and essential practices are as the followings:

(1) The feed ingredient and additive storage area for organic aquatic animal feed production should be separated from the conventional ones.

(2) The machines should be used specifically for organic aquatic animal feed. If the machines are used for the conventional production, they should be totally cleaned prior to the organic production. The first portion of the production line is not yet regarded as organic so as to prevent the contamination of non-organic ingredients.

(3) The certified organic aquatic animal feed formula should be registered shouldwith the competent authority.

(4) Organic aquatic animal feed should be of good quality and meet nutritional requirements of the culture aquatic animal in both quantity and age.

(5) The record keeping of the organic production should be separated from the conventional one.

2) Containers, equipment and tools

Do not use containers, equipment and tools together with conventional feed production. If the machines are usedfor conventional feed production, they should follow Section A.1.5.2.4 (2).

3) Effluent management

ShouldThe treatment system for effluent from production plant should be in place and the effluent properties should be complied with the notification of the Ministry of Natural Resources and Environment.

4) Packaging and storing the organic aquatic animal complete feed should be complied with the requirements as follows:

(1) Container should be clearly labelled of “Organic aquatic animal feed”.

(2) The produced feed should be stored separately from conventional ingredients or conventional aquatic animal feed storage areas to avoid the cross contamination thereby designating the specific area with clear sign.

(3) The feed storage should be in good conditions such as a shady, cool, dry and well-ventilated place.

5) Labelling

In compliance with the TAS 9000 PART 1-2009 and the criteria and condition under the Feed Quality Control Act B.E. 2525 (1982) and its amendments.

However, during organic aquatic animal system production period, natural or organic agricultural ingredients may be not enough. Certification body may allow the feed composition partly not conformed to this requirements but should the conformed composition should be at least 60 %, if farmer can demonstrate to the certification body that the non-conformed composition are applied due to the unforeseeable of the natural, climate or manmade conditions .. Certification body may defer the non-conformed composition of less than 60 % in a limit period. Besides, at least 50 % of aquatic animal protein composition should be derived from the remaining or other materials not suitable for human consumption. Vitamins and minerals in feed should be mainly from natural source. Synthetic vitamins and minerals should be approved by certification body or relevant competent authority.

A.1.5.2.5 Feed ingredients, feed and feed supplement should be separately, hygienically and orderly stored in clean building not exposed directly to sunshine, heat, and rain with good ventilation. Feed bags should be placed on pallets to keep space from both floor and wall to avoid humidity causing mouldy feed. They should be also stored orderly by categories with first-in first-out principle. The pest control system such as for mice should be in place.

A.1.5.3. Materials, equipment and tools

A.1.5.3.1 Materials, equipment and tools in organic farming such as lime, compost etc. should not be contaminated by non-organic. The organic production inputs should be orderly and separately stored in the buildings from conventional inputs. The storage should be clean, hygienic and well ventilated. Production inputs should be placed on pallets to keep space from both floor and wall to avoid humidity or heat damage. They should be also stored orderly by categories with first-in first-out principle. The pest control system such as for mice, cockroach, fly, bird, dog, cat etc. should be in place.

A.1.5.3.2 Natural fertilizer should be obtained from remains or by-products of organic farming or nature and should be complete decomposition or drying. If the agro-industrial by-products are used, they should not be contaminated with synthetic or chemical process and be approved by certification body.

A.1.5.3.3 Micro-organisms used in organic culture system should not come from genetic modification.

A.1.5.4 Chemical or synthetic substances

A.1.5.4.1 Chemical or synthetic substances or antibiotics including materials prohibited in aquatic animal feed as mentioned in Appendix D, should not be allowed. If necessary, substances or natural materials as mentioned in Appendix C would be allowed.

A.1.6 Farm sanitation

Farm hygiene management should be practiced to ensure that the organic snakeskin gourami products are safe and fit for consumption. Recommendations for hygiene management are as follows:

A.1.6.1 Farm workers should be in a good hygiene, no contagious disease or objectionable disease. If workers are suffered from such diseases, temporary suspension should be required, if necessary the worker should be treated till recovery to normal condition before coming back to work. .

