

# Supplementary Materials

**Table S1.** Chemicals used for oxygen supply in fish ponds at Rajshahi district of Bangladesh.

Serial No	Brand Name	Active Ingredients	Dose	Producers	Price*
1	ACI-ox	2Na <sub>2</sub> CO <sub>3</sub> . 3H <sub>2</sub> O <sub>2</sub> 10%	5–8g/decimal	ACI Animal Health	550/kg (6.11)
2	Aqua oxygen	CuSO <sub>4</sub> , Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> , KH <sub>2</sub> O, Co stic thyo sulphate, sodium salt, NH <sub>4</sub> , Blue vitriole	1packet/40–50mL water	RnF Agro and Food Industries Ltd.	560/kg (6.22)
3	Azla	2Na <sub>2</sub> CO <sub>3</sub> . 3H <sub>2</sub> O <sub>2</sub>	500–600g/acre	Intefa	680/kg (7.56)
4	Best oxygen	2Na <sub>2</sub> CO <sub>3</sub> . 3H <sub>2</sub> O <sub>2</sub>	250–500/acre	Univet Ltd.	580/kg (6.44)
5	Oxy flow	H <sub>2</sub> O <sub>2</sub> 10%	250–350g/acre	Novartis (Bangladesh) Ltd.	220/250g (2.44)
6	Oxy-A	2Na <sub>2</sub> CO <sub>3</sub> . 3H <sub>2</sub> O <sub>2</sub>	300–400t/acre	ACME Laboratories Ltd.	235/250 tablets (2.61)
7	Oxycare	2Na <sub>2</sub> CO <sub>3</sub> . 3H <sub>2</sub> O <sub>2</sub>	500–600g/acre	Corbel International Ltd.	650/kg (7.22)
8	Oxygreen	2Na <sub>2</sub> CO <sub>3</sub> . 3H <sub>2</sub> O <sub>2</sub>	250–300g/acre	ZDHF Pharmaceuticals	640/kg (7.11)
9	Oxylife	Oxygen precursors, Probiotics, Detoxificants	400g/acre	Square Pharmaceuticals Ltd.	210/250g (2.33)
10	Oxymax	H <sub>2</sub> O <sub>2</sub> 10%	250–500/acre	Eon Animal Health Products	720/kg (8.00)
11	Oxymore	2Na <sub>2</sub> CO <sub>3</sub> . 3H <sub>2</sub> O <sub>2</sub>	250–500/acre	SK+F	220/250g (2.44)
12	Oxypro	Calcium peroxide, <i>Bacillus subtilis</i> , <i>B. megaterium</i>	5–8g/acre	PVS Impex Private Limited	750/kg (8.33)
13	Oxyren	2Na <sub>2</sub> CO <sub>3</sub> . 3H <sub>2</sub> O <sub>2</sub>	500g–1kg/acre	Renata Limited	600/kg (6.67)
14	Zeoxy	2Na <sub>2</sub> CO <sub>3</sub> . 3H <sub>2</sub> O <sub>2</sub>	250–450g/acre	GME Agro Limited	620/kg (6.89)

\* Values outside the parentheses shows the price in taka, and the value inside the parentheses indicates the price in USD (1 USD= 90 BDT).

**Table S2.** Chemicals used as growth promoter for cultured fish at Rajshahi district of Bangladesh.

Serial no	Brand Name	Active Ingredients	Dose	Producers	Price*
1	Aqua boost	Organic acid, β-glucan	500 g/ton feed	Elanco Ltd.	300/kg (3.33)
2	Aqua growth	Bitu glucon, oligosaccharide, essential oils, organic acids and their salts Vitamins, minerals,	1g/kg feed	GME Agro Limited	700/kg (7.78)
3	Aqua mix	Aminoacids, prebiotics, yeast, and antioxidant	1g/kg feed	Square Pharmaceuticals Ltd.	310/kg (3.44)
4	Cevit aqua	Vitamin C supplements	0.5–2g/ton of water	Square Pharmaceuticals Ltd.	90/100g (1.00)
5	Cevit vet	Vitamin C	25 mg/kg feed	Square Pharmaceuticals Ltd.	100/100 g (1.11)
6	DCP plus	Dicalcium phosphate, magnesium sulphate, NaCl, Trace elements	1kg/100kg feed	Opsonin Pharma Ltd.	415/kg (4.61)
7	Faster growth	Vitamin, mineral. amino acid, micronutrient, enzyme	10g/10kg feed	Modern Herbal Agro Pharma	650/kg (7.22)
8	Fish vita plus	Vitamin, mineral and amino acid supplement	200–300 mL/100 kg feed	Rals Agro Limited	250/kg (2.78)
9	G Growth	Inasitol, Mannitol (Manna Sugar), Calcium Chloride, Sodium Bi-carbonate etc.	1–2g/2–3kg feed	General Agrovat Ltd.	580/500g (6.44)
10	Gel bind	Protein, Fat, CHO, P, Ca, VitA, D3, E, K3	8–10mL/kg feed	Rims BD	650/L (7.22)

