



GUIDELINES FOR THE USE OF CHEMICALS IN AQUACULTURE AND MEASURES TO ELIMINATE THE USE OF HARMFUL CHEMICALS

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Guidelines for the Use of Chemicals in Aquaculture and Measures to Eliminate the Use of Harmful Chemicals

The ASEAN Secretariat

Jakarta

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The ASEAN Secretariat is based in Jakarta, Indonesia.

For inquiries, contact:
The ASEAN Secretariat
Public Outreach and Civil Society Division
70A Jalan Sisingamangaraja
Jakarta 12110
Indonesia
Phone : (62 21) 724-3372, 726-2991
Fax : (62 21) 739-8234, 724-3504
E-mail : public@asean.org

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the ASEAN Website: www.asean.org

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2. AIM AND PURPOSE

This set of guidelines has been developed to help national regulators and stakeholders on managing the diverse use of chemicals in aquaculture. It recognising the existing variation in capacity among AMS but has been designed so that it could be adopted and implemented within the specific policy and legal framework of each country.

This document aims to provide guidance for Competent Authorities (CAs) in standards setting / regulating the use of Chemicals in Aquaculture and Measures to Eliminate the Use of Harmful Chemical among AMS. AMS are encouraged to assess and review gaps at their national level with regard to chemicals used in aquaculture, as listed in this document.

Furthermore, it would also help to develop measures to eliminate the use of harmful chemicals in aquaculture; and it is further envisaged that a harmonised regional set of guidelines for the use of chemicals in aquaculture for ASEAN could be produced.

The purpose of this set of guidelines is to list the major chemicals and other substances commonly used in AMS. This set of guidelines will also list the banned chemicals that should not be used or practiced by farmers or aquaculturist in all AMS. The list was compiled and agreed from previous workshops to assess and review gaps exist among AMS with regards to chemical use in aquaculture.

3. FOREWORD

The 9th ASEAN Summit in Bali, Indonesia in October 2003 adopted the declaration of ASEAN Concord Bali II (Bali Concord II) aimed at making the Southeast Asian region a more dynamic and stronger segment of the global supply chain and the world economy. Under the Declaration, ASEAN has committed to deepen and broaden its internal economic integration linkages, with the participation of the private sector, to realize an ASEAN Economic Community (AEC).

In the following year (2004), ASEAN at its 10th Summit in Vientiane saw the Leaders signed the Framework Agreement for Integration of Priority Sector. An individual protocol including ASEAN Sectoral Integration Protocol for Fisheries was developed and signed. Attached to the protocol is the ASEAN Roadmap for Integration of Fisheries Sector. It lays down both specific measures that are of direct relevance to fisheries sector as well as common issues that cut across all priority integration section to be implemented with timeline until 2010.

In the wake of slow integration of priority sectors, 12th ASEAN Summit in 2006 Philippines adopted a second phase of that Agreement. The previously set timelines in 2004 was extended in view of real situation and constraint. Prior to that, at the 13th meeting of ASEAN Sectoral Working Group on Fisheries (ASWGFi) in Myanmar in 2005, Malaysia along with Singapore and Thailand had been tasked to lead the implementation of several specific issues in view to accelerate the integration of fisheries sector.

During the 13th ASEAN Summit in Singapore in November 2007, the ASEAN Leaders signed the Declaration on the ASEAN Economic Community Blueprint to realise the AEC. The role of the AEC Blueprint is to offer AMS a short to medium term strategic plan towards 2015. Under the AEC Blueprint, a number of actions have been identified for integration of food, agriculture and forestry sectors. Based on the goals and actions outlined in the AEC Blueprint, a Scorecard was developed for monitoring the progress of the implementation of AEC Blueprint over the period from 2008 to 2015.

The Regional Workshop on Implementing the ASEAN Roadmap for Integration of Fisheries Sector was timely held from 16-18 January 2008, in Bangkok prior to the convening of 14th ASEAN Summit. The Roadmap has provided a good guide both for Lead AMS as well as other AMS as to how to carry out their responsibilities.

Subsequently, during the 14th ASEAN Summit, the Leaders signed the Cha-am Hua Hin Declaration on the Roadmap for the ASEAN Community (2009-2015), comprising three pillars: Political Security Community, Economic Community, and Socio Cultural Community. As a result, the Leaders agreed that the Roadmap shall replace the Vientiane Action Programme (VAP).

Based upon the AEC Scorecard, Malaysia further undertook the responsibility to promote harmonization as laid down in its measure 1.8 for ASEAN to *"Harmonise guidelines for the use of chemicals in aquaculture and measures to eliminate the use of harmful chemicals by 2009"*. In the interest of the time and to ease draft guidelines preparation, a questionnaire was carried out in 2009 to all AMS. Specific recommendations by the Regional Workshop on Implementing the ASEAN Roadmap for Integration of Fisheries Sector held in Thailand in 2008 guided Malaysia to form a Working Committee (WC), and this Committee was tasked to maintain networking until the end of the process, including circulating the final draft of the guidelines.

The First Regional Workshop on Harmonisation of Guideline for the Use of Chemicals in Aquaculture and Measures to Eliminate the Use of Harmful Chemical was held on 2-3 December 2009. The objectives of this first workshop were to assess and review gaps exist among AMSs with regards to chemical use in aquaculture, and to develop a common list of harmful chemicals used in aquaculture. Delegates attending the workshop updated the details of the questionnaire and gave clarifications on the current status of the use of chemicals in aquaculture in their respective countries.

On 25-26 November 2010, Malaysia hosted the Second Regional Workshop on Harmonisation of Guidelines for the Use of Chemicals in Aquaculture and Measures to Eliminate the Use of Harmful Chemicals. This workshop was specifically conducted to list the commonly use chemicals in aquaculture, and to develop a harmonised guideline for ASEAN.The Third Regional Workshop to Finalise Guideline for the Use of Chemicals in Aquaculture and Measures to Eliminate the Use of Harmful Chemical was again hosted by Malaysia on the 9-12 July 2012. This third and final workshop was carried out to develop and finalise common measures to eliminate the use of harmful chemical in aquaculture; and to finalise the draft harmonised guideline for the use of chemicals in aquaculture for ASEAN from all ASEAN Member States.

4. BACKGROUND AND INTRODUCTION

Aquaculture activity is an important fishery sector for the production of fish for food consumption and ornamental purpose. Aquaculture is an established and growing industry to all ASEAN Member States, and an increasingly important supplier of foods for consumers. Aquaculture is an important contributor to the agriculture economy, and provides as a source of income to the community who depends on it entirely to their social-economic livelihood.