A.1.6.2 Sewage and waste from the household should be separated from the culture pond by providing the discharge system separated from culture system to prevent the contaminations..

A.1.6.3 Toilet should be separated from culture pond and provided with hygienic waste management to prevent the contamination organic culture pond. No pets such as dog, cat, etc. is allowed in the culture pond. Besides, there should be bacterial contamination monitoring system particularly those causing gastrointestinal disease thereby sampling pond water to analyse total coliform which should be controlled to less than 5,000 MPN/100 ml (most probable number per 100 milliliters) and fecal coliform to less than 1,000 MPN/100 ml (most probable number per 100 milliliters). If the bacteria exceed the controlled levels, it implies that there is contamination from toilet or household sewage or excretion of human and pet.

A.1.6.4 Proper waste management for animal carcasses, feed and other production input containers, including other expired or unused production inputs should be in place. For instances, aquatic animal carcasses should be buried or burnt; the expired or unused production inputs should be destroyed by recommendations by veterinarian, fishery biologist or of label etc.

A.1.6.5 Garbage and refuse of the farm should be disposed and destroyed properly. Garbage bin with lid should be provided to prevent the carrier animals such as fly, mice, cockroach etc. and rummage by pet. Garbage should be disposed in the designated area and eliminated properly.

A.1.6.6 Residence, feed preparation premise and housing should be regularly cleaned and in order.

A.1.7 Health Management

A.1.7.1 Snakeskin gourami's general health management should be emphasize on management and environment of the culture pond. Recommendations for snakeskin gourami health management are as follows:

A.1.7.1.1 Snakeskin gourami health should be regularly inspected and fish behavior should be observed such as swimming, morning surfacing and feeding. The inspection should be done and recorded on daily basis. Water quality monitoring should be implemented. Each week, those inspection and record should be assessed for fish health. In addition, the disease outbreak within vicinity should be monitored.

A.1.7.1.2 If a large number of snakeskin gourami show unusual behaviour, the preliminary causes should be found out. The environmental management of the pond should

be considered as far as possible such as water filling, feed reduction, aeration, etc. before deciding to use pest and disease control substances that are allowed in organic production.

A.1.7.1.3 If a large number of fish die unusually, the authorized officers should be notified immediately to find solutions for disease outbreaks to nearby farms. The proper technical method of carcass disposal and treatment of infected water should be provided such as collecting the dead fish from the culture pond, using disinfectant or lime prior to burying or burning, etc. The infected water in culturing or nursing pond should be treated before discharge.

A.1.7.2 Disease control and treatment

A.1.7.2.1 Disease control and treatment should be technically provided and in line with organic integrity. The disease prevention should be appropriately managed such as low stocking density, cleaning equipment and tools regularly, feeding with good quality feed, reducing feed supply according to fish behaviour, using feed supplements or vitamins conformed with organic principles, etc. If fish are sick, the treatment and cause should be provided and found out immediately. The solution using environmental management should be considered as far as possible such as water filling, feed reduction or stop feeding, etc. before deciding to use veterinary drugs and chemicals. If it is necessary to use chemical or animal drug as a treatment, those should be the items that are permitted in organic production.

A.1.7.2.2 Preventive measures and disease outbreak management should be provided under organic integrity. Such measures and management should have the least impact on the human and environment.

A.1.8 Harvesting, Post-harvest handling and Marketing

A.1.8.1 Harvesting

This is the last important step in organic snakeskin gourami culturing to keep the organic quality. That is due to the fact that, after this step, the product will be distributed for domestic consumption and export. Farmers should take good care of harvesting by setting up harvest plan harvest steps and method, and sale contracts. Recommendations are as follows:

A.1.8.1.1 Plan for harvesting and marketing should be in place in order to maintain the freshness and minimize the stress of the fish and to prevent contamination during and after harvest as well as to maintain the organic integrity. Farmers should practise as follows:

(1) No feeding at least 1 day before harvest to allow the gourami excretes so as to keep freshness during transportation. Healthy fish should be harvested to keep good quality of organic products.

