

THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF AGRICULTURE, LIVESTOCK & IRRIGATION
DEPARTMENT OF FISHERIES



FISH INSPECTION & QUALITY CONTROL SECTION
RESEARCH AND DEVELOPMENT DIVISION

National Residues Monitoring Plan for Aquaculture Products

Progress Report for the NRMP 2018/19

March 2019

Progress Report for the NRMP for Certain Harmful Substances in Aquaculture Fish for 2018/2019

1. General

The National Residues Monitoring Program (NRMP) for certain harmful veterinary drugs and others substances in aquaculture fish and products is implemented with allocated budget and plan approved by the Ministry of Agriculture, Livestock and Irrigation (MOALI). The DOF within MOALI is the designated Central Competent Authority (CCA) for fishery product exports to the EU. Quality Control and Research Section of (R&DD) (QCRS) under Department of Fisheries (DOF) is responsible for carrying out the NRMP in accordance with the written procedures described in Official Control System Manual (OCSM) for the Inspection and Certification of Fish and Fishery Products. The Residues Monitoring Committee (RMC) is responsible for managing the effective implementation, monitoring and reporting of all NRMP activities. The Inspection and Certification Unit and the Analytical Laboratory Unit of QCRS are responsible for sampling and testing respectively.

2. Scope and species monitored in 2018/19

The NRMP 2018-2019 is a segregated system including 34 farms from 10 townships in four Regions. The 34 farms are linked with a total of 23 processing factories approved for export to EU and only products from these processing factories with documented traceability to the included farm would be allowed to export products from aquaculture to EU. Currently there is however not yet any processing factories approved for export of aquaculture products to EU. The scope of the segregated system is in Table 1.

2.1 Scope and species monitored by regions

Table1:Scope of the NRMP 2018/19

Region	Township	Area(Ha)	Total Production in the Segregated System (MT)	Farms	Aquaculture Species
Yangon	Kyauk Tan	211.26	1043.63	3	Crab (<i>Scyllaserrata</i> and <i>Scylla olivacea</i>)
Yangon	TwanTay	48.55	490.20	1	Carfu (<i>Cyprinus carpio</i>), Rohu (<i>Labeo rohita</i>), Tilapia (<i>Oreochromis</i> spp.), Pangush (<i>Pangasius</i> spp.), Puti (<i>Puntius</i>), Katla (<i>Catla catla</i>), Mrigal (<i>Cirrhinus</i> spp.)
Ayeyarwaddy	NyaungDone	511.50	4809.90	7	Carfu (<i>Cyprinus carpio</i>), Rohu (<i>Labeo rohita</i>), Tilapia (<i>Oreochromis</i> spp.), Pangush (<i>Pangasius</i> spp.), Puti (<i>Puntius</i>), Katla (<i>Catla catla</i>), Mrigal (<i>Cirrhinus</i> spp.)
Ayeyarwaddy	MaUBin	1667.41	7224.35	13	Carfu (<i>Cyprinus carpio</i>), Rohu (<i>Labeo rohita</i>), Tilapia (<i>Oreochromis</i> spp.), Pangush (<i>Pangasius</i> spp.), Puti (<i>Puntius</i>), Katla (<i>Catla catla</i>), Mrigal (<i>Cirrhinus</i> spp.)
Ayeyarwaddy	Pathein	367.59	150	1	Asian tiger shrimp (<i>Penaeus monodon</i>) and whiteleg shrimp (<i>Penaeus vannamei</i>)
Ayeyarwaddy	Laputta	141.21	338.97	3	Crab (<i>Scyllaserrata</i> and <i>Scylla olivacea</i>)
Ayeyarwaddy	Ngaputaw	656.65	660	1	Asian tiger shrimp (<i>Penaeus monodon</i>)
Ayeyarwaddy	Pantanaw ¹	163.09	700	1	Pangush (<i>Pangasius</i> spp.),
Thanintharyi	Kyunsu	274.87	1560.11	3	Crab (<i>Scyllaserrata</i> and <i>Scylla olivacea</i>) whiteleg shrimp (<i>Penaeus vannamei</i>)
Rakhine	Taung gote ²	20.88	26	1	Crab (<i>Scyllaserrata</i> and <i>Scylla olivacea</i>)
Total		4063.01	17003.16	34	

2.2 Sampled species

All samples have been collected at farms, included in the segregated system, at all stages of production. For Group A substances several sizes of the animals from nursery farms and grow

¹ This farm was added to the original plan by December 2018

² This farm was added to the original plan by January 2019

out farms were taken and for Group B Substances the size of animals were mostly approximately 900 g to 1 kg (market size).

Detailed monthly sampling schedule for 2018/19 has been completed by the Inspection and Certification Unit (ICU), Quality Control and Research Section of (R&DD) (QCRS) of Research and Development Division (R&DD) teams under the supervision of the RMC.

Table2–PlacesofSampleCollection

No.	Production Stage	Samples taken	Testing parameters
1.	Aquaculture site	Farmed fish at all growth stages	A1, A3, A6
2.	Aquaculture site	Farmed fish ready to be place on the market	B1,B2a,B3a,B3c,B3e
3.	Aquaculture site	Dried feed pellets and raw	B3d(AflatoxinB1)

Note:

- A1 Group(stilbenes):Diethylstilbestrol–Finfish only
- A3 Group(steroids):Methyltestosterone–Finfish only
- A6 Group(prohibitedveterinarymedicines):Chloramphenicol,Nitrofurans–Finfish, Crab and shrimp .
- B1 Group (Antibacterial Substances): Florfenicol, Amoxicillin, Lincomycin, Erythromycin, Enrofloxacin–Finfish ,Crab and shrimp .
- B2a (Anthelmintics) Ivermectin, Praziquantel–Finfish , Crab and shrimp .
- B3a Group (Organochlorinated Pesticides):DDT,Aldrin,Dieldrin,Alpha-HCH,Beta-HCH,Lindane,Heptachlor,Endrin, Sum of Dioxin, dioxin like PCBs and sum of PCBs–Finfish ,Crab and shrimp .
- B3c Group (Heavy metals):Pb,Cd,Hg–Finfish , Crab and shrimp .
- B3d Group (Mycotoxin):Aflatoxin(B1)–Feed/Pellet–Finfish and shrimp(note: crab feed is chopped up local fresh fish)
- B3e Group (dyes): MG/LMG,CV/LCV–Finfish , Crab and shrimp .

3. Sampling and Testing

3.1 Sampling

In 2018/19, the sampling was carried out by the Inspection and Certification Unit (ICU) in compliance with the plan approved by the R M C. However, following monthly reports by local authorities and processing factories, QCRS include the Inspection and Certification Unit (ICU) and Analytical Laboratory Unit (ALU) amended monthly sampling plan to be appropriate to current local context. Sampling activities carried out in 2018/19 by regions are shown in Table 3.

Table 3.1: Sampling in 2018/19

Regions	Yangon (Kyauk Tan)		Yangon (Twantay)		Ayeyarwaddy (Nyaung Done)		Ayeyarwaddy (Ma U Bin)		Ayeyarwaddy (Patheingyi)		Ayeyarwaddy (Laputta)		Ayeyarwaddy (Ngazun)		Ayeyarwaddy (Pantaw)		Tannintharyi (Kyun Su)		Rakhine (Taungtha)		Total			(+ = Extra) (- = Required)
	Plan	De facto	Plan	De facto	Plan	De facto	Plan	De facto	Plan	De facto	Plan	De facto	Plan	De facto	Plan	De facto	Plan	De facto	Plan	De facto	Plan	De facto	Difference	
1	2	3	4	5	6	7	8	14	14	14	13	14	15	16	17	18	19	20	21	22	23	24(23-22)		
A1 Group (Stilbenes): diethylstilbestrol	0	0	1	1	5	5	8	8	0	0	0	0	0	0	1	0	0	0	0	14	15	1	+1	
A3 Group (Steroids) Methyltestosterone	0	0	1	1	5	5	8	8	0	0	0	0	0	0	1	0	0	0	0	14	15	1	+1	
A6 Group (Prohibited Veterinary medicines); Chloramphenicol, Nitrofurans	3	3	1	1	5	5	8	8	1	1	1	1	2	2	0	0	6	6	0	1	27	28	1	+1
B1 Group (Antibacterial Substances): Florfenicol, Amoxicillin, Lincomycin, Erythromycin, Enrofloxacin	3	3	2	2	16	16	24	24	1	1	1	1	2	2	0	1	6	6	0	1	55	57	2	+2
B2a: Anthelmintics (Ivermectin, Praziquantel)	1	1	1	1	6	6	10	11	1	1	1	1	1	1	0	2	2	4	0	1	23	29	6	+6
B3a Group (Organochlorinated Pesticides): DDT, Aldrin, Dieldrin, Alpha-HCH, Beta-HCH, Lindane, Heptachlor, Endrin, Dioxin, Sum of dioxin and dioxin like PCBs	1	1	1	1	3	4	3	5	0	0	1	2	1	1	0	1	1	2	0	0	11	17	6	+6
B3c Group (Heavy Metals): Pb, Cd, Hg	1	1	0	0	1	1	2	2	1	1	0	0	1	1	0	0	1	1	0	1	7	8	1	+1
B3d Group (Mycotoxin) : Aflatoxin (B1)	0	0	0	0	4	4	7	13	0	0	0	0	0	0	0	1	0	1	0	0	11	19	8	+8
B3e Group (Dyes): MG/LMG, CV/LCV	1	1	0	0	3	3	2	2	0	0	0	0	0	0	1	1	1	0	0	7	8	1	+1	
Total	10	10	7	7	48	49	72	81	4	4	4	5	7	7	0	8	17	21	0	4	169	196	27	+27

Note: Plan number of samples is changed when compare with Original Sampling Plan that submitted to EU, cause of the production rate increase a bit according to **Annex I** updated excel plan.

Under the NRMP 2018/19, a total of 196 samples were taken thus completing 115.97% of the plan. The above table shows that the sampling completed in the regions was over the plan.

3.2 Testing results

A6 Group(Prohibited Veterinary Medicines): Chloramphenicol,Nitrofurans were tested at ALU(Lab1)and other substances were tested in Central Laboratory Thailand(Lab2).and Dioxin , Sum of Dioxin and Dioxin liked PCBs were tested in Eurofins Lab (Netherlands) (Lab 3).

One sample (Ivermectin) out of 22 analyzed were found positive for Group B2a (Anthelmintics) Praziquantel non-compliant results were above the MRPL.

Aflatoxin B1 was found in 4 feed samples out of 15 analyzed. Four of the non-compliant results were above the MRL of 20µg/kg as prescribed in the EU Directive 2002/32/EC for compound feed.

Analytical results for2018/19 are shown in Table 4.

Table4:Analytical Results in2018/19

Groups	Non-Compliant Results/Total SamplesAnalysed(%)
	Year2018/19
A1Group(Stilbenes):Diethylstilbestrol	0
A3Group(Steroids):Methyltestosterone	0
A6Group(ProhibitedVeterinaryMedicines): Chloramphenicol,Nitrofurans	0
B1Group(Antibacterials substances):Florfenicol, Amoxicillin, Lincomycin, Erythromycin, Enrofloxacin	0
B2a:Anthelmintics(Praziquantel),Ivemectin	1(Ivermectin) (4.54%)
B3aGroup(OrganochlorinatedPesticides):DDT,Aldrin,Diel drin, Alpha-HCH, Beta-HCH, Lindane, Heptachlor, Endrin, Dioxin , Sum of dioxin and dioxin like PCBs	0
B3cGroup(Heavymetals):Pb,Cd,Hg	0
B3dGroup(Mycotoxin):Aflatoxin(B1)	4(26.67%)
B3eGroup(Dyes):MG/LMG,CV/LCV	0

Table5: Testing Resultsin2018/19

GROUP OF SUBSTANCES TO BE MONITORED	COMPOUND or MARKER RESIDUE	MATRIX ANALYSED	NUMBER OF SAMPLES		LEVEL OF ACTION (i.e. concentration above which a result is deemed non-compliant) [µg/Kg]	NUMBER OF NON COMPLIANT RESULTS (ABOVE LEVEL OF ACTION)
			PLANNED	TESTED		
A1. STILBENES	(Diethylstilbestrol)	LC/MS/MS	14	15	Any Detected	0
A3. SYNTHETIC STEROIDS (WITH ANDROGENIC, GESTAGENIC OR ESTROGENIC ACTIVITY)	(Methyltestosterone)	LC/MS/MS	14	15		0
A6. CHLORAMPHENICOL	Chloramphenicol	ELISA	27	28	Any Detected	0
A6. NITROFURANS						
Nitrofurantoin metabolite	AHD	LC/MS/MS		28		0
Furaladone metabolite	AMOZ	LC/MS/MS		28		0
Furazolidone metabolite	AOZ	LC/MS/MS		28		0
Nitrofurazone metabolite	SEM	LC/MS/MS		28		0
B1. ANTIBACTERIAL SUBSTANCES Confirmatory test	Florfenicol	LC/MS/MS	55	57	100	0
	Amoxicillin	LC/MS/MS		57	100	0
	Lincomycin	LC/MS/MS		57	100	0
	Erythromycin	LC/MS/MS		57	100	0
	Enrofloxacin	LC/MS/MS		57	0.5	0
B2a. ANTHELMINTICS	Praziquantel	LC/MS/MS	23	29	Any Detected	0
	Ivermectin	LC/MS/MS				
B3a. ORGANOCHLORINE COMPOUNDS INCLUDING PCBS	Aldrine	GC/µECD	11	12	10	0
	Dieldrine				10	0
	DDT				10	0
	Alpha-HCH					
	Beta-HCH					
	Lindane					
	Heptachlor					
	Endrin					
	Dioxin			5		0
	Sum of Dioxin	HSGC/HSMS		5		0
	Dioxin like PCBS			5		0
B3c. CHEMICAL ELEMENTS	Lead(Pb)	ICPMS	7	8	300	0
	Mercury(Hg)				500	0
	Cadmium(Cd)				50	0
B3d. MYCOTOXINS	Aflatoxin B1	HPLC	11	19	20	4
B3e. DYES	Malachite green	LC/MS/MS	7	8	Any Detected	0
	Leukomalachite green					0
	Crystal Violet and					0
	Leuco-crystalviolet					0
Total			169	196		5

3.2.1 For fish and crab samples collected at farms

GroupA1: Diethylstilbestrol residues were total 15 samples but not detected in 13 samples and 2 samples were under testing.

GroupA3: Methyltestosterone residues were total 15 samples but not detected in 12 samples and 3 samples were under testing.

3GroupA6: Prohibited antibiotics:

- *Chloramphenicol residues were not detected in 28 samples.

- *Nitrofurans residues were not detected in 28 samples.

GroupB1: Restricted antibiotics in 57 samples.

- *Florfenicol residues were total 57 samples but not detected in 45 samples and 12 samples were under testing.

- *Amoxicillin residues were total 57 samples but not detected in 45 samples and 12 samples were under testing.

- *Lincomycin residues were total 57 samples but not detected in 45 samples and 12 samples were under testing.

- *Erythromycin residues were total 57 samples but not detected in 45 samples and 12 samples were under testing.

- *Enrofloxacin residues were total 57 samples but not detected in 45 samples and 12 samples were under testing.

GroupB2a: Anthelmintics (Praziquantel) residues were total 29 samples but not detected in 22 samples and 7 samples were under testing.

Anthelmintics (Ivermectin) residues 1 was detected in 22 samples and 7 samples were under testing.

- 1 Ivermectin samples/ 22 analyzed (4.54%) were found positive results,

GroupsB3a,B3c: Forenvironment contaminants:

- *There were total 17 samples but no detection of Organochlorine Pesticides residues, Dioxin and PCBs (Group B3a) in 14 samples and 3 samples are under testing.

- *For Heavy Metal residues (Group B3c): residues were total 8 samples but not detected in 6 samples and 2 samples are under testing. However, they were below the action levels.

GroupB3d Aflatoxin(B1):Total were 19 samples but 4 feed samples/ 15 analyzed (26.67%) were found positive results, 4 non-compliant results were above the MRL of 20µg/kg (EU Directive 2002/32/EC) and 4 samples are under testing.

GroupB3e: Dyes: Malachite Green/Leuco_malachitegreen and CrystalViolet /Leuco_crystalviolet: total were 8 samples but not detected in 7 samples and 1 sample was under testing.

3.3 Follow up Action to Non-Compliance Results

Related to *Aflatoxin(B1)*(**GroupB3d**):

- Immediately informed to farm by official letter when the non-compliance result was found in

feed sample and requested them to take out these feed from farm. And requested to use the new feed with good quality and fresh.

- Request farm owners to check the quality and shelf_life of feed;
- Request farm owners to buy fish feed from the approved feed suppliers;
- Request farm owners to store fish feed under hygienic conditions;
- Strengthening communication on relevant regulations to farmers;
- Provide guidelines to farmers to comply with the fresh and clean feed use.

4. Conclusion

The 2018/2019 National Residues Monitoring Plan for certain harmful veterinary drugs and others substances in aquaculture products (fish, shrimp and crabs) was set up and implemented in accordance with the directive promulgated by the DOF Directive 3/2009 of 3 April 2009 of the Department of Fisheries, Ministry of Agriculture, Livestock and Irrigation, which adopted all relevant food control legislation and subsequent corrigenda and updates of the European Commission.

By May 2015 the Department of Fisheries issued a new Directive 2/2015 on Technical Regulations for Export and Import of Fisheries Products as amended by DOF Directive 8/2018. The directive including among others the detailed requirements for planning and implementing of the NRMP in Myanmar, will be fully enforced by 1st April 2019.

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