All aquaculture operations will have a demand for drugs and other chemicals. The use of these drugs and chemicals may be used for: i) Disinfectants, ii) Herbicides, piscicide and pesticides used in pond maintenance, iii) Spawning aids, and iv) Vaccines used in disease prevention. There may be other reasons why these chemicals are used in aquaculture operations, but it is critical that aquaculturists should have access to regulated and controlled chemicals that are safe and effective and apply them in a manner that is consistent with their intended use, best management practices, and relevant rules and regulations.

Aquaculture its should be aware of the risks involved when handling chemicals, and their potential impacts on the environment and food safety.The use of chemicals and drugs should have a sufficient regulatory system in place. The uncontrolled and indiscriminate use of antibiotic or drugs in aquaculture may lead to the emergence of antimicrobial resistant (AMR) organisms.

These benefits too are outweighed by concerns with regard to the use of chemicals in aquaculture. These include human health concerns related to the use of feed additives, chemotherapeutants, hormones, disinfectants and vaccines; and also concerns related to product quality such as issues of chemical residues in aquaculture products.

The practice of using drugs and chemicals in aquaculture operations in the ASEAN region currently are not fully regulated and controlled by Competent Authorities. Aquaculturists is currently applying ‘best practiced’ and ‘know-how’ on using this chemicals.

This guideline is intended to serve as a resource to assist aquaculturists to use regulated drugs and chemicals legally and properly. The principles outlined in this guideline are intended to provide directions for the use of drugs and other chemicals in ways that ensure the safety of treated animals, end-users, consumers and to the environment.

5. TERMS AND DEFINITION

Anesthetic

A substance or drug that causes temporary loss or bodily sensation.

Antibiotic

A substance produced by or derived from certain fungus, bacteria or other microorganism, that can destroy or inhibit the growth of other microorganism and is used to prevent and treat infectious diseases.

Antimicrobial

An agent that kills microorganisms or suppresses their multiplication or growth.

Aquaculture

Science, art and business of cultivating aquatic organism under controlled condition.

Aquaculturist

A person who engages in aquaculture.

Chemical

A substance, pure or mixture, with distinct molecular composition that is produced by or used in a chemical process.

Chemotherapeutant

An agent used for treatment or disease on animals or humans using chemicals or drugs that are selectively toxic to the causative agent of the disease such as bacteria, virus or other microorganism.

Competent Authority (CA)

A body or organisation legally qualified or sufficient to perform an act such as regulation, organisation, certification, and etc.

Culture system preparation

Methods or procedures to prepare the tank, pond or floating cages prior to the introduction of culture animals.

Disinfectant

An agent such as a chemical, heat or radiation that destroys, neutralises or inhibits the growth of disease carrying organism. Disinfectants are generally applied to equipment and structures and are not intended to have therapeutic effect on cultured animals. In aquaculture disinfectants can also include compounds used to destroy microorganisms living on the surface of fish eggs.

Drug

Any chemical compound used in the diagnosis, treatment, or prevention of disease or other abnormal condition.

Fish

Any aquatic animal or plant life, sedentary or not, and includes all species of finfish, crustacean, mollusca, aquatic mammals, or their eggs or spawn, fry, fingerling, spat or young, but does not include any species of otters, turtle or their eggs.

Hormone

A substance, usually a peptide or steroid produced by one tissue and carried by the blood stream to another to effect physiological activity such as growth and metabolism.

Maximum Residue Limit (MRL)

The maximum concentration of residue resulting from the use of veterinary drugs and aquaculture chemical (expressed in mg or kg on a fresh weight basis) that is legally permitted or recognised as acceptable in fish and fish products.

Pest

Unwanted species of animals or plants detrimental to aquaculture.

Pesticide

A substance used to control pest.

Piscicide

A piscicide is a chemical substance which is poisonous to fish. The primary use for piscicides is to eliminate parasitic and invasive species of fish in a body of water.

Withdrawal period

The period of time between last administration or exposure of fish to a veterinary drug, and point of harvest to ensure that the concentration of the veterinary drug in their edible flesh complies with the maximum permitted residue limits for human consumption.

6. CHEMICALS IN AQUACULTURE

There are different classifications of "chemicals" and "drugs" being used in aquaculture. In aquaculture, chemicals are classified according to its nature, functions and intended purpose.

In using drugs or chemicals, it is important for all aquaculturists and operators to observe the withdrawal periods while applying drugs and chemicals in fisheries produce intended for human consumption. Concerns regarding the over-use and misuse of certain drugs and chemicals for which proper risk assessments with respect to the target species, human factors and the environment have not been fully conducted and documented.

Product withdrawal times must be observed to ensure that a product used in a target animal does not exceed legal tolerance levels in the animal tissue at the time the edible portion is made available for human consumption. Following proper withdrawal times helps to ensure that products reaching consumers are safe and wholesome. Withdrawal information is found on the product label, package insert, or feed tag of any approved product.

Chemicals

Chemicals have many uses in aquaculture. They are used in:

i. culture system preparation
ii. pest control
iii. soil and, or water quality management
iv. feed and supplements
v. transportation of live fish
vi. breeding
vii. disease treatment and control
viii. health management

Drugs

All drugs used to control mortality associated with bacterial diseases or infestation density of parasites, sedate or anesthetize fish, induce spawning, change gender, or in any other way change the structure or function of aquatic species must be approved by the CAs.

It is illegal and prohibited to use unapproved drugs for any purpose, and approved drugs in a manner other than that specified on the product label.

7. ROLES AND RESPONSIBILITY

7.1. Competent Authority

A Competent Authority (CA), or its national regulator(s) in each AMS as listed in **Appendix I** shall be responsible for the following:

a) technical, diagnostic capacity and capability in the country.
b) coordinate with other relevant agencies within the country.
c) approval and/or registration of aquaculture premises.
d) approval and/or registration of third party service provider (laboratory, quarantine facilities).
e) approval and/or registration of manufacturers and traders of chemicals and drugs for use in aquaculture.
f) establish and regular update a national list of chemicals for aquaculture purposes.
g) to create awareness among aquaculturists through extension and awareness programs.
h) communicate with other AMS (refer to para 8.3).
i) carry out monitoring, inspection and surveillance activities.
j) to regulate the import, manufacture and trade of chemicals and products.
k) to evaluate and verify efficacy and safety of chemicals intended for use in aquaculture systems.
l) to carry out enforcement activities for non-compliance to national practice and/or legislations.