(2) The appropriate harvest method should be used to prevent bruising on snakeskin gourami such as using plastic basket, by gently placing snakeskin gourami to the container, and not to stack too many layers which may cause the fish at the bottom to be damaged. During harvest, hygienic practices and management of the gourami should be in place to keep snakeskin gourami products in good quality and safe for consumers.

(3) Containers and tools used for harvesting should not affect the quality, shelf life and cause the non-organic contamination such as chemicals. Also, snakeskin gourami should be prevented from direct contact to the ground.

(4) Containers and tools used for harvest organic snakeskin gourami should be separated from non-organic use. They should be in a good condition and ready for use. After each use, those containers and tools should be cleaned immediately to avoid accumulation of microorganism.

A.1.8.1.2 If there is a risk of chemical contamination especially veterinary drugs or prohibited chemicals in snakeskin gourami culturing as mentioned in Appendix D, snakeskin gourami should be sampled for the chemical residue analysis prior to harvesting.

A.1.8.1.3 Hygienic practices and management of the gourami should be in place during harvesting. Snakeskin gourami should be prevented from direct contact to the ground. The post harvest handling should be in place to prevent the contamination from containers, workers or mode of transportation. Snakeskin gourami should be kept in good quality during transportation to maintain freshness.

A.1.8.2 Movement Document (MD) issued by the Department of Fisheries (DoF) or any authorized agencies should be made available. This is to inform consumers and stakeholders to know the origin of organic snakeskin gourami products.

A.1.9 Training

Farmers and workers should have knowledge or be technically trained on organic principles and practices in culturing techniques, input use, and harvesting, including the training on laws and regulations concerning the organic aquaculture to enhance and improve knowledge of farmers and relevant farm workers for appropriate practices.

A.1.10 Records and record keeping

A.1.10.1 Record the transition period for organic, culturing steps and harvesting

A.1.10.1.1 Farmer should have a clear farm management plan on transition period and culturing for approval by the certification body .

A.1.10.1.2 Transition plan should provide explicit information of the area applied for certification as follows:

- (1) farm history
- (2) transition plan and period
- (3) land use history

A.1.10.1.3 Farmers should have records on organic snakeskin gourami culturing starting from broodstock and fry origin, feeding record in both type and quantities, culturing management, veterinary drug and chemical use, water quality, growth, health observation and product management such as harvesting quantity etc. so as to achieve efficient organic culturing. Data can be reviewed for the efficient improvement of the sustainable management system.

A.1.10.2 Records should be regularly updated.

A.2 HANDLING, STORAGE, TRANSPORTATION, PROCESSING AND PACKAGING

The separation of organic from non-organic should be maintained. Also, contamination of non-permitted substances should be avoided to maintain organic integrity as follows:

A.2.1 During storage and transport, the organic produce should be managed with the following precautions:

A.2.1.1 Organic snakeskin gourami produce should be protected at all time from co-mingling with non-organic produce and products.

(1) In transportation, organic snakeskin gourami should be separated from those coming from other non-organic production systems. The products should be identified with clear tags or labels to separate from each other with document showing the product origin.

(2) Suitable and efficient management should be in place to achieve transportation in due time and avoid increasing stress of the fish.

(3) Hygienic practices during transportation should be maintained. Suitable tools, containers or vehicles should be clean and should be free from contamination of hazardous substances. Truck used for loading soil, animal, animal manure, fertilizer and chemical should not be used because the produce may be contaminated with pathogens and toxic substances unless they are properly cleaned before loading snakeskin gourami. Such practices should also prevent organic snakeskin gourami products from non-organic product and non-permitted substance contaminations throughout transportation process from producer to distributor.

A.2.1.2 Organic snakeskin gourami produce and products should be prevented at all time from non-permitted substances.

A.2.2 If the snakeskin gourami farm is partially organic certified, the clear identity of the organic product should be managed separately from the non-organic products.

