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INFORMATION SHEET

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Table 1- TESTS AVAILABLE AND PRICES FOR THE ANALYSIS OF WATER CHEMISTRY

#	PARAMETER	PRICE (MVR)	TEST METHOD	AMOUNT REQ (ML)	RANGE	CONTAINER	TIME TAKEN FOR TESTING
1)	Aluminum	310	Method 8326(Adapted from DR4000™/5000™ Spectrophotometer procedure manual), Aluminum Test Spectroquant® 114825	100	0.002 to 0.250 mg/L Al3+	Plastic, Glass	1 day
2)	Ammonia	560	Method 8038(Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	50	0.02 to 2.50 mg/L NH3–N)	Plastic, Glass	1 day
	Ammonium		Method 8038 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	50	0.02 to 2.50 mg/L NH3–N)	Plastic, Glass	1 day
3)	Arsenic	1245	Method 8013 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	500	0 to 0.200 mg/L As	Plastic, Glass	2 days / sample
4)	Barium	350	Method 8014 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	20	2 to 100 mg/L	Plastic, Glass	1 day
	Barium	350	Method adapted from Flame photometer	20	2 to 100 mg/L	Plastic, Glass	3 days
5)	Boron	925	Method 8015 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	10		Plastic	1 day
6)	Bromine	325	Method 8016 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	100	0.05 to 4.50 mg/L	Plastic, Glass	1 day
7)	Cadmium	640	Method 8017) (Adapted from DR4000™/5000™ Spectrophotometer procedure manual), Cadmium Test Spectroquant® 101745	500	0 to 80.0 µg/L	Plastic, Glass	1 day
8)	Calcium	525	Adapted from standard methods for the examination of water and waste water by APHA, 22nd edition, Method 8030 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	150		Plastic, Glass	1 day
9)	Calcium Hardness	540	Method 3500 – Adapted from standard methods for the examination of water and waste water by APHA, 22nd edition Chapter 3, page 57 Method 8374) (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	200		Plastic, Glass	1 day
10)	Carbonate and Bicarbonate	300	Method 920.194 adapted from AOAC official method (18th edition, 2005)11.1.17(chapter 11 page 13)	200		Plastic, Glass	1 day
11)	Chloride	360	Adapted from Sherwood MK II chloride analyzer instruction manual	5	>5mg/L	Plastic, Glass	1 day
12)	Free chlorine	330	Method 8021, 10102, 10069 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	50	0.02 to 2.00 mg/L	Plastic, Glass	1 day
13)	Chlorine, Total	300	Method 8167, 1010, 10070 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	50	0.02 to 2.00 mg/L	Plastic, Glass	1 day
14)	Chromium Hexavalent	150	Method 8023 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	50	0.010 to 0.700 mg/L Cr6+	Plastic, Glass	1 day
15)	Cobalt	655	Method 8078 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	20	0.01 to 2.00 mg/L	Plastic, Glass	1 day
16)	Color, Apparent	415	Method 8025(Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	50	15 to 500 units	Plastic, Glass	1 day
17)	Copper	450	Method 8506 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	50	1 to 210 µg/L	Plastic, Glass	1 day
18)	Cyanide	1020	Method 8027(Adapted from DR4000™/5000™, Spectrophotometer procedure manual), Cyanide Test Spectroquant® 109701	20	0.002 to 0.240 mg/L CN^-	Plastic, Glass	1 day