7.2. Manufacturers and Traders

Manufacturers and traders of chemicals in each AMS, shall be responsible for the following:

a) registration and/or approval of the chemicals and products with the Competent Authority, in accordance with national requirements.
b) chemicals to be registered should use its generic name.
c) registration and/or approval of the aquaculture premises with the Competent Authority, in accordance with national requirements.
d) technical information of the chemicals.
e) to provide necessary instructions on the intended use on the label.
f) communicate with national CAs on the requirements of the chemicals.
g) obtain prior approval from national CAs for importation of chemicals or drugs.
h) cooperate with national CAs on trace ability, inspection, audit and other related activities.

7.3. Aquaculturist

Aquaculturist shall be responsible for the following:

a) obtain registration and/or approval of aquaculture premise from national or local CAs.
b) consult with national or local CAs and manufacturers or traders on the proper and safe methods to use and for disposal of the chemicals.
c) comply to national legislation involving the procurement, use and disposal of chemicals.
d) understand the correct application of chemicals in order to increase their effectiveness and minimise adverse impacts.
e) aware of the minimise implications of the use of chemicals to food safety, public health and environment.
f) maintain records of chemicals and its usage for traceability.

8. COMMUNICATION

8.1. The CAs will actively communicate with the following stakeholders about the use of chemicals:

a) Manufacturers and traders.
b) Suppliers and other service providers to aquaculture farms.
c) Aquaculturists.
d) Relevant national CAs.
e) Relevant national government agencies, academic and research institutions.
f) Other ASEAN CAs bilaterally and multilaterally through ASEAN Secretariat or ASWGFi.

8.2. The CA will advise national stakeholders about:

a) new or amended laws and regulations.
b) procedures and guidelines for proper use of chemicals.
c) list of prohibited chemicals.
d) Maximum Residue Limits (MRLs) of chemicals in fish for consumption.
e) the updated *Guidelines for The Use of Chemicals in Aquaculture and Measures to Eliminate the Use of Harmful Chemicals*

8.3. The CA will notify other ASEAN CAs and other relevant international organizations such as NACA, SEAFDEC and ASWGFi about:

a) Current laws and regulations regarding chemicals in aquaculture.

b) Contact person(s) from each CA.

9. REGISTRATION

The CA will set requirements for registration of aquaculturists, manufacturers and traders as follows:

9.1. Aquaculturists

a) Business registration with relevant government authority.

b) Inspection of registered premises and farms.

9.2. Manufacturers and traders

a) Business registration with relevant government authority.

b) Registration with trade or customs authority, where required.

9.3. Accredited laboratories

a) Accreditation with relevant national CAs.

b) Accreditation with the national and/or international accreditation body.

10. MONITORING PROGRESS OF CAs IN THE IMPLEMENTATION OF THE GUIDELINES FOR THE USE OF CHEMICALS IN AQUACULTURE AND MEASURES TO ELIMINATE THE USE OF HARMFUL CHEMICALS

10.1. The ASWGFi will establish a network among CAs to collate, summarise and analise compliance with the guidelines among the AMS.

10.2. Where non-compliance with guidelines or related problems affect trade in aquaculture products between AMS, the CAs will mutually work to resolve the issues.

11. COMMONLY USED CHEMICALS AND DRUGS IN AQUACULTURE

The list provided below are list of commonly used chemicals in aquaculture in each AMS, which have been agreed and deliberated upon during the Regional Workshops on Harmonisation of Guidelines for the Use of Chemicals in Aquaculture and Measures to Eliminate the Use of Harmful Chemicals, held in Kuala Lumpur in 2010 and 2012. Special care should be considered while using these chemicals and drugs so as not to expose danger to the fish or human. Please seek advice from the Competent Authority or local Veterinarian if in doubt.

Antibiotics/Antimicrobials

Oxolinic acid

Erythromycin

Sulfonamides

Oxytetracyclines

Sulfamerazine

Disinfectants

Benzalkonium Chloride (BKC)

Calcium Hypochlorite/sodium hypochlorite

Lime

Formalin

Sodium chloride

Potassium permanganate

Acetic acid

Acriflavin

Hydrogen peroxide

Iodine

Culture system preparation

Lime

Zeolite

Calcium chloride

Sodium thiosulphate

Anaesthetics

Tricane methanesulphonate

Eugenol, Aqui-S

Hormones

HCG

LHRHa

17” methyltestosterone

Chemotherapeutants

Copper sulfate

Sodium chloride

Formalin
Hydrogen peroxide

Praziquantel

Pottasium permanganate

Methylene blue

Pisicides

Saponin

Rotenone

Organophosphates (dichlorvos, dichlorovos, dipterex, neguvo)

Compound	Indication(s)	Dose
Acetic Acid	Parasiticide for fish	1000-2000 ppm dip for 1-10 minutes
Calcium chloride	Used to aid in egg hardening Used to aid in maintaining osmotic balance during fish holding and transport	10-20 ppm $CaCO_3$ (eggs) ≤150 ppm $CaCO_3$, indefinitely (fish)
Sodium chloride (salt)	Used as an osmoregulatory aid to relieve stress and prevent shock in fish Parasiticide for fish	0.5-1.0% indefinitely 3% dip for 10-30 min
Iodine	Egg surface disinfectant	100 ppm for 10 min during or after waterhardening

Appendix II will list the drugs and chemicals currently being used, or prohibited by each ASEAN Member States. The list has been exhaustedly deliberated and provided by AMS to provide the current practices in their aquaculture activities.

A) FORMALIN

Approved Indications:

Formalin is approved for: (a) for the control of external protozoa (*Chilodonella* spp., Costia spp., *Epistylis* spp., *Ichthyophthirius* spp., *Scyphidia* spp. and *Trichodina* spp.), and the monogenetic trematode parasites (*Cleidodiscus* spp., *Dactylogyrus* spp., and *Gyrodactylus* spp.) on all finfish, (b) for the control of fungi of the family Saprolegniaceae on all finfish eggs and (c) for the control of external protozoan parasites (*Bodo* spp., *Epistylis* spp., and *Zoothamnium* spp.) on penaeid shrimp.

Dosage:

For The Control of Fungi of the Family Saprolegniaceae on Finfish Eggs:

Aquatic Species	Administer in Hatchery Systems (µL/L)
Eggs of all finfish except Acipenseriformes	1000 to 2000 for 15 minutes**
Eggs of Acipenseriformes	up to 1500 for 15 minutes**

**Apply in constant flow water supply of incubating facilities. A preliminary bioassay should be conducted on a small sub-sample of finfish eggs to determine sensitivity before treating an entire group. This is necessary for all species because egg sensitivity can vary with species or strain and the unique conditions at each facility.