A.2.3 Processing

A.2.3.1 The use of mechanical, physical or biological process for dried organic snakeskin gourami or dry-salted organic snakeskin gourami such as salting/salting with ice and drying are recommended. The use of non-agricultural ingredients should be minimized. The synthetic substances should not be used except for the processing aids that are listed in Appendix E, Tables E.1 and E.2, and other substances conformed with Section 9 and Appendix A, Table A.5 of TAS 9000 PART 1-2009. The organic snakeskin production and processing such as dried organic snakeskin gourami should follow the details mentioned in Appendix A of this standard with additional details as follows:

(1) Processing management should be conformed to the principles of Good Manufacturing Practices (GMP) including relevant provisions on good hygienic practices in relevant standards. The process of organic snakeskin gourami process should be separated from non-organic such as processing line, production lot.

(2) Ingredients and materials used in organic snakeskin gourami processing, such as salt, should be permitted to use as food ingredients in accordance with TAS 9000 PART 1-2009 or the Table in Appendix E.

(3) If the tools and equipment such as knife, container etc. are used for organic and non-organic processing, those tools and equipment should be cleaned before organic production. The cleaning agents should be permitted for use in accordance with the TAS 9000 PART 1-2009 or the Table in Appendix F.

A.2.4 Packaging

Packaging should be environmentally friendly, reused and made from bio-degradable materials, and maintain the quality of organic snakeskin gourami.

A.2.5 Storage and transport

A.2.5.1 The organic integrity of the snakeskin gourami produce or product should be maintained during storage, transportation and handlings by using the following precautions:

A.2.5.1.1 Organic snakeskin gourami produce and/or products should be protected at all time from co-mingling with non-organic produce and products. Products should be separately stored or identified with clear tags or labels with document showing the origin of

ingredients and products for examination. The products should be kept at low temperature to prevent deterioration.

A.2.5.1.2 Organic snakeskin gourami produce and/or products should be protected at all time from contact with materials and substances that are not permitted to use in organic agriculture.

A.2.5.2 In case where the snakeskin gourami produce and/or products are partly certified, it should be stored and managed separately from the non-organic produce and/or products with a clear identification.

Appendix B

**Table B.1 Agricultural inputs to be used as fertilizers
and pond conditioner in aquaculture**

(Section 4.4.3)

Substances	Details/Requirements
1. The permitted organic substances	
1.1 organic fertilizer that are produced from organic materials such as the compost from fermented humus, rice straw, sawdust, bark, wood chips and other agricultural by-products.	-If not come from organic production system, it is necessary to be recognized by certification body. -If inorganic substances are added to provide nutrients such as phosphate rock, they must be permitted.
1.2 manure	-If not come from organic production system, it is necessary to be recognized by certification body or relevant competent authority.
1.3 green manure, fresh crop residues and farm by-product in organic matter form.	-If not come from organic production system, it is necessary to be recognized by certification body or relevant competent authority.
1.4 By-product from slaughterhouses, industrial factories such as sugar factories, casava factories, fish sauce factories.	- synthetic substances should not be added and the substance need to be recognized by certification body or competent authority- or relevant competent authority.
1.5 growth control substances for aquatic animals which are free from synthetic substances.	-If not come from organic production system, it is necessary to be recognized by certification body or relevant competent authority.
1.6 bacteria, molds and enzymes	-If not come from organic production system, it is necessary to be recognized by certification body or relevant competent authority.
2. permitted inorganic substances	
2.1 phosphate rock	-
2.2 ground limestone in the form of calcite or dolomite. Baked dolomite is prohibited.	-
2.3 calcium silicate	-
2.4 sodium silicate	-
2.5 magnesium sulfate	-

**Table B.1 Agricultural inputs to be used as fertilizers
and pond conditioner in aquaculture (continued)**

Substance	Details/Requirements
2.6 clay minerals such as smectite, kaolinite, chlorite etc.	-
2.7 perlite, zeolite, bentonite	-
2.8 rock potash, potassium salt with less than 60 % chloride	-
2.9 calcium from seaweed	-
2.10 seashells	-
2.11 potassium sulphate produced by physical processes	-
2.12 rock salt	-
2.13 oxygen	-

Appendix C

Substances for plant pest and disease control (Section 4.4.4)

The substances should be complied with the requirements in Appendix A of TAS 9000 PART 1-2009 and revised version or as follows:

Substances	Details/Requirements
1. tea seed cake	Eradicate another fishes that may be pests of snakeskin gourami in pond preparation.
2. rotenone	Eradicate another fishes that may be pests of snakeskin gourami in pond preparation.
3. potassium permanganate	Defer to use in hatcheries under the advice of fisheries biologists or veterinarians.
4. hydrogen peroxide	
5. povidone iodine	

Appendix D
Prohibited chemicals and materials in aquatic animal feed
(Section 4.5.4.1)

Chemicals and materials that are prohibited to use in aquatic animal feed are as follows:

1. all kinds of pharmaceutical chemicals and antibiotics
2. urea
3. pure amino acid
4. synthetic appetizers
5. ingredients or products that are genetically modified
6. synthetic colour additives
7. chemicals or other ingredients that are prohibited to use in aquatic animal feed under the notification of the Feed Quality Control Act.

Appendix E

Substances for processing of organic snakeskin gourami products

(Section 5.3.1)

Substances for processing organic snakeskin gourami products should be complied with the requirements in Appendix A of TAS 9000 PART 1-2009, the Thai Agricultural Standard on Organic Agriculture Part 1 : the Production, Processing, Labelling and Marketing of Produce and Products from Organic Agriculture, and revised version or as follows:

Table E.1 Substances for processing of organic snakeskin gourami products.

(Section 5.3.1)

Substances	Details/Requirements
1. flavouring substances	- substances and products that labelled as natural flavouring substances or natural flavouring preparations should be in accordance with the requirements of national legislation. - allow to use as necessary and legitimately in food products only.
2. drinking water	-
3. salt	- sodium chloride or potassium chloride as main components generally used in food processing. - allow to use as necessary and legitimately in food products only.

Table E.2 Processing aids that may be used for preparing products from agricultural origin

(Section 5.3.1)

INS	Substances	Details/Requirements
	vegetable oils	- as lubricants or anti-adherents and waxing the fish skin.

Appendix F

Cleaning agents

(Appendix B.2.3(4))

Substances should be complied with the requirements in Appendix A of the TAS 9000 PART 1-2009, Thai Agricultural Standard on Organic Agriculture Part 1 : the Production, Processing, Labelling and Marketing of Produce and Products from Organic Agriculture, and the revised version or as follows:

Table F.1 Cleaning agents.

Substances	Details/Requirements
1. biodegradable detergents	- necessary to be recognized by certification body or relevant competent authority.
2. plant vinegar, fruit vinegar	- necessary to be recognized by certification body or relevant competent authority.
3. sodium bicarbonate	- necessary to be recognized by certification body or relevant competent authority.
4. hydrogen peroxide	- necessary to be recognized by certification body or relevant competent authority.
5. iodine	- necessary to be recognized by certification body or relevant competent authority.
6. potassium permanganate	- necessary to be recognized by certification body or relevant competent authority.
7. alkali water	- necessary to be recognized by certification body or relevant competent authority.
8. caustic potash	- necessary to be recognized by certification body or relevant competent authority.
9. lime	- necessary to be recognized by certification body or relevant competent authority.
10. bleaching agent not morethan 10 %	- necessary to be recognized by certification body or relevant competent authority.

Appendix G

Minimum inspection requirements and precautionary measures under the inspection and certification system

G.1 INSPECTION MEASURE

Inspection measures are necessary across the whole food chain to verify product labelled according to Section 8 of this standard. The certification body should establish policy and procedures in accordance with this standard.

G.2 ACCESSIBILITY TO DOCUMENTATION

Access by the inspection body to all written and/or documentary records and to the establishment under the inspection scheme is essential. The operator under an inspection should also give access to the authorised personnel and provide any necessary information for third party audit purposes.

G.3 PRODUCTION UNITS

G.3.1 Production according to this standard should take place in a unit where the land parcels for agriculture or aquaculture, production areas, farm buildings and storage facilities for crop, livestock and aquatic animal are clearly separated from those of any other unit which does not produce according to this standard. In addition, the production unit may have specific activity to prepare and pack of its own produce.

G.3.2 When the inspection arrangements are first implemented, the operator and the certification body should draw up and sign in a document which includes:

G.3.2.1 a full description of the production unit and/or collection area showing building, farm storage and production area. Besides, where applicable, specific building where certain preparation and/or packaging operations take place are also shown.

G.3.2.2 in case of collection of wild plants, the guarantees given by certification body, if possible, which the producer can provide to ensure that the conformity in Section 4 to Section 7 of this standard are satisfied.

G.3.2.3 all the appropriate practical measures to be taken at the level of the unit to ensure compliance with this standard.

G.3.2.4 the date of the last application on the land parcels and/or collection areas concerned of products the use of which is not compatible with Section 4 of this standard.

G.3.2.5 an undertaking by the operator to carry out operations in accordance with Section 3 and Section 8 of standard to accept, in event of infringements, implementation of the measures of this standard.

G.3.3 Each year, before the date indicated by the certification body, the operator should notify the certification body of its schedule of production of crop, livestock and aquaculture, giving a breakdown by land parcel/herd, flock or hive and aquaculture.

G.3.4 The operator should keep records and documentary accounting system of production inputs, produce and/or products which enable the certification body to trace back the origin, nature and quantities of all raw materials bought, and the use of such inputs. In addition, the consignees documents of all produce and/or products sold should be kept. Quantities sold directly to the final consumer should preferably be accounted for on a daily basis. When the

unit itself processes agricultural products, its accounts should contain the information required in G.4.2 of this Appendix.

G.3.5 All livestock should be identified individually or, in the case of small mammals by herd; poultry by flock; bees by hive. Written and/or documentary accounts should be kept to enable tracking of livestock and bee colonies within the system at all time and to provide adequate traceback for audit purposes. The operator should maintain details and up-to-date records of :

G.3.5.1 breeding and/or origins of livestock;

G.3.5.2 registration of any purchases;

G.3.5.3 the health plan to be used in the prevention and management of disease, injury and repeated problems;

G.3.5.4 all treatments and medicines administered for any purpose, including quarantine periods and identification of treated animals or hives;

G.3.5.5 feed provided and the source of the feedstuffs;

G.3.5.6 stock movements within the unit and hive movements within designated forage areas as identified on maps;

G.3.5.7 transportation, slaughter and/or sales.

G.3.5.8 extraction, processing and storing of all bee products.

G.3.6 Storage of inputs, other than those prohibited in this standard.

G.3.7 The certification body should ensure that a full physical inspection is undertaken, at least once a year, of the unit. Samples for testing of products that not listed in this standard may be taken where their use is suspected. An inspection report should be drawn up after each visit. Additional occasional unannounced visits should also be undertaken according to need or at random.

G.3.8 The operator should give the certification body, for inspection purposes, access to the storage, production areas and to the parcels of land, as well as to the accounts of production inputs, produce and/or products and relevant supporting documents. The operator should also provide the inspection body with any information deemed necessary for the purposes of the inspection.

G.3.9 Organic produce and/or products which are not contained in their packaging for the end consumer should be transported in a manner which prevents contamination or substitution of the content with substances or products not compatible with this standard and subjected to the following informations:

G.3.9.1 name and address of the person responsible for the production or preparation of the product;

G.3.9.2 name of the product; and

G.3.9.3 the product is of organic status.

G.3.10 Where an operator runs several production units in the same area and parallel cropping, such units should be subjected to the inspection arrangements. Non-organic produce or products should not be produced together with organic produce and products of indistinguishable varieties.

G.3.10.1 If derogations are allowed by the certification body or the competent authority, the authority should specify the types of production and circumstances for which

derogations are granted; the supplementary inspection requirements; additional documentary requirements; and assessment of an operation's ability.

G.3.11 In organic livestock production, all livestock on one and the same production unit should be reared in accordance with the rules laid down in this standard. However, livestock not reared in accordance with this standard may be presented on the organic holding provided that they are separated clearly from livestock produced in accordance with this standard. The competent authority can prescribe more restrictive measures.

G.3.12 The competent authority may accept that animals reared in accordance with the requirements of this standard may be grazed on common land, provided that:

G.3.12.1 such land has not been treated with products other than those allowed in accordance with requirement in No.4 of this standard, for at least three years;

G.3.12.2 a clear segregation between the animals reared in accordance with the requirements of this standard, and the other animals.

G.3.13 For livestock production, the competent authority should ensure that the inspections related to all stages of production, preparation up to the sale to the consumer, and ensure, as far as technically possible, the traceability of livestock and livestock products from the livestock production unit through processing and any other preparation until final packaging and/or labelling.

G.4. PREPARATION AND PACKAGING UNITS

G.4.1 The producer and/or operator should provide the following information:

G.4.1.1 A full description of the production unit, showing the facilities used for the preparation, packaging and storage of agricultural products before and after the operations concerning them;

G.4.1.2 All the practical measures to be taken at the level of the unit to ensure compliance with this standard.

G.4.1.3 This description and the measures concerned should be signed by the responsible person of that production unit and the certification body.

G.4.1.4 The report should include an undertaking by the operator to perform the operations in such a way as to comply with requirements in Section 3 to Section 7 of this standard and corrective action reports in both minor and non-conformity; in case of severe major non-conformity or that cannot be rectified to comply with this standard. And the report should be countersigned by both parties.

G.4.2 Written accounts of production inputs, produce and/or products should be kept enabling the certification body to trace:

G.4.2.1 the origin, nature and quantities of organic produce and/or products which have been delivered to the unit;

G.4.2.2 the nature, quantities and consignees of organic produce and/or products which have left the unit;

G.4.2.3 any other information such as the origin, nature and quantities of ingredients, additives and processing aids delivered to the unit and the composition of processed products, that is required by the certification body for the purposes of proper inspection of the operations.

G.4.3 In case that non-organic produce and/or products are also processed, packaged or stored in the related unit:

G.4.3.1 the unit should have separate areas within the building for the storage of produce and/or products before and after the operations;

G.4.3.2 operations should be carried out continuously until the complete run has been dealt with, separated by place or time from similar operations performed on non-organic produce and/or products;

G.4.3.3 if such operations are not carried out frequently, they should be announced in advance, with a deadline agreed on with the certification body or competent authority;

G.4.3.4 every measure should be taken to ensure identification of lots and to avoid mixtures with products not obtained in accordance with the requirements of this standard.

G.4.4 The certification body or competent authority should ensure that a full physical inspection, at least once a year, of the unit. Samples for testing of products not listed in this standard may be taken where their use is suspected. An inspection report must be drawn up after each visit by the person responsible for the unit inspected. Additional occasional unannounced visits should also be undertaken according to need or at random.

G.4.5 The operator should give the certification body or competent authority, for inspection purposes, access to the unit and to written accounts and relevant supporting documents, including any other information necessary for the purposes of inspection.

G.4.6 The requirements in respect to the transport as laid down in Section G.3.8 of this Appendix are applicable.

G.4.7 On receipt of organic produce and/or products, the operator should check the followings:

G.4.7.1 the container or package is in a sealed condition. (if required to be sealed);

G.4.7.2 the presence of the document mentioned in Section G.3.8 of this appendix, the result of this verification should be explicitly mentioned in the written accounts of production inputs and produce and/or products referred to in Section 4 - Section 7 of this standard. When there is any doubt that the product cannot be verified according to the production system provided in Section 10 (Inspection and Certification System) of the TAS 9000 PART 1-2009, the Thai Agricultural Standard on Organic Agriculture Part 1: the Production, Processing, Labelling and Marketing of Produce and Products from Organic Agriculture, the produce and products should not be claimed as organic.

Appendix H

Unit

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

Item	Unit	Symbol
length	centimeter	cm
	meter	m
concentration	milligram per liter	mg/l
	milligram per kilogram	mg/kg
volume	cubic meter	m ³
	liter	L
	cubic centimeter	cm ³
mass	milligram	mg
	gram	g
	kilogram	kg