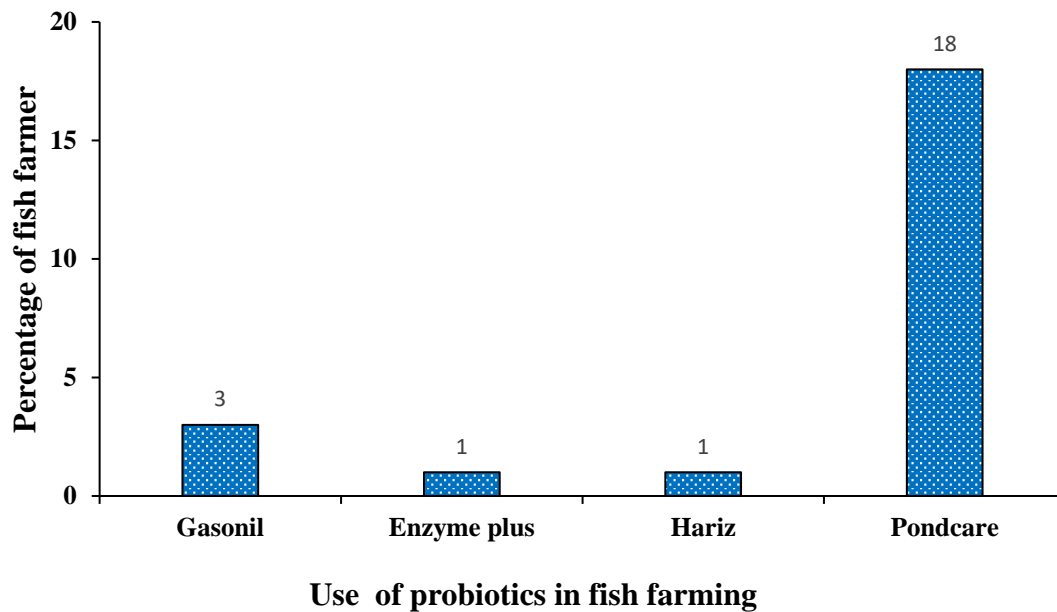
11	GP fish	Vitamin, mineral. amino acid, micronutrient, enzyme, omega-3 fatty acid, feed attractant, glucose	10g/kg feed	ACI Animal Health	150/kg (1.67)
12	Liquavit	Vitamin A, D3, B1, B2, B6, E, immunostimulant	5–10mL/kg feed	ACI Animal Health	130/100mL (1.44)
13	Megavit aqua	Vitamin, mineral and amino acid supplement	100 g/100 kg feed	Elanco Ltd.	380/kg (4.22)
14	Panvit aqua	Vitamin A, D3, B1, B2, B6, ascorbic acid, nicotinamide, Ca D pathothionate	5–10mL/kg feed	Square Pharmaceuticals Ltd.	170/100mL (1.89)
15	Rena WS powder	Vitamin A, D3, B1, B2, B6, B12, K3, C, D, E, ascorbic acid, nicotinamide, D biotin, pathothionate acid, Folic acid	1g/2.5–5L water	Renata Ltd.	270/100kg (3.00)
16	Renafish	Vitamin A, D3, B1, B2, B6, B12, K3, C, D, E, nicotinamide, D biotin, pathothionate acid, Folic acid, Cu, Fe, Mn, Co, CaCO <sub>3</sub>	1kg/ton feed	Renata Ltd.	300/kg (3.33)
17	Safegut	Probiotics, Vitamin & Enzymes	1–2g/2–3kg feed	SK+F	350/250g (3.89)
18	Vitamix F aqua	Vitamin, mineral and amino acid	2.5 kg/ton feed	ACME Laboratories Ltd.	330/kg (3.67)

\* Values outside the parentheses shows the price in taka, and the value inside the parentheses indicates the price in USD (1 USD= 90 BDT).