19)	Conductivity with temperature	255	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA, WEF, 23rd Edition, 2017, Part 2510	100	1 to 50000 µs/cm	Plastic, Glass	1 day
20)	Fluoride	800	Method 8029 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	50	0.02 to 2.00 mg/L F–	Plastic	1 day
21)	Hardness, Total (Titration)	1470	Method 2340 Adapted from standard methods 22nd. Edition, 2012 for the examination of water and waste water by APHA	250		Plastic, Glass	1 day
	Hardness, Total by (spectrophotometer)	245	Method 8030, 8374 METHOD 2340 Adapted from standard methods 19th edition for the examination of water and waste water by APHA	100		Plastic, Glass	1 day
22)	Hydrogen Sulfide	200	HACH kit cat No 2238-01(ADAPTED FROM section 427B of APHA standard method 15th Edition)	100	LR (0.05 to 2.25 mg/L S2-) HR (0.25 to 11.25 mg/L S2-)	Plastic, Glass	1 day
23)	Iodine (Total)	325	Method 8031 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	20	0.07 to 7.00 mg/L	Plastic, Glass	1 day
24)	Iron (Total)	235	Method 8008(Adapted from DR4000™/5000™ Spectrophotometer procedure manual), Iron Test Spectroquant® 114761	20	0.02 to 3.00 mg/L	Plastic, Glass	1 day
25)	Lead	640	Method 8317 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	200	5 to 150 µg/L	Plastic, Glass	1 day
26)	Lithium	300	Adapted from Flame Photometer, Models PFP7 and PFP7/C Operating and service Manual	200		Plastic, Glass	1 day
27)	Magnesium	800	Method 3500 –Adapted from standard methods 22nd edition, 2012 for the examination of water and waste water by APHA chapter 3, page 76 Method 8030 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	500		Plastic, Glass	1 day
28)	Magnesium Hardness	790	Adapted from standard methods 22nd edition,2012 for the examination of water and waste water by APHA Chapter 3, page 57 Method 8030 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual	200		Plastic, Glass	1 day
29)	Manganese	500	Method 8034, 8149 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual), Manganese Test Spectroquant® 101846	30	LR (0.006 to 0.700 mg/L) HR (0.1 to 20.0 mg/L)	Plastic, Glass	1 day
30)	Mercury by spectrophotometer	2980	Method 10065 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	2000	0.1 to 2.5 µg/L	Plastic, Glass	3 days
	Mercury by mercury analyzer	2755	Manufactures method mileston-DMA-80 Direct Hg Analyzer	300		Plastic, Glass	3 days
31)	Nickel	655	Method 8150 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	50	0.006 to 1.000 mg/L	Plastic, Glass	1 day
32)	Nitrate	300	Method 8039, 8171 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual), Nitrate Test Spectroquant® 109713	50	HR (0.3 to 30.0 mg/L NO3—N) LR (0.01 to 0.50 mg/L NO3—N)	Plastic, Glass	1 day
33)	Nitrite	310	Method 8507(Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	20	LR (0.002 to 0.300 mg/L NO2—N)	Plastic, Glass	1 day
34)	Oil& Grease	420	Practical Methods in Ecology and Environmental Science (R.K.Trivedy, P.K.Goel, C.I.Trishal) chapter 10 pages 215-217)	500		Glass	2 days / 3 samples
35)	Total Organic Carbon, (TOC)	1230	Method 10128, 10173, 10129 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual), Total Organic Carbon Test Spectroquant® 114878-79	10	LR (0.3 to 20.0 mg/L C) MR (15 to 150 mg/L C) HR (100 to 700 mg/L C)	Plastic, Glass	2 days
36)	Biological Oxygen Demand,	860	Adapted from HACH BOD Track instruction manual	1000	0 to 700 mg/L	Plastic, Glass	6 days
37)	Chemical Oxygen Demand,	550	Method 8000, (Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual)	1000	MR 3 to 150, 20 to 1500, and 200 to 15,000 mg/L COD LR (TNT821, 3–150 COD); HR (TNT822, 20–1500mg/L COD)	Plastic, Glass	2 days
38)	Dissolved Oxygen	270	Method 8366, 8166, 8333, 8316 (Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual)	100	LR (6 to 800 µg/L O2) HR (0.3 to 15.0 mg/L O2)	Glass with no space and immediate	1 day

					UHR (1.0 to 40.0 mg/L O2)	capping after sampling	
39)	Ozone	300	Method 8311, (Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual) Ozone kit58700-04	100	LR (0.01 to 0.25 mg/L O3), MR (0.01 to 0.75 mg/L O3), HR (0.01 to 1.50 mg/L O3)	Plastic, Glass	1 day
40)	pH with temperature	175	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA, WEF, 23rd Edition, 2017, Part 4500-H+B	100	0 to 14	Plastic, Glass	1 day
41)	Phenols	1350	Method 8047(Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual)	600	0.002 to 0.200 mg/L	Glass	1 day
42)	Phosphorus, Reactive (Orthophosphate)	350	Method 8048, (Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual), Phosphate Test Spectroquant® 114729	50	0.02 to 2.50 mg/L PO43–	Glass	1 day
43)	Potassium by spectrophotometer	300	Method8049, 8012 (Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual)	50		Plastic, Glass	1 day
	Potassium by AAS	1290	In-house method NHL/WC/SOP-TE 004 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd Edition, 2017, Part 3500-K B	50	0 to 50 mg/L	Plastic, Glass	3 days
44)	Sodium by AAS	1290	In-house method NHL/WC/SOP-TE 003 based on Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WEF, 23rd Edition, 2017, Part 3500-Na B	50	0 to 250 mg/L	Plastic, Glass	3 days
45)	Salinity	250	Adapted from corning checkmate II meter instruction manual	50		Plastic, Glass	1 day
46)	Selenium	1800	Method 8149.8194,8012 (Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual)	200	0.01 to 1.00 mg/L	Plastic, Glass	1 day
47)	Silica	250	Method 8186, 8185 (Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual)	100	LR (0.010 to 1.600 mg/L as SiO2) HR (1 to 100 mg/L)	Plastic	1 day
48)	Silver	850	Method 8120(Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual)	100	0.005 to 0.700 mg/L	Plastic, Glass	1 day
49)	Sulfate	220	Method 8051, (Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual)	25	2 to 70 mg/L	Plastic, Glass	1 day
50)	Surfactants, Anionic (Detergents)	675	Method 8028 (Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual)	1000	0.002 to 0.275 mg/L as LAS	Plastic, Glass	1 day
51)	Suspended Solids	150	Method 8006((Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual)	1000	5 to 750 mg/L	Plastic, Glass	1 day
52)	Tannin and Lignin	240	Method 8193 (Adapted from DR2010™/4000™/5000™ Spectrophotometer procedure manual)	50	0.1 to 9.0 mg/L	Plastic, Glass	1 day
53)	Threshold odor	340	Adapted from standard methods 22nd edition,2012 2150b ch 2 page 12	1000		Glass	1 day
54)	Total Alkalinity	215	Adapted from standard methods 22nd edition,2012 2320b ch2 page 26	200		Plastic, Glass	1 day
55)	Total Dissolved Solids with temperature	255	Standard Methods for the Examination of Water and Wastewater. APHA, AWWA, WEF, 23rd Edition, 2017, Part 2510	100		Plastic, Glass	1 day
56)	TPH (Total Petroleum Hydrocarbon)	520	Method 10050 (Adapted from 4000™/5000™ Spectrophotometer procedure manual)	20		Plastic, Glass	1 day
57)	Trihalomethanes	1280	Method 10132 (Adapted from /4000™/5000™ Spectrophotometer procedure manual)	50	10 to 600 ppb as Chloroform	Plastic, Glass	1 day
58)	Turbidity by turbidimeter	255	Adapted from HACH 2100 N TURBIDIMETER instruction manual	50		Plastic, Glass	1 day
59)	Zinc	500	Method 8009 (Adapted from DR4000™/5000™ Spectrophotometer procedure manual)	50	0.01 to 3.00 mg/L	Plastic, Glass	1 day