Precautions:

Can cause central nervous system (CNS) depression. Slightly irritating to the respiratory system. May cause sensitisation by inhalation. Reports have associated repeated and prolonged occupational over exposure to solvents with permanent brain and nervous system damage. Toxic if inhaled. Harmful if swallowed. Causes bums. May be fatal or cause blindness if swallowed. Harmful in contact with skin, may cause sensitisation cause blindness. Corrosive to eyes.

Withdrawal Period: None.

B) HYDROGEN PEROXIDE

APPROVED INDICATIONS:

For the control of mortality in freshwater-reared finfish eggs due to saprolegniasis.

- 500 to 1,000 mg/L for 15 minutes in a continuous flow system once per day on consecutive or alternate days until hatch for all coldwater and coolwater species of freshwater-reared finfish eggs.
- 750 to 1,000 mg/L for 15 minutes in a continuous flow system once per day on consecutive or alternate days until hatch for all warmwater species of freshwater-reared finfish eggs.

For the control of mortality in freshwater-reared salmonids due to bacterial gill disease associated with *Flavobacterium branchiophilum.*

- 100 mg/L for 30 minutes or 50 to 100 mg/L for 60 minutes once per day on alternate days for three treatments in a continuous flow water supply or as a static bath.

For the control of mortality in freshwater-reared coolwater finfish and channel catfish due to external columnaris disease associated with *Flavobacterium*.

- 50 to 75 mg/L for 60 minutes once per day on alternate days for three treatments in a continuous flow water supply or as a static bath (coolwater species of freshwater-reared finfish (except northern pike & paddlefish) and channel catfish).
- 50 mg/L for 60 minutes once per day on alternate days for three treatments in continuous flow water supply or as a static bath (coolwater species of freshwater-reared finfish fry (except northern pike, pallid sturgeon, and paddlefish) and channel catfish fry).

Precautions:

Hydrogen peroxide is a strong oxidiser and personal protective equipment should always be used when handling this chemical (Note: Prolonged exposure may cause skin irritation or burns).

Withdrawal Period: None.

C) TRICAINE METHANESULFONATE (or MS 222)

Approved Indications:

Tricaine methanesulfonate is approved for the temporary immobilisation of fish, amphibians, and other aquatic, cold-blooded animals. It has been recognised as a valuable tool for the proper handling of these animals during manual spawning (other aquatic), weighing, measuring, marking, surgical operations, transport, photography, and research.

Dosage: 10-1,000 mg/L.

Precautions:

May cause skin irritation. May be harmful if absorbed through the skin. May cause eye irritation. Dust may be irritating to the mucous membranes and upper respiratory tract. May be harmful if inhaled. May be harmful if swallowed.

Practical Administration:

Do not use within 21 days of harvesting fish for food.

Withdrawal Period: 21 days

D) COPPER SULFATE

Approved Indications:

Administer as a static bath to control Ichthyophthiriasis (Ich) on catfish and mortality associated with Saprolegniasis in all finfish species.

For the treatment of ichthyophthiriasis (*Ichthyophthirius multifiliis*) on Ictalurid catfish cultured in earthen ponds.

- Administer 0.4 to 1 mg/L per 100 mg/L total alkalinity (as $CaCO_3$) as an indefinite exposure once daily for 5 to 11 consecutive days.

To control mortality associated with Saprolegniasis on channel catfish eggs.

- Administer 10 mg/L for Administer 10 mg/L to the water of a flow-through hatching trough once daily until the embryos (eggs) develop eyes; flow rate should allow for 1 exchange every 30 minutes.

Withdrawal period: 7 days.

E) POTASSIUM PERMANGANATE

Approved Indications:

Administer as a static bath to control external protozoan and metazoan parasites, and bacterial and fungal infections in a variety of warmwater fish species.

Dosage:

Use at a dosage of 1 - 10 mg/L for 1 hour. Although a single treatment event is generally efficacious, repeated treatments may be used.

Withdrawal period: none for fish that are not susceptible

F) LHRHa (Luteinizing Hormone–Releasing Hormone)

Administer by injection to enhance gamete maturation in a variety of variety of fish species.

Dosage:

- LHRHa is available in vials containing 1, 5, or 25 mg LHRHa/vial. LHRHa should be diluted with sterile physiological saline immediately prior to intended use.

- Standard hormone dose rates are 5 to 20 µg LHRHa/kg BW. Although higher dose rates may be used, the total dose may not exceed 100 µg/kg BW.
- LHRHa should be dissolved in sterile physiological saline and administered as either an intraperitoneal (IP) or intramuscular (IM) injection. Intraperitoneal injections are typically administered in females whereas IM injections are typically administered in males.
- The LHRHa dose may be administered as a single injection or multiple injections depending on the species or strain treated. Multiple treatment regimens will generally consist of a single "priming" dose followed by a single "resolving" dose.
- LHRHa treatment has been shown to be most effective when administered during the final stages of gamete maturation. In most cases, LHRHa will be used within 4 weeks of the time fish are normally expected to spawn.

Withdrawal period: 14 days.

G) LIME

Lime is widely used to neutralise acidity, increase total alkalinity, and to increase total hardness in the soil and water of grow-out ponds for fish and shrimp.

Dosage:
The most common preparations/forms are agricultural limestone [calcite-($CaCO_3$) and dolomite ($MgCO_3$)], hydrated or slaked lime [$Ca(OH)_2$] and burnt lime or quick lime (CaO). During pond preparation, lime is applied to the pond bottom at doses of 100-8,000 kg/ha or to the water during the rearing period at 10-500 kg/ha. Liming is also practised (using different procedures) to neutralise acid sulphate resulting from oxidation of pyrites in ponds constructed in mangrove areas. Burnt lime is also used (at 50-100 g/m^2) in conjunction with ammonium phosphate to kill pests and predators.

APPENDIX I

COMPETENT AUTHORITY (IES) IN ASEAN COUNTRIES REGULATING AND MONITORING THE USE OF CHEMICAL IN AQUACULTURE

COMPETENT AUTHORITY			
COUNTRY	**REGULATION ON CHEMICAL USED IN AQUACULTURE**	**VETERINARY DRUGS**	**PESTICIDE**
Brunei Darussalam	**Contact Agency:** Department of Fisheries, Ministry of Industry and Primary Resources Department of Pharmaceutical Services, Ministry of Health		Department of Agrifood and Agriculture, Ministry of Industry and Primary Resources
Cambodia	**Contact Agency:** Fisheries Administration Ministry of Agriculture, Forestry and Fisheries		
Indonesia	**Contact Agency:** Directorate of Fish Health & Environment, Directorate General of Aquaculture, Ministry of Marine Affairs and Fisheries		Pesticide Commission, Ministry of Agriculture
Lao PDR	**Contact Agency:** Department of Livestock and Fisheries Ministry of Agriculture and Forestry		
Malaysia	**Contact Agency:** Department of Fisheries, Ministry of Agriculture and Agro-Based Industry Ministry of Health	National Pharmaceutical Control Bureau, Ministry of Health Department of Veterinary Services, Ministry of Agriculture and Agro-Based Industry Food Safety and Quality Division, Ministry of Health	Pesticide Board, Department of Agriculture, Ministry of Agriculture and Agro-Based Industry Food Safety and Quality Division, Ministry of Health

Myanmar	**Contact Agency:** Department of Fisheries, Ministry of Livestock and Fisheries	Department of Fisheries, Ministry of Livestock and Fisheries	Department of Fisheries, Ministry of Livestock and Fisheries
Philippines	**Contact Agency:** Bureau of Fisheries and Aquatic Resources of Department of Agriculture	Food and Drug Administration Department of Health	Fertiliser and Pesticide Authority
Singapore	**Contact Agency:** Agri-Food and Veterinary Authority of Singapore		
Thailand	**Contact Agency:** Department of Fisheries, Ministry of Agriculture and Cooperative	Food and Drug Administration (FDA), Ministry of Public Health	Pesticide Board, Department of Agriculture, Ministry of Agriculture and Cooperative
Viet Nam	**Contact Agency:** Department of Animal Health, Ministry of Agriculture and Rural Development Department of Fisheries, Ministry of Agriculture and Rural Development	Department of Animal Health, Ministry of Agriculture and Rural Development	Plant Protection Department, Ministry of Agriculture and Rural Development

APPENDIX II

List of chemicals used in Aquaculture by ASEAN Member States

Explanatory note –
PROHIBITED – Total banned
NO – Currently not used
NDA – No Data Available (Status not known)
YES – Allowed to be used with recommended MRL and with withdrawal Period

A) ANTIBIOTICS/ANTIMICROBIAL

FISH FOR FOOD CONSUMPTION:

	Brunei Darussalam	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Antibiotics/ Antimicrobials								
Tetracyclines *	PROHIBITED	PROHIBITED	YES	YES	YES	NO	YES	NO
Nitrofurans	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED
Chloramphenicol	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED
Oxolinic acid *	PROHIBITED	NO	YES	PROHIBITED/ YES	YES	YES	YES	NO
Erythromycin *	PROHIBITED	NO	YES	YES	YES	NO	NO	NO
Dimetridazole/Metronidazole	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	NO	PROHIBITED
Elbaju/Ebazine	PROHIBITED	NO	YES	NDA	NDA	NDA	NO	NO
Sulfonamides *	PROHIBITED	NO	YES	YES	YES	NO	YES	YES
Oxytetracyclines *	PROHIBITED	NDA	YES	YES	YES	NO	YES	YES
Chlortetracycline *	PROHIBITED	NO	YES	YES	YES	NO	YES	NO

Sulfamerazine *	PROHIBITED	NO	YES	NDA	YES	NO	YES	YES
Nifurpirinol	PROHIBITED	PROHIBITED	YES	NDA	NO	PROHIBITED	NO	NO
Amoxicilin	PROHIBITED	NO	YES	YES	YES	NO	NO	NO
Doxycyclin	PROHIBITED	NO	NDA	NDA	YES	NO	NO	YES
Enrofloxacin *	PROHIBITED	NDA	NDA	YES	YES	NO	PROHIBITED	PROHIBITED
Florfenicol	PROHIBITED	PROHIBITED	NDA	NDA	YES	NO	NO	YES
Norfloxacin	PROHIBITED	NO	NDA	NDA	YES	NO	NO	NO
Rifamicin / or Rifampicin??	PROHIBITED	NO	NDA	NDA	YES	NO	NO	NO
Ciprofloxacin	PROHIBITED	NO	NDA	NDA	NDA	NO	NO	NO
Sarafloxacin	PROHIBITED	NO	NDA	NDA	NDA	NO	YES	NO
Ormethoprim	PROHIBITED	NO	NDA	NDA	NDA	NO	YES	YES
Sulfadimethoxin + Ormethoprim *	PROHIBITED	NO	NDA	NDA	NDA	NO	YES	YES
Sulfadimethoxin + trimethoprim *	PROHIBITED	NO	NDA	NDA	YES	NO	YES	YES

*Residues with Maximum Residual Limit

ORNAMENTAL FISH:

	Brunei Darussalam	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Antibiotics/ Antimicrobials	NO ANTIBIOTIC							
Tetracyclines	YES	YES	YES	YES	YES	YES	YES	NO
Nitrofurans	PROHIBITED	YES	PROHIBITED	PROHIBITED	YES	PROHIBITED	PROHIBITED	PROHIBITED
Chloramphenicol	PROHIBITED	YES	PROHIBITED	PROHIBITED	NO	PROHIBITED	PROHIBITED	PROHIBITED
Oxolinic acid	YES	YES	YES	YES	YES	YES	YES	NO
Erythromycin	NDA	YES	YES	YES	YES	YES	NO	NO
Dimetridazole/ Metronidazole	PROHIBITED	PROHIBITED	PROHIBITED	PROHIBITED	NO	NO	NO	PROHIBITED
Elbaju/Ebazine	NDA	YES	YES	NDA	NO	NDA	NO	NO
Sulfonamides	NDA	YES	YES	YES	YES	YES	YES	YES
Oxytetracyclines	YES	YES	YES	YES	YES	YES	YES	YES
Chlortetracyclin	YES	YES	YES	YES	YES	NDA	YES	NO
Sulfamerazine	NDA	NO	YES	NDA	YES	NDA	YES	YES
Nifurpirinol	NDA	NDA	YES	NDA	NO	NDA	NO	NO
Amoxicilin	NDA	NDA	NDA	YES	YES	NDA	NO	NO
Doxycyclin	NDA	NO	NDA	NDA	YES	NO	NO	YES
Enrofloxacin	NDA	NO	NDA	YES	YES	NO	PROHIBITED	PROHIBITED
Florfenicol	YES	NO	NDA	NDA	YES	NO	NO	YES
Norfloxacin	NDA	NO	NDA	NDA	YES	NO	NO	NO
Rifamicin	NDA	NO	NDA	NDA	YES	NO	NO	NO
Ciprofloxacin	NDA	NO	NDA	NDA	NDA	NO	NO	NO
Sarafloxacin	NDA	NO	NDA	NDA	NDA	NO	YES	NO
Ormethoprim	NDA	NO	NDA	NDA	NDA	NO	YES	YES
Sulfadimethoxin + Ormethoprim	NDA	NO	NDA	NDA	YES	NO	YES	YES
Sulfadimethoxin + trimethoprim	NDA	NO	NDA	NDA	YES	NO	YES	YES

B) DISINFECTANTS

Disinfectants	Brunei Darussalam	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
BKC	**NO**	YES	YES	YES	**YES**	**YES**	YES	YES
Calcium Hypochlorite	YES	YES	YES	YES	YES	YES	YES	YES
Lime	YES	YES	YES	YES	YES	YES	YES	YES
Formalin	YES	YES	YES	YES	YES	YES	YES	YES
Sodium chloride	**NO**	YES	YES	YES	YES	YES	**NO**	**NO**
Potassium permanganate	**NO**	YES	YES	YES	YES	YES	YES	**NO**
Methylene blue	**NO**	YES	**YES**	YES	**YES**	**NDA**	YES	**NO**
Malachite green	**PROHIBITED**	PROHIBITED	**PROHIBITED**	PROHIBITED	**PROHIBITED**	**PROHIBITED**	**PROHIBITED**	**PROHIBITED**
Copper sulphate	**YES**	YES	YES	YES	**NO**	**NDA**	**NO**	**YES**
Acetic acid	**NO**	YES	NO	YES	**NO**	**NDA**	YES	**YES**
Acriflavin	**NO**	NO	NO	NDA	**NO**	NO	YES	**NO**
Hydrogen peroxide	**NO**	YES	YES	YES	YES	YES	YES	**YES**
Sodium hypochlorite	**YES**	NO	YES	YES	YES	YES	YES	**NO**
Iodine	**YES**	YES	YES	YES	YES	YES	YES	**YES**
Cypermethrin	**NO**	NO	**NO**	NDA	YES	**NO**	**NO**	**PROHIBITED**
Potasium monopersulfate	**NO**	YES	**NO**	NDA	YES	**NO**	YES	**NO**
Omnicide	**NO**	YES	**NO**	NO	YES	**NO**	**NO**	**YES**
Trichlorfon	**NO**	NO	**NO**	NDA	YES	**NO**	**NO**	**NO**
Glutaraldehyde	**NO**	YES	**NO**	NDA	**NO**	**NO**	YES	**YES**
Chloramin T	**NO**	NO	**NO**	NDA	**YES**	**NO**	**NO**	**YES**
Sodium Dichloroisoyanurate	**NO**	NO	**NO**	NDA	**NO**	**NO**	**YES**	**YES**

Tricholoroicyanuric acid	**NO**	NO	**NO**	NDA	**NO**	**NO**	**NO**	**YES**
Myristalkonium chloride	**NO**	NO	**NO**	NDA	**NO**	**NO**	**NO**	**YES**
Ethylenediamine tetraacetic acid (EDTA)	**NO**	NO	**NO**	NDA	**NO**	**NO**	**NO**	**YES**
Pottasium peroxymonosulfate	**NO**	YES	**NO**	NDA	**NO**	**NO**	**YES**	**NO**

C) CHEMOTHERAPEUTANTS AGENTS

FISH FOR FOOD CONSUMPTION:

Chemotherapeutants	**Brunei Darussalam**	**Indonesia**	**Malaysia**	**Myanmar**	**Philippines**	**Singapore**	**Thailand**	**Viet Nam**
Acriflavin	**NDA**	YES	**YES**	NDA	**NDA**	**NO**	**YES**	**NO**
copper sulfate	**YES**	YES	**YES**	YES	**YES**	**YES**	**YES**	**YES**
trichlorfon	**NO**	PROHIBITED	**YES**	NDA	**YES**	**NO**	**YES**	**NO**
trifluralin	**NO**	PROHIBITED	**NO**	YES	**YES**	**NO**	**YES**	**PROHIBITED**
Cypermethrin	**NO**	NO	**NO**	NDA	**YES**	**NO**	**NO**	**YES**
sodium chloride	**YES**	YES	**YES**	YES	**YES**	**YES**	**YES**	**YES**
formaldehyde	**YES**	YES	**YES**	YES	**YES**	**NO**	**YES**	**YES**
hydrogen peroxide	**NO**	YES	**YES**	YES	**YES**	**YES**	**YES**	**YES**
praziquantel	**NO**	NO	**YES**	NDA	**YES**	**NO**	**YES**	**YES**
potasium permanganate	**YES**	YES	**YES**	YES	**YES**	**NO**	**YES**	**NO**
methylene blue	**NO**	YES	**YES**	YES	**YES**	**NO**	**YES**	**NO**
Bronopol	**NO**	NO	**NO**	NDA	**NO**	**NO**	**NO**	**YES**
Levamisol	**NO**	NO	**NO**	NDA	**NO**	**NO**	**NO**	**YES**

ORNAMENTAL FISH:

Chemotherapeutants	Brunei Darussalam	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Acriflavin	**YES**	YES	**YES**	NDA	**NDA**	**YES**	**YES**	**NO**
copper sulfate	**YES**	YES	**YES**	YES	**YES**	**YES**	**YES**	**YES**
trichlorfon	**NDA**	PROHIBITED	**YES**	NDA	**YES**	**NO**	**YES**	**NO**
trifluralin	**NDA**	PROHIBITED	**NO**	YES	**YES**	**NO**	**YES**	**PROHIBITED**
cypermethrin	**NDA**	NO	**NO**	NDA	**NDA**	**NO**	**NO**	**YES**
sodium chloride	**YES**	YES	**YES**	YES	**YES**	**YES**	**YES**	**YES**
formaldehyde	**YES**	YES	**YES**	YES	**YES**	**YES**	**YES**	**YES**
hydrogen peroxide	**NO**	YES	**YES**	YES	**YES**	**YES**	**YES**	**YES**
praziquantel	**NDA**	NO	**YES**	NDA	**YES**	**YES**	**YES**	**YES**
potassium permanganate	**NO**	YES	**YES**	YES	**YES**	**YES**	**YES**	**NO**
methylene blue	**YES**	YES	**YES**	YES	**YES**	**YES**	**YES**	**NO**
Bronopol	**NDA**	NO	**NO**	NDA	**NO**	**NO**	**YES**	**YES**
Levamisol	**NDA**	NO	**NO**	NDA	**NO**	**NO**	**NO**	**YES**

D) PISCICIDE (FOR USE IN POND PREPARATION OR EARLY CULTURE ONLY)

Piscicide	Brunei Darussalam	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
saponin	**YES**	YES	**YES**	YES	**YES**	**YES**	**YES**	**YES**
Rotenone	**YES**	YES	**YES**	YES	**YES**	**NDA**	**YES**	**YES**
Organophosphates (OPs) - The two most commonly used OPs are dichlorvos (dichlorovos) and trichlorfon (dipterex, and neguvon).	**YES**	YES	**YES**	YES	**YES**	**NDA**	**YES**	**NO**

cyanide	**PROHIBITED**	NO	**NO**	NO	**NO**	**NO**	**PROHIBITED**	**NO**
fentin acetate	**NO**	YES	**NDA**	NDA	**NO**	**NO**	**YES**	**NO**
Deltamethrine	**NDA**	NO	**NDA**	NDA	**NDA**	**NO**	**PROHIBITED**	**PROHIBITED**

E) HORMONES

FISH FOR FOOD CONSUMPTION:

Hormones	Brunei Darussalam	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
HCG	**YES**	NO	**YES**	YES	**YES**	**NO**	**YES**	**YES**
LHRHa	**YES**	YES	**YES**	YES	**YES**	**YES**	**YES**	**NDA**
GnRHa	**NO**	YES	**YES**	YES	**NO**	**NO**	**YES**	**NDA**
Ovaprim	**NO**	YES	**YES**	YES	**NO**	**NO**	**NO**	**NO**
Pituitary extract	**YES**	NDA	**NO**	YES	**YES**	**NO**	**YES**	**NO**
Puberogen	**NO**	NO	**YES**	NDA	**NO**	**NO**	**YES**	**NO**
17" methyltestosterone	**YES**	PROHIBITED	**YES**	YES	**YES**	**NO**	**YES**	**NO**
androgen	**NO**	NO	**NO**	NDA	**NO**	**NO**	**YES**	**NO**
17 - Beta estradiol	**NO**	NO	**NO**	YES	**NO**	**NO**	**YES**	**NO**
Ovatide	**NO**	NO	**YES**	NDA	**NO**	**NO**	**NO**	**NO**

F) HORMONES

ORNAMENTAL FISH

Hormones	Brunei Darussalam	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
HCG	**YES**	NO	**YES**	YES	**YES**	**YES**	**YES**	**YES**
LHRHa	**YES**	YES	**YES**	YES	**YES**	**YES**	**YES**	**NDA**

Ovaprim	**NO**	YES	**YES**	YES	**NO**	**NO**	**NO**	**NO**
Puberogen	**NO**	NO	**YES**	NDA	**NO**	**NO**	**YES**	**NO**
androgen	**NO**	NO	**NO**	NDA	**NO**	**NO**	**YES**	**NO**
Ovatide	**NO**	NO	**YES**	NDA	**NO**	**NO**	**NO**	**NO**

G) ANAESTHETICS (FOR USE BOTH ON FISH FOR FOOD CONSUMPTION AND ORNAMENTAL FISH)

Anaesthetics	**Brunei Darussalam**	**Indonesia**	**Malaysia**	**Myanmar**	**Philippines**	**Singapore**	**Thailand**	**Viet Nam**
Tricane methanesulphonate (TMS222)	**YES**	**YES**	**YES**	YES	**YES**	**YES**	**YES**	**NDA**
Eugenol, Aqui-S	**NDA**	**YES**	**YES**	YES	**YES**	**NO**	**YES**	**YES**
Quinaldine	**NDA**	**NO**	**NO**	NDA	**NO**	**NO**	**YES**	**NO**
Tranquil (Aquacalm)	**NDA**	**NO**	**YES**	NDA	**NO**	**NO**	**NO**	**NO**
Benzocaine	**NDA**	**NO**	**YES**	NDA	**NO**	**NO**	**YES**	**NDA**
phenoxy ethanol	**NDA**	**YES**	**NO**	NDA	**YES**	**NO**	**YES**	**NO**

H) CULTURE SYSTEM PREPARATION

Culture System Preparation	**Brunei Darussalam**	**Indonesia**	**Malaysia**	**Myanmar**	**Philippines**	**Singapore**	**Thailand**	**Viet Nam**
Calcium Hypochlorite	**YES**	**YES**	**YES**	YES	**YES**	**YES**	**NO**	**YES**
lime	**YES**	**YES**	**YES**	YES	**YES**	**YES**	**YES**	**YES**
urea	**YES**	**YES**	**YES**	YES	**YES**	**NO**	**NO**	**NO**
zeolite	**YES**	**YES**	**YES**	YES	**YES**	**NDA**	**YES**	**YES**
calcium chloride	**NO**	**YES**	**YES**	YES	**YES**	**NDA**	**NO**	**YES**
EDTA	**YES**	**NO**	**NO**	YES	**NDA**	**NO**	**YES**	**YES**
Sodium thiosulphate	**YES**	**YES**	**YES**	YES	**YES**	**NO**	**YES**	**YES**

I) BANNED CHEMICALS

FISH FOR FOOD CONSUMPTION:

Banned chemicals	Brunei Darussalam	Indonesia	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Enrofloxacin		NDA			YES	PROHIBITED	**YES**	**YES**
Cypermethrin		YES			YES			**YES**
Deltamethrine		YES			NDA			**YES**
Malachite green	**YES**	**YES**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**
Nitrofurans	**YES**	**YES**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**
Chloramphenicol	**YES**	**YES**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**
Beta-agonist	**YES**	**YES**	**YES**		PROHIBITED	PROHIBITED	**YES**	**YES**
Nitroimidazoles	**YES**	**YES**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**
organotin	**YES**	**NO**	**NDA**	NDA	PROHIBITED	PROHIBITED	**NO**	**NO**
organochlorin	**YES**	**YES**	**NO ***	NDA	PROHIBITED	PROHIBITED	**YES**	**NO**
Crystal violet	**YES**	**YES**	**YES**	NDA	PROHIBITED	PROHIBITED	**NO**	**YES**
*selected organophosphates	**YES**	**NO**	**YES**	YES	PROHIBITED	PROHIBITED	**NO**	**NO**
Trichlorfon (Dipterex)	**NDA**	**YES**	**YES**	YES	YES	PROHIBITED	**NO**	**YES**
Chloroform	**NDA**	**YES**	**NOT KNOWN**	PROHIBITED	NDA	PROHIBITED	**YES**	**YES**
Chlorpromazine	**NDA**	**YES**	**YES**	PROHIBITED	NDA	PROHIBITED	**YES**	**YES**
Colchicine	**NDA**	**YES**	**YES**	PROHIBITED	NDA	PROHIBITED	**YES**	**YES**
Dapsone	**NDA**	**YES**	**YES**	PROHIBITED	NDA	PROHIBITED	**YES**	**YES**
Ronidazole (nitroimidazole)	**NDA**	**YES**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**
Ipronidazole	**NDA**	**NOT KNOWN**	**YES**		PROHIBITED	PROHIBITED	**YES**	**YES**
Clenbuterol	**NDA**	**NOT KNOWN**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**

Glycopeptides	**NDA**	**NOT KNOWN**	**NOT KNOWN**		NDA	PROHIBITED	**YES**	**YES**
Diethylstilbestrol (stilbene)	**NDA**	**YES**	**YES**		PROHIBITED	PROHIBITED	**YES**	**YES**
Trifluralin	**NDA**	**YES**	**NDA**		YES	PROHIBITED	**NO**	**YES**
Dimetridazole (nitroimidazole)	**NDA**	**YES**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**
Metronidazole (nitroimidazole)	**NDA**	**YES**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**

***Residues with Maximum Residual Limit (MRL)**

ORNAMENTAL FISH:

Banned chemicals	**Brunei Darussalam**	**Indonesia**	**Malaysia**	**Myanmar**	**Philippines**	**Singapore[b]**	**Thailand**	**Viet Nam**
Enrofloxacin		NO			YES	PROHIBITED	**YES**	**YES**
Cypermethrin		NO			NDA			**YES**
Deltamethrine		NO			NDA			**YES**
Malachite green	**YES**	**YES**	**YES**	PROHIBITED	PROHIBITED	**NO**	**NO**	**YES**
Nitrofurans	**YES**	**YES**	**YES**	PROHIBITED	YES	PROHIBITED	**YES**	**YES**
Chloramphenicol	**YES**	**YES**	**YES**	PROHIBITED	NO	PROHIBITED	**YES**	**YES**
Beta-agonist	**YES**	**YES**	**YES**		NO	**NO**	**YES**	**YES**
Nitroimidazoles	**YES**	**YES**	**YES**	PROHIBITED	NDA	PROHIBITED	**YES**	**YES**
organotin	**YES**	**NO**	**NOT KNOWN**		PROHIBITED	**NO**	**NO**	**NO**
organochlorin	**YES**	**YES**	**NO**		PROHIBITED	**NO**	**YES**	**NO**
Crystal violet	**YES**	**YES**	**NO**	NDA	PROHIBITED	**NO**	**NO**	**YES**

*selected organophosphates	**YES**	**NO**	**YES**	YES	PROHIBITED	**NO**	**NO**	**NO**
Trichlorfon (Dipterex)	**NOT KNOWN**	**YES**	**NO**	YES	YES	**NO**	**NO**	**YES**
Chloroform	**NOT KNOWN**	**YES**	**NOT KNOWN**	PROHIBITED	NDA	**NO**	**YES**	**YES**
Chlorpromazine	**NOT KNOWN**	**YES**	**YES**	PROHIBITED	NDA	**NO**	**YES**	**YES**
Colchicine	**NOT KNOWN**	**YES**	**YES**	PROHIBITED	NDA	**NO**	**YES**	**YES**
Dapsone	**NOT KNOWN**	**YES**	**YES**	PROHIBITED	NDA	PROHIBITED	**YES**	**YES**
Ronidazole (nitroimidazole)	**NOT KNOWN**	**YES**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**
Ipronidazole	**NOT KNOWN**	**NOT KNOWN**	**YES**		PROHIBITED	**NO**	**YES**	**YES**
Clenbuterol	**NOT KNOWN**	**NOT KNOWN**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**
Glycopeptides	**NOT KNOWN**	**NOT KNOWN**	**NOT KNOWN**		NDA	PROHIBITED	**YES**	**YES**
Diethylstilbestrol (stilbene)	**NOT KNOWN**	**YES**	**YES**		PROHIBITED	**NO**	**YES**	**YES**
Trifluralin	**NOT KNOWN**	**YES**	**NOT KNOWN**		YES	**NO**	**NO**	**YES**
Dimetridazole (nitroimidazole)	**NOT KNOWN**	**YES**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**
Metronidazole (nitroimidazole)	**NOT KNOWN**	**YES**	**YES**	PROHIBITED	PROHIBITED	PROHIBITED	**YES**	**YES**

[b]For Singapore, no specific regulation for ornamental fish

APPENDIX III

DRAFTING COMMITTEE

Resource Persons

1. Dr. Hassan Bin Hj. Mohd Daud
   Faculty of Veterinary Medicine
   University Putra Malaysia, Serdang, Malaysia

2. Dr. Relicardo M. Coloso
   SEAFDEC Aquaculture Department,
   Tigbauan, Iloilo, Philippines

3. Dr. Eduardo M. Leano
   Network of Aquaculture Centres in Asia-Pacific (NACA)
   Bangkok, Thailand

4. Mr. Suriyan Vichitlerkarn
   ASEAN Secretariat

Brunei Darussalam

Mdm Laila Bt. Hj. A. Hamid
Mdm Noorizan Bt. Hj. Abd. Karim
Mdm Wanidawati Tamat

Cambodia

Mr. Chhoun Chamnan
Mr. Chin Da

Indonesia

Mdm Maysaroh Mawardi
Mdm Refnita Eliza
Drh. Siti Fatimah
Mdm Mufidah Fitriati

Malaysia

Mr. Mohamad Shaupi Bin Derahman
Mr. Abdul Rahman Bin Abdul Wahab
Mr. Zulkafli Abd Rashid
Dr. Kua Beng Choo
Mr. Adrian F. Vijiarungam
Mr. Hj. Raihan B. Sh. Hj. Ahmad
Ms. Hemalatha a/p Raja Sekaran
Mr. Jamaludin Ibrahim
Dr. Siti Zahrah Bt. Abdullah
Mdm Maria Afiza Bt. Omar
Mdm Zaleenah Bt. Zainuddin
Mdm Azlinda Bt. Abdul Samad
Mdm Maznah Bt. Othman

Philippines

Dr. Simeona E. Regidor
Dr. Sonia S. Somga

Singapore

Dr. Kelvin Lim Zhi Jian
Ms. Phua Hoon Hong

Mr. Tan Yit Wee
Dr. Chong Shin Min

Mr. Johari Daud
Mdm Nik Haiha Nik Yusof
Mr. Saberi Mawi
Mr. Kaharudin Md Salleh
Dr. Hamdan Bin Ahmad
Mr. Arthur Besther Sujang
Mr. Yusri bin Ismail

Thailand

Dr. Kom Silapajarn
Mr. Youngyut Predalumpaburt
Mdm Mukda Uttarapong

Viet Nam

Ms. Nguyen Thi Thu Trang
Mr. Vo Dinh Chuong
Ms. Le Thi Hue

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