**Table S3.** Chemicals used to remove toxic gases from aquaculture ponds at Rajshahi district of Bangladesh.

Serial no	Brand Name	Active Ingredients	Dose	Producers	Price*
1	Ammonil	Yucca plant extract, <i>Bacillus subtilis</i> , <i>Candida utilis</i>	100–200 g/acre	Novartis (Bangladesh) Ltd.	2800/kg (31.11)
2	Aquakleen	Brominated organic salts, Benzalkonium chloride (BKC) and Aminonitrogen with buffer	1 L/acre	Square Pharmaceuticals Ltd.	475/L (5.28)
3	Bioclean	<i>Bacillus sp.</i> , <i>Lactobacillus sp.</i> , <i>Nitrobacter</i> , <i>Nitrosomonas</i>	1kg/hectare	Organica Biotech Pvt. Ltd.	520/kg (5.78)
4	Gasonex plus	Na-lorile ether sulphate	500–1000g/hectare	Growel Formulations Pvt. Ltd.	1200/500g (13.33)
5	Gastrap	Lactic acid <i>Bacillus sp.</i> , <i>Bacillus subtilis</i> , Cellulase, Hemicellulase, amylase, Cellulase, Pectinase, Protease, Xylanase, $\beta$ -Glucanase	200 mg/acre	Square Pharmaceuticals Ltd.	3000/kg (33.33)
6	Growzyme	$\alpha$ -Amylase, <i>Lactobacillus acidophilus</i> , <i>Lactobacillus sporogenes</i> , <i>Saccharomyces cerevisiae</i>	500g–1.5kg/ton feed	Century Agro Ltd.	2500/kg (27.78)
7	Pondkleen	An extract of Yucca schidigera plants; Contain Saponins & Glycocomponents	100mL/33 decimal	ACI Animal Health	320/100mL (3.56)
8	Tara	Yucca plant extract	50–100mL /33decimal	Intefa	325/100mL (3.61)

\* Values outside the parentheses shows the price in taka, and the value inside the parentheses indicates the price in USD (1 USD= 90 BDT).



**Figure S1.** Percentage of fish farmers (n = 100) used probiotics in fish farming at Rajshahi district of Bangladesh.

## Questionnaire

ID: No.....

**Questionnaire survey to identify the antibiotics, pesticides and chemicals used in finfish aquaculture**  
Questionnaire was designed to conduct survey and get relevant information about antibiotics, pesticides and other chemicals used in freshwater aquaculture in Rajshahi area, Bangladesh. Fish farmers are the target of this survey. **The information will be used solely for the research purpose with confidentiality.**

### A.Part I: Consent of the fish farmer

Do you agree to participate this survey? if you agree with this survey, we will proceed the survey with you.

a. Agree

b. Disagree

1. Name of the interviewee:
2. Name of the household head:
3. Address: Village.....Union/Ward.....  
Upazila..... District.....
4. Religion: Muslim/Hindu/Christian/Others (specify).....
5. Sex: Male/Female
6. Age:
7. Marital Status: Married/Single/ Widowed/others
8. Educational Level: Illiterate/can read/Primary/Secondary/Higher secondary/graduate/post graduate/PhD

9. **Principle Occupation:** Fish culture/Fishing/ Agriculture /Daily labour/Shop keeping/Driving/Business/Job/Others (specify).....

## B. Part II: Information about chemical use in fish farming

10. Do you use any kind of chemicals/drugs in your culture system?

- ☐ Yes
- ☐ No

If your answer is **YES**, please provide the following information.....

11. From who have you inspired of using chemicals/drugs in your aquaculture farms

- ☐ Adjacent farmers
- ☐ Friends/relatives
- ☐ Upazilla Fisheries Officer/ Fisheries technician
- ☐ Educational institute
- ☐ Representative from pharmaceuticals company
- ☐ Media
- ☐ Other:

12. What are the diseases are you having in your aquaculture farm

- ☐ Bacterial diseases
- ☐ Viral diseases
- ☐ Fungal diseases
- ☐ Parasitic infestation
- ☐ Other:

13. Do you use antibiotics and pesticides in your culture system

- ☐ Yes
- ☐ No

If your answer is YES, why do you use antibiotics and pesticides in your farming system (please mention)

- Antibiotics:
- Pesticides:

14. Do you face any problems regarding using aqua-chemicals and drugs

- Yes
- No

If your answer is Yes, please mention what are the problem do you face to use chemicals/drugs in your farm

- Lack of knowledge about the use of chemicals/drugs
- Lack of knowledge about the effective doses of the chemicals/drugs
- Lack of disease diagnostic tools
- Lack of knowledge of safety issues in the use of hazardous chemicals
- Insufficient supply/ unavailability of the chemicals/drugs
- High prices of the chemicals/drugs
- Other:

**15. Chemicals used for pond preparation and water quality management:**

Brand (Trade) Name of chemicals	Active ingredients	Host fish species	Symptoms	Dose	Price	Purpose of use	remarks
Geotox							
Zeolite gold							
JV zeolite							
Hunter							
Green zeolite							
Pontox plus							
Geolite							
Rotenone							
Blue vitriol							
Cal zeolite							
Matrix							
Benzo							
TSP							
Urea							
Yucca							
Zeocare							
Mega zeo							
Mega zeo plus							
Lime							
Agriculture lime							
Bis zeolite							