Note: ***Parameters which are currently NOT available at NHL are highlighted in blue***

ACCEPTANCE CRITERIA FOR WATER CHEMISTRY SAMPLES

The collection of water samples may seem a relatively simple task. However, to obtain representative water samples and to preserve their integrity until they are analyzed in the laboratory requires a series of steps, procedures and practices.

The objective of the sampling is to collect a portion of material, small enough in volume, to be conveniently transported and handled in the laboratory while still accurately representing the materials being sampled. The sample must be handled in such a way that no significant change in composition occurs before the test is performed.

Water samples are collected in suitable containers. A sample container must satisfy the following requirements.

1) It should be free from contamination.
2) It should not change the relevant water characteristics on contact.
3) It should have adequate capacity for storing the samples.
4) It should be resistant to impact and to internal pressure that is increased by expansion of water by release of dissolved gases at elevated temperature on storage.
5) It should be labeled properly with the sampled date, time, and location of the sample and the name of the person who collected the sample.
6) The type of material of the container must be appropriate for the parameter requested for testing.
7) It is recommended that the samples be stored in chilled condition (0-4°C), sealed well and protected from light. It is also recommended that the samples be brought as soon as possible and within 6 hours of sampling.

Apart from the right type of containers, samples should be brought in adequate amounts for testing. Refer to table 1 for relevant containers for the parameters and the minimum amount of sample required for testing.

WATER SAMPLING METHODS FOR PHYSIOCHEMICAL ANALYSIS (W.H.O)

Wash both hands with soap and water. Wipe using a towel or piece of tissue before collecting the samples.

A. SAMPLING FROM A TAP OR PUMP OUTLET

1) Date, time, location and name of the person who collected should be labeled on the bottle before collecting the sample.
2) Clean the tap using a clean cloth. Wipe the outlet to remove any dirt.
3) Open the tap. Turn the tap at maximum flow and let the water run for 1-2 minutes
4) Open the cap of the sampling bottle rinse the bottle with the water to be tested.
5) Fill the bottle. While holding the cap and protective cover, face downwards (to prevent the entry of dust), which may contaminate the sample.
6) Stopper or cap the bottle.

B. SAMPLING FROM DUG WELLS AND SIMILAR SOURCES

1) Date, time, location, type of water and name of the person who collected should be labeled on the bottle.
2) Prepare the bottle with a piece of string; attach a clean weight to the sampling bottle.
3) Attach the bottle to the string. Take a 20m length of clean string rolled round a stick and tie it to the bottle string. Open the bottle.
4) Lower the bottle, weighed down by the weight into the well, winding the string slowly. Do not allow the bottle to touch the sides of the well.
5) Fill the bottle. Immerse the bottle completely in the water and lower it well below the surface without hitting the bottom or disturbing any sediment.
6) Raise the bottle. Once the bottle is judged to be filled, rewind the string on the stick to bring up the bottle.
7) When the bottle gets filled, close the cap tightly.

C. The label of the bottle should contain all the information below.

- Place / location:
- Sample collected by:
- Source / type of water:
- Date sampled:
- Time sampled:

Table 2- TEST AVAILABLE AND PRICES FOR THE CHEMICAL ANALYSIS OF FOOD

#	Name of the test	Price	Method number	Amount of sample Required	Special Conditions	Time taken
1.	Histamine analysis by Fluorometric method	900	AOAC(2019) 977.13	***>100g***	Temperature of the sample should be below 5ºC	4 days
2.	Aflatoxin total (kit method)	865	Manufacturer's method (Ridascreen®Aflatoxin total)	>50g	-	2 days
3.	Aflatoxin M1 (kit method)	1000	Manufacturer's method (Ridascreen®Aflatoxin M1)	>50g	-	2 days
4.	Ciguatera (kit method)	560	Manufacturer's method (cigua-check fish poison)	***5g***	Sample should be cooled properly to prevent from spoiling.	1 day
5.	Pesticide detection (kit method)	575	Manufacturer's method (Agri-screen ticket)	Depending on the sample	-	1 day
6.	Nitrogen and Protein content	1585	AOAC 981.10, 16th Ed, Vol II	>10g	-	2 days
7.	TVB-N (total volatile nitrogenous base)	885	Official Journal of the European Union, Regulation(EC)NO2074/2005, L338/37,Chapter11	Must consist of about 100g of flesh taken from at least 3 different points (>100g)	Sample should be properly cooled to prevent from spoiling	2 days
8.	Ash content of foods	535	AOAC (2019) 900.02, 920.153, 923.03, 940.26, 941.12, 942.05, 945.46, 950.49, 972.15	>20g	-	3 days
9.	Refractive index of oils and fats	80	AOAC (2019) 921.08	***>10ml or 10 g***	Sample should be stored away from heat	1 day
10.	Total and reducing sugar	230	Analytical chemistry of foods (James, C.S 1999), part 2, 5.23, page 117	>30g	-	2 days
11.	Iodine content in Salt	150	Manual of chemical analysis of food, 1998, ministry of health, Malaysia	***>100g***	Sample should be stored away from heat	2 days
12.	Moisture and total solid content	200	Analytical chemistry of foods (James, C.S 1999), part 2, 5.3, page 73	***>20g***	Sample should be properly sealed to prevent absorption of moisture	2 days
13.	Saponification value of oils and fats	600	AOAC (2019) 920.160	***>20ml or 20 g***	Sample should be stored away from heat	2 days
14.	Free fatty acid and Acid value of oils and fats	195	AOAC (2019) 940.28	***>120 ml or 120 g***	Sample should be stored away from heat	2 days
15.	Iodine value of oils and fats	435	AOAC (2019) 993.20	***>30 ml***	Sample should be stored away from heat	2 days
16.	Sodium chloride content in seafood	1080	AOAC (2019) 937.09	>30g	-	2 days
17.	Peroxide value of oils and fats	255	AOAC (2019) 965.33	***>15ml***	Sample should be stored away from heat	2 days
18.	Fat content	1245	Analytical chemistry of foods (James C.S.1999), part 2, 5.13, page 91	***>30g***	Sample should be stored away from heat	2 days
19.	Fat content in seafood and dairy food products	910	AOAC 933.05, 989.05, 922.09, 952.06, 948.15	>20g	-	4 days
20.	Fat content in feeding stuff by acid hydrolysis method	1940	Official Journal of the European Communities, L257/23-25	>20g	-	4 days
21.	Alcohol content (>1%) by specific gravity	150	Analytical chemistry of foods (James C.S.1999), part 2, 6.14, page 163	>120ml	Sample should be sealed properly to prevent evaporation	2 days
22.	Melamine content	510	ELISA method	>200ml	-	2 days
23.	Net weight	25	Codex alimentarius, vol 9A, 2nd ed, page 71	Whole sample	-	1 day
24.	Drained weight	45	Codex alimentarius, vol 9A, 2nd ed, page 71	Whole sample		1 day

25.	Sodium and Potassium in food	2575	AOAC 985.35, 16th Ed, Vol II	>20g	-	3 days
26.	Gross weight	15	Codex alimentarius, vol 9A, 2nd ed, page 71	Whole sample	-	1 day
27.	pH	25	-	>10g	-	1 day
28.	Sensory evaluation	275	-	Depending on the sample	-	1 day
29.	Total carbohydrate content	3560	-	>100g	-	10 days
30.	Chloride	815	AOAC (2019) 937.09	>30g	-	2 days
31.	Mercury content	115	Manufacturer's method (Direct mercury analyzer, DMA-80)	***>10g***	-	3 days

Note: Parameters which are currently NOT available at NHL are highlighted in blue

ACCEPTANCE CRITERIA FOR FOOD CHEMISTRY SAMPLE RECEIVING

1) All the samples should be properly sealed to prevent contamination, absorption of moisture and evaporation of volatile compounds
2) All the samples should be properly labeled. The client should provide all the information (date sampled, who collected the sample, location, type of food, batch no., production date etc.) with the sample.
3) Frozen food products should be in frozen state.
4) Whenever possible, submit samples to the laboratory in the original unopened containers. If products are in bulk or in containers too large for submission to the laboratory, transfer representative portions to clean containers.
5) Samples should be brought in adequate amounts for testing. Refer to table 2 for amount of sample required for testing and special conditions of transport and storage of samples for respective parameters.

TEST AVAILABLE AND PRICES FOR THE ANALYSIS OF MICROBIOLOGY:

Table 3- FOOD MICROBIOLOGY

#	TESTS	PRICE in MVR	TEST METHOD	AMOUNT REQUIRED IN GRAMS		TIME FOR TESTING
1)	Total Viable count (Total Plate Count)	350	FDA BAM *Online*, 2001 (Chapter 3)	50	100	2 days
2)	Total Coliform Count	370	FDA BAM *Online*, 2017 (Chapter 4)	50		1 day
3)	*Bacillus cereus*	400	FDA BAM *Online*, 2012 (Chapter 14)	50		2 days
4)	*Clostridium perfringens*	430	FDA BAM *Online*, 2001 (Chapter 16)	50		1 day
5)	*E.coli*	415	FDA BAM *Online*, 2017 (Chapter 4)	50		1 day
6)	*Staphylococcus aureus*	430	FDA BAM *Online*, 2016 (Chapter 12)	50		2 days
7)	Yeast and Mould	365	FDA BAM *Online*, 2001 (Chapter 18)	50	50	5 days
8)	*Salmonella*	540	FDA BAM *Online*, 2016 (Chapter 5)	50	50	4 days
9)	*Shigella*	480	FDA BAM *Online*, 2001 (Chapter 6)	50	50	2 days
10)	*Listeria monocytogenes*	460	FDA BAM *Online*, 2017 (Chapter 10)	50	50	4 days
11)	*Campylobactor*	470	FDA BAM *Online*, 2001 (Chapter 7)	50	50	2 days
12)	*Vibrio cholerae*	525	FDA BAM *Online*, 2004 (Chapter 9)	50	50	2 days
13)	*Vibrio parahaemolyticus*	525	FDA BAM *Online*, 2004 (Chapter 9)	50		2 days

Table 4- SWAB SAMPLES

#	TESTS	PRICE in MVR	TEST METHOD	TYPE OF DILUENT TO BE USED[#]	TIME REQUIRED FOR TESTING
1)	Total Viable count (Total Plate Count)	350	FDA BAM *Online*, 2001 (Chapter 3)	Ringers Salt Solution (RSS)	2 days
2)	Total Coliform Count	370	FDA BAM *Online*, 2017 (Chapter 4)		1 day
3)	*Bacillus cereus*	400	FDA BAM *Online*, 2012 (Chapter 14)		2 days
4)	*Clostridium perfringens*	430	FDA BAM *Online*, 2001 (Chapter 16)		1 day
5)	*E.coli*	415	FDA BAM *Online*, 2017 (Chapter 4)		1 day
6)	*Staphylococcus aureus*	430	FDA BAM *Online*, 2016 (Chapter 12)		2 days
7)	*Salmonella*	540	FDA BAM *Online*, 2016 (Chapter 5)	Dey-Engley Neutralizing Broth (DEN)	4 days
8)	*Shigella*	480	FDA BAM *Online*, 2001 (Chapter 6)	Shigella Broth (SB)	2 days
9)	*Listeria monocytogenes*	460	FDA BAM *Online*, 2017 (Chapter 10)	Buffered Listeria Enrichment Broth (BLEB)	4 days
10	*Vibrio cholerae*	525	FDA BAM *Online*, 2004 (Chapter 9)	Alkaline Peptone Water (APW)	2 days
11	*Vibrio parahaemolyticus*	525	FDA BAM *Online*, 2004 (Chapter 9)		2 days
12	Yeast and Mould	365	FDA BAM *Online*, 2001 (Chapter 18)	0.1% peptone water	5 days

[#]Please request for the diluents at least 2 days before the required date

Table 5- TEST AVAILABLE AND PRICES FOR THE ANALYSIS OF MICROBIOLOGY: WATER MICROBIOLOGY

#	TESTS	PRICE in MVR	TEST METHOD	AMOUNT REQUIRED	TIME FOR TESTING
1.	Faecal coliform/ E.coli/100ml	440	Environmental Agency Methods for the Examination of Waters and Associated Materials, 2009, Part 4	200ml	4 days
2.	Total coliform/100ml	350	Environmental Agency Methods for the Examination of Waters and Associated Materials, 2009, Part 4	200ml	4 days
3.	Total Viable count at 22°C (cfu/ml)	260	ISO 6222:1999	10 ml	3 days
4.	Total Viable count at 36°C (cfu/ml)	260	ISO 6222:1999	10 ml	2 days
5.	*Vibrio cholerae*/100ml	530	Standard methods 22nd Edition APHA	200ml	2 days
6.	Salmonella /100ml	570	Environmental Agency Methods for the Examination of Waters and Associated Materials, 2006, Part 9	200ml	2 days
7.	Shigella /100ml	520	Standard methods 22nd Edition APHA	200ml	2 days
8.	*Staphylococcus aureus*/100ml	415	HPA standard method, 2005, W5 Issue 3.3	200ml	2 days
9.	*Enterococci*/ 100ml	330	ISO 7899-2:2000	200ml	2 days
10.	*Clostridium perfringens* /100ml	400	Environmental Agency Methods for the Examination of Waters and Associated Materials, 2010, Part 6	200ml	2 days
11.	*Pseudomonas aeruginosa*/100 ml	370	Standard methods 22nd Edition APHA	200ml	2 days

Parameters which are currently NOT available at NHL are highlighted in blue.

Water Samples should reach the laboratory within 24hrs of sample collection in chilled condition (0-4℃)

I. COLLECTION OF FOOD SAMPLES FOR MICROBIOLOGY

The adequacy and condition of the sample or specimen received for examination are of primary importance.
Whenever possible, submit samples to the laboratory in the original unopened containers. If products are in bulk or in containers too large for submission to the laboratory, transfer representative portions to sterile containers under aseptic conditions. There can be no compromise in the use of sterile sampling equipment and the use of aseptic technique.

Sterilize one-piece stainless steel spoons, forceps, spatulas, and scissors in an autoclave or dry-heat oven. Use of a propane torch or dipping the instrument in alcohol and igniting is dangerous and may be inadequate for sterilizing equipment.

Use containers that are clean, dry, leak-proof, wide-mouthed, sterile, and of a size suitable for samples of the product. Containers such as plastic jars or metal cans that are leak-proof may be hermetically sealed. Whenever possible, avoid glass containers, which may break and contaminate the food product. For dry materials, use sterile metal boxes, cans, bags, or packets with suitable closures. Sterile plastic bags (for dry, unfrozen materials only) or plastic bottles are useful containers for line samples. Take care not to overfill bags or permit puncture by wire closure. Identify each sample unit (defined later) with a properly marked strip of masking tape. Do not use a felt pen on plastic because the ink might penetrate the container. Amount of samples has to be taken as per the parameters to be tested.

Transport to the laboratory

Deliver samples to the laboratory promptly with the original storage conditions maintained as nearly as possible. Make a record for all samples of the times and dates of collection and of arrival at the laboratory. Dry or canned foods that are not perishable and are collected at ambient temperatures need not be refrigerated. Transport frozen or refrigerated products in approved insulated containers of rigid construction so that they will arrive at the laboratory unchanged. Collect frozen samples in pre-chilled containers.

Place containers in a freezer long enough to chill them thoroughly. Keep frozen samples solidly frozen at all times. Cool refrigerated samples, except shellfish and shell stock, in ice at 0-4°C and transport them in a sample chest with suitable refrigerant capable of maintaining the sample at 0-4°C until arrival at the laboratory. Do not freeze refrigerated products. Unless otherwise specified, refrigerated samples should be analyzed within 36 h after collection.

CONDITION OF SAMPLES CONTAINERS

Check sample containers for gross physical defects. Carefully inspect plastic bags and bottles for tears, pinholes and puncture marks. Any cross-contamination resulting from one or more of the above defects would invalidate the sample. Samples should be adequately sealed and labeled.

II. COLLECTION OF WATER FOR MICROBIOLOGICAL EXAMINATION.

It is important to take water samples carefully because this can be vital. Care must be taken to avoid contamination during sampling. At the sampling site, if there are other samples being taken (e.g. for chemical testing), the sample for bacteriological testing should always be taken first.

1. CONTAINERS FOR WATER MICROBIOLOGICAL SAMPLES:

i. These should be sampled to sterile bottles. Samples brought in non-sterile bottles to laboratory cannot be accepted.
ii. Sterile bottles are released to clients upon request.
iii. To request for bottles call the Sample Receiving Counter at 3014347 or email us at nhl@health.gov.mv
iv. Laboratory will queue up and call or inform via email when bottles are available.
v. Regular clients are suggested to have their own bottles with the following specs.
vi. Bottles made of material that are autoclavable (can withstand 1210C temperature and 15lb pressure) bottles with autoclavable caps (caps that are made of material that can withstand 1210C temperature and 15lb pressure) (e.g. polypropylene with plug seal cap)
vii. Client bottles with samples will be sterilized and returned to client 3 days after the report date.
viii. Empty client bottles brought to laboratory will be sterilized and returned in 3 working days.

ix. If sterilization of client bottles takes longer than the above mentioned periods, the client will be informed.

2. GENERAL POINTS ON WATER SAMPLING:

i. DO NOT open the bottle (or alternative sample container) until immediately before filling.
ii. DO NOT rinse out the bottle before taking a sample, especially when sampling chlorinated water, as it contains a chlorine neutralizer (sodium thiosulphate).
iii. When removing cap or stopper from the sample bottle, hold it in such a way that the fingers do not come into contact with it's inside surface or with the neck of the bottle. Do not put down the cap or stopper in such a way that will allow it to become contaminated.
iv. Hold the bottle near the base rather than near the neck.
v. Fill the bottle immediately with sample and replace the closure, observing the same precautions as for opening.
vi. DO NOT COMPLETELY FILL THE BOTTLE but leave about 2.5 cm (1 inch) air space.

3. SAMPLING FROM A TAP

i. Wash hand with soap and water, dry with a clean towel or paper towel.
ii. If the tap is metal, than flame the outlet using cotton wool dipped in surgical spirit.
iii. If the tap is plastic, wipe the outlet carefully using a cotton wool dipped in surgical spirit.
iv. Allow the water to run for 2 minutes.
v. Collect at least 250ml (leave an air space in the bottle) of water in to the prepared bottle and cap tightly.
vi. Label the bottle completely.

4. SAMPLING FROM A WELL:

i. Wash hand (as above)
ii. Attach a long string to the bottle.
iii. Remove the cap and lower the bottle into the well.
iv. Hold the bottle near its base and plunge it, neck downwards, to about 20 cm below surface.
v. Collect at least 250ml (leave an air space in the bottle) of water.
vi. Pull up the bottle and replace the cap.
vii. Wipe outside, and label the bottle completely.

5. SAMPLING FROM SWIMMING POOL AND OTHER SUCH SOURCES:

i. Wash hand (as above)
ii. Remove the cap.
iii. Hold the bottle in such a way that your hand does not come in contact with the mouth of the bottle.
iv. Dip into the water about 20cm below (the bottle should be in a slanting position)
v. If there is water current, than place the bottle facing towards the water current while collecting the water.
vi. Collect at least 250ml (leave an air space in the bottle) of water.
vii. Take the bottle and replace the cap.
viii. Wipe outside, and label the bottle completely.

6. TRANSPORT TO THE LABORATORY:

i. The sample should be transported to the laboratory in an ice box protected from light and should reach the laboratory within 24 hours.
ii. The label of the bottle should contain all the information below.
    - Place / location:
    - Sample collected by:
    - Source / type of water:
    - Date sampled:
    - Time sampled:

III. COLLECTION OF SURFACE SWAB FOR MICROBIOLOGICAL ANALYSIS

1. Hold a sterilize aluminum template firmly over the surface to delineate the area to be sampled.
2. Dip a cotton wool swab in a 9ml of diluent solution. If sanitizing agent has been used for cleaning the surface, the diluents should contain 0.05% sodium thiosulphate for neutralization purposes. Squeeze out the excess fluid against the side of the bottle, and rub the moisten swab thoroughly over the entire test area, turning the swab in order to maximize its ability to pick the organisms.
3. Break off the cotton wool end of this swab into 9ml diluent.
4. Shake the diluent bottle containing the swabs.
5. Swab sample should be transport to the laboratory in a cool box in an aseptic condition.
6. Following are the list of diluents used for different parameters.
7. **Swab samples with less than 9ml diluent will not be accepted.**
8. **Please request for the diluents at least 2 days before the required date**
9. **Transport to the laboratory:** The sample should be transported to the laboratory in an ice box protected from light and should reach the laboratory within 24 hours.
10. **The label of the bottle should contain all the information below.**
    - Place / location:
    - Sample collected by:
    - Date sampled:
    - Time sampled:

IN GENERAL - FOR ALL TYPES OF SAMPLES:

The label of the bottle or container should contain all the information below.

- Place / location:
- Sample collected by:
- Source / type of water:
- Date sampled:
- Time sampled:

1. Parameters which are currently unavailable at NHL are highlighted in blue.
2. Pharmaceutical samples and tests need to be negotiated and discussed with the laboratory before receiving to the laboratory. This is to ensure the availability of chemicals and equipment.
3. Two samples are requested to be sent to the laboratory for each test (water and food) so that tests can be repeated if necessary.
4. During the time of sample receiving to the laboratory a responsible person needs to check and sign in the requisition form on behalf of the requesting company or the customer. The remaining of the samples will be returned to the client if requested on the date of the report issue.
5. The fees for testing should be paid immediately upon signing the requisition forms. Payment should be made to the cash receiving counter of Ministry of Health. Unpaid samples will not be processed and will be discarded.
6. After the issuing of the report the samples will be disposed if laboratory is not informed otherwise.
7. Time for sample receiving is from 08:00 hours to 12:00 hours on official working days.
8. Reports can be collected during official hours of the report date given unless otherwise informed.
9. Sterilized bottles, for microbiological examination of water, will be issued in the order of request depending on the availability of the bottles.
10. Bottles of clients would be available after two days of report date.
11. For further queries please contact:

    National Health Laboratory,
    Maldives Food and Drug Authority,
    Sosun Magu, Male',
    Republic of Maldives.
    Tel: +960 3014346, 3014347
    Email: nhl@health.gov.mv, thooma@health.gov.mv,

Table 5- National Criteria For Drinking Water

Chemical and Microbiological Criteria for Drinking Water

Chemical criteria

Parameter	Reference Range
Free Chlorine	0.04 – 0.2 mg/l
pH	6.5 – 8.5
Physical Appearance	Clear & Colorless
Electrical Conduction	<1000 µs/cm
Suspended Solids	5-750 mg/L
Turbidity	<1 NTU
Total Dissolved Solids	<500 mg/L
Chlorides	<200 mg/l
Nitrates	<50 mg/l
Ammonia	<0.02 – 2.50 mg/l
Iron	<0.3 mg/l
Hydrogen Sulphide	0.05 mg/l
Total Hardness	<75 mg/l
Sulphate	<250 mg/l
Manganese	0.1 mg/l
Total Petroleum Hydrocarbon	0
Sodium	<200 mg/l
Potassium	0 – 50 mg/l
Calcium Hardness	<60 mg/l
Bromine	0.05 – 4.50 mg/l
Mercury	<0.001 mg/l
Lead	<0.01 mg/l
Copper	<2 mg/l
Boron	<0.3 mg/l
Arsenic	<0.01 mg/l
Fluoride	<1.5 mg/l
Phenolic compounds	0.002 – 0.2 mg/l
Anionic Detergents	0.002 – 0.275 mg/l
Cadmium	<0.003 mg/l
Chromium	<0.05 mg/l
Cyanide	<0.07 mg/l

Microbiological Criteria

Parameter	Acceptable Limit
Total Coliform Count	0/100ml
Faecal Coliform Count	0/100ml
Total Viable Count 22°C	100cfu/ml
Total Viable Count 36°C	20cfu/ml
Salmonella typhi	Not Detected
Vibrio cholerae	Not Detected
Shigella spp.	Not Detected
Enterococci	0/100ml

Table 6- Tests Available and Prices for the Chemical Analysis of Pharmaceutical Products

#	TEST	PRICE in MRF	TEST METHOD	Amount Required (tablets/capsules)	TIME FOR TESTING
1.	Identification of Allopurinol by FTIR	190	BP,USP, IP	10	3 days
2.	Quantitative analysis of Allopurinol by UV Spectrophotometer	600	BP,USP, IP	20	3 days
3.	Identification of Amoxycillin by FTIR	220	BP,USP, IP	10	3 days
4.	Quantitative analysis of Amoxycillin by UV Spectrophotometer	780	BP,USP, IP	20	3 days
5.	Identification of Ascorbic acid by TLC	560	BP,USP, IP	10	3 days
6.	Identification of Ascorbic acid by FTIR	180	BP,USP, IP	10	3 days
7.	Quantification of Ascorbic acid by Titrimetric Method	400	BP,USP, IP	20	3 days
8.	Identification of Aspirin by FTIR	180	BP,USP, IP	10	3 days
9.	Quantification of Aspirin by Titration	460	BP,USP, IP	20	3 days
10.	Identification of Atenolol by FTIR	190	BP,USP, IP	10	3 days
11.	Quantitative analysis of Atenolol by UV Spectrophotometer	1200	BP,USP, IP	20	3 days
12.	Identification of Bisacodyl by FTIR	180	BP,USP, IP	10	3 days
13.	Quantitative analysis of Bisacodyl by UV Spectrophotometer	1020	BP,USP, IP	20	3 days
14.	Identification of Carbamezapine by chemical test (Color)	400	BP,USP, IP	10	3 days
15.	Identification of Carbamezapine by FTIR	450	BP,USP, IP	10	3 days
16.	Quantitative analysis of Carbamezapine by UV Spectrophotometer	970	BP,USP, IP	20	3 days
17.	Identification of Carbimazole by FTIR	200	BP,USP, IP	10	3 days
18.	Quantitative analysis of Carbimazole by UV Spectrophotometer	560	BP,USP, IP	20	3 days
19.	Identification of Chlorpheniramine by (Color test)	300	BP,USP, IP	10	3 days
20.	Quantitative analysis of Chlorpheniramine by UV Spectrophotometer	1025	BP,USP, IP	20	3 days
21.	Identification of Diazepam by Chemical test (Color Test)	390	WHO Basic Tests for Pharmaceutical Dosage forms 1991	10	3 days
22.	Quantitative analysis of Diazepam by UV Spectrophotometer	750	BP,USP, IP	20	3 days
23.	Identification of Diclofenac by FTIR	190	BP,USP, IP	10	3 days

24.	Quantitative analysis of Diclofenac by UV Spectrophotometer	930	BP,USP, IP	20	3 days
25.	Identification of Frusemide by Chemical test (Colour)	460	WHO Basic Tests for Pharmaceutical Dosage forms 1991	10	3 days
26.	Identification of Frusemide by FTIR	340	BP,USP, IP	10	3 days
27.	Quantitative analysis of Frusemide by UV Spectrophotometer	460	BP,USP, IP	20	3 days
28.	Identification of Glibenclamide by FTIR	190	BP,USP, IP	10	3 days
29.	Quantitative analysis of Glibenclamide by UV Spectrophotometer	890	BP,USP, IP	20	3 days
30.	Identification of Ibuprofen by TLC	1640	BP,USP, IP	10	3 days
31.	Identification of Ibuprofen by FTIR	200	BP,USP, IP	10	3 days
32.	Quantification of Ibuprofen by Titration	1450	BP,USP, IP	20	3 days
33.	Identification of Mefanamic acid by FTIR	205	BP,USP, IP	10	3 days
34.	Identification of Mefenamic acid by Chemical test (Color)	300	BP,USP, IP	10	3 days
35.	Quantification of Mefenamic acid by Titrimetric method	510	BP,USP, IP	20	3 days
36.	Identification of Metronidazole by FTIR	190	BP,USP, IP	10	3 days
37.	Quantitative analysis of Metronidazole by UV Spectrophotometer	715	BP,USP, IP	20	3 days
38.	Identification of Naproxen by FTIR	190	BP,USP, IP	10	3 days
39.	Quantification of Naproxen by Titration	500	BP,USP, IP	20	3 days
40.	Quantitative analysis of Naproxen by UV Spectrophotometer	735	BP,USP, IP	20	3 days
41.	Identification of Paracetamol by Chemical test (Colour)	430	WHO Basic Tests for Pharmaceutical Dosage forms 1991	10	3 days
42.	Identification of Paracetamol by TLC	810	BP,USP, IP	10	3 days
43.	Identification of Paracetamol by FTIR	180	BP,USP, IP	10	3 days
44.	Quantification of paracetamol by Titrimetric method	625	BP,USP, IP	10	3 days
45.	Quantitative analysis of Paracetamol by UV Spectrophotometer	590	BP,USP, IP	20	3 days
46.	Identification of Povidone Iodine by Chemical test (Color)	300	BP,USP, IP	10	3 days
47.	Quantification of Povidone Iodine Titration	170	BP,USP, IP	20	3 days
48.	Identification of Prednisolone by Chemical test (Color)	375	WHO Basic Tests for Pharmaceutical Dosage forms 1991	10	3 days

49.	Identification of Prednisolone by TLC	1260	BP,USP, IP	10	3 days
50.	Identification of Prednisolone by FTIR	180	BP,USP, IP	10	3 days
51.	Quantitative analysis of Prednisolone by UV Spectrophotometer	965	BP,USP, IP	20	3 days