Super zeolite							
Bio-Tuff							
Well zeolite							
Bio aqua							
Aquazet							
<b>Others:</b>							

#### 16. Chemicals used as disinfectant:

Brand (Trade) Name of chemicals		Host fish species	Symptoms	Dose	Price	Purpose of use	remarks
EDTA (Sodium thiosulfate)							
Bleaching powder							
Timsen							
Emsen							
Aquakleen							
Micronil							
Germnil							
Fam-30							
GPC-8							
Eon CTC							
Pathocide							
Water clear							
Miras							
Pathonil							
Polgard							
Potash							
Salt							
Omicide							
Lenocide							
Microdinelodine 20%							
Virex							
Virocid							
Formalin							
BKC (benzalkonium chloride)							
Efinol							

<b>Others:</b>							

**17. Chemicals used for oxygen supply:**

Brand name	Active ingredients	Dose	Producers	Price
Oxy flow				
Oximax				
O2- Marine				
Oxy-A				
Oxycare				
Oxygreen				
Bio care				
Bio- Ox				
Oxylife				
Oxymax				
Oxy plus				
Oxymore				
Oxypro				
Oxyren				
Zeoxy				
Oxygen plus				
Oxymore				
Quick oxygen				
O-Plus				
Oxygrow				
Oxysun				
Fish care powder				
Fish curepas				
Best oxygen				
Oxy-gold				
<b>Others:</b>				

**18. Chemicals used as toxic gas removal**

Brand name	Active ingredients	Dose	Producers	Price
Aquakleen				
Ammonil				
Bioclean				
Gastrap				
Gasonex plus				
Growzyme				
Pondkleen				
Tara				
<b>Others:</b>				



**19. Pesticides and other chemicals used for disease treatment:**

Brand name	Active ingredients	Dose	Producers	Price	Purpose of Use
Melathion					
Sumithion					
Protacide					
Deletix					
Bicothrin					
Yucca plant extract					
Rotenone					
Methylene blue					
Malachite green					
Timsen					
Acimec-1%					
Angreb					
Potash					
Eco-solution					
Lime					
Corolux					
Cyperin					
Formalin					
Fifenon					
Fishmethrin					
Argulex					
OSSI-C					
Ripcord					
Salt					

Albez					
Spa					
<b>Others:</b>					

**20. Antibiotics for disease treatment:**

Brand name	Active ingredients	Dose	Host fish species	Symptoms	Producers	Price
Oxysentin 20%						
Chlorsteclin						
Renamycin						
Cipro-A vet						
Fish cur						
Ranamox						
Ciproflox						
Acimox (vet) powder						
Oxy-D-vet						
Renaflox						
Renatrim						
Orgacyline 15%						
Orgamycin 15%						
Bacitab						
Contrim vet Bolus						

Otetravet powder 50						
Sulfatrim						
Oxin WS						
Cotrim- Vet						
Sulphatrim						
<b>Others:</b>						

**21. Chemicals used as growth promoter:**

Brand name	Active ingredients	Dose	Producers	Price
Acimix super-fish				
AC mix super-fish				
AQ cell				
AQ grow-G				
Aqua growth				
Aqua mix				
Cevit aqua				
DCP plus				
G Growth				
GP fish				
Liquavit				
Panvit aqua				
Rena WS powder				
Renafish				
Safegut				

AQ grow-L				
AQ grow-P				
Aqua boost				
Aqua savor				
Auqamin				
Ayumin Powder				
Calfostonic powder				
Cevit vet				
Diamond fish				
Diaginix aqua				
Fibisoel				
Fish vita plus				
Faster growth				
Growmax				
Machalmen				
Megavit Aqua				
Nature aqua GP				
Nature's gift liquid gold				
Orgavit aqua				
Vitamin premix				
Vitamin F aqua				
<b>Others:</b>				

22. Probiotic used is fish culture

Brand name	Active ingredients	Dose	Producers	Price
Pondcare				
Aqua gold				
Aqua Photo				
Bio-Zyme				
C-150				
Eco manine				
Gasonil				
Ecomax				
Golden Bac				
Enzyme plus				
Super Biotic				
Prococn -PH				
PH fixer				
Mutagen				
Super PS				
Zymetine				
Zymetine				
<b>Others:</b>				

**23. Recently introduced aqua-chemicals in aquaculture of the study area.**

Chemicals	Active ingredients	Purpose of use	Producer

Signature:

Mobile Number: