CLOUD INTELLIGENT AQUACULTURE TOXIC CONCENTRATION MONITOR AND REAL-TIME IMPROVEMENT SYSTEM

Team Name: To Rescue Life

Gintel Technology Inc./Kaohsiung, Taiwan

CEO- Dr./Prof. Chin-Yuan Hsieh

Customers

- Aquaculture
- River/Lake water monitor and control
- Waster water monitor and control
- Drinking water monitor and control …….

Customer's Problems

- ALL aquaculture farmers have no idea about the water parameters in their farming pond, especially the change rate (like Drinking Water)
- Change of Water Parameters by Water itself, but also Air pollution, Soil.
- Current aquaculture farming is like blind farming, like gambling
- Shrimp survival rate < 20% currently
- ALL expert suggestions seem useless due to unknown of water parameters data.

Solutions

World-changing

- ✓ **Auto measure** 24 hours a day
- ✓ Over 20 parameters
- ✓ Water **Data record** and **sent** to user's mobile phone
- ✓ **Alert** on bad water
- ✓ **Message notice** to user's mobile phone on bad water
- ✓ Start the **auto-improvement** system, **Waterwheel + Gas Pumping+ heater + Probiotics + nitrifying bacteria+…,** on bad water (Old machine available)
- ✓ Data stored in cloud server for **big data analysis**
- ✓ GPS locating for **anti-theft**

Comparisons

	OURS	MARKET
Measurement	Automatic	Man operation
Timing	24 hours a day	NO
Data recorded	Yes	NO
Alert	Yes	NO
Message Notice	Yes	NO
Smart-improvement	Yes	NO
Data stored in server	Yes	NO
Cost	Low (<20%)	High
Parameters	>20 parameters	<6 parameters

7 Major Functions

Novelty Technology

Core Technology

- **More than 10 transdisciplinary majors**

✓ **Intelligent Technology**

✓ **Mathematical Model Development** (All parameters affect each other)

✓ IOT (Internet of Things)

✓ Hardware design

✓ Algorithm/software design

✓ Physics/Chemistry/Biology/Aquaculture

✓ Wireless communications

✓ Auto Control

✓ Mobile Technology Applications

Core Technology- Transdisciplinary

Toxic Ammonia NH3%

The accuracy is 99.7%

Practicability

Data Comparisons

(USA) PH=8, T=20, %(Ammonia)=3.81% (3.82%)

Ammonia in Aquatic Systems, Univ. of Florida, USA, 2015

USA

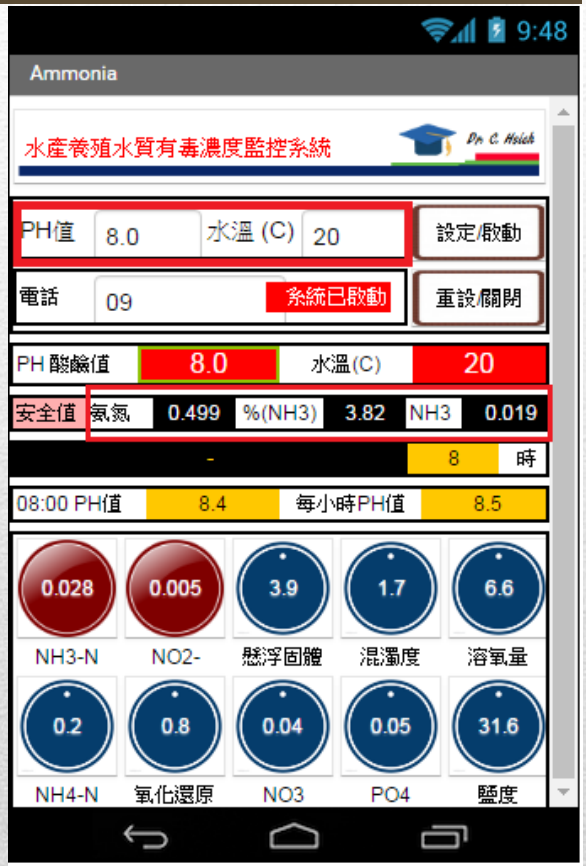
Table 1. Fraction of toxic (un-ionized) ammonia in aqueous solutions at different pH values and temperatures. Calculated from data in Emerson, et al. (1975).
To determine the amount of un-ionized ammonia present, get the fraction of ammonia that is in form for a specific pH and temperature from the table. Multiply this fraction by the total ammonia present in a sample to get the concentration in ppm (mg/L) of toxic (un-ionized) ammonia.

	Temperatures (°C)												
pH	6	8	10	12	14	16	18	20	22	24	26	28	30
7.0	.0013	.0016	.0018	.0022	.0025	.0029	.0034	.0039	.0046	.0052	.0060	.0069	.0080
7.2	.0021	.0025	.0029	.0034	.0040	.0046	.0054	.0062	.0072	.0083	.0096	.0110	.0126
7.4	.0034	.0040	.0046	.0054	.0063	.0073	.0085	.0098	.0114	.0131	.0150	.0173	.0198
7.6	.0053	.0063	.0073	.0086	.0100	.0116	.0134	.0155	.0179	.0206	.0236	.0271	.0310
7.8	.0084	.0099	.0116	.0135	.0157	.0182	.0211	.0244	.0281	.0322	.0370	.0423	.0482
8.0	.0133	.0156	.0182	.0212	.0247	.0286	.0330	.0381	.0438	.0502	.0574	.0654	.0743
8.2	.0210	.0245	.0286	.0332	.0385	.0445	.0514	.0596	.0676	.0772	.0880	.0998	.1129
8.4	.0328	.0383	.0445	.0517	.0597	.0688	.0790	.0904	.1031	.1171	.1326	.1495	.1678
8.6	.0510	.0593	.0688	.0795	.0914	.1048	.1197	.1361	.1541	.1737	.1950	.2178	.2422
8.8	.0785	.0909	.1048	.1204	.1376	.1566	.1773	.1998	.2241	.2500	.2774	.3062	.3362
9.0	.1190	.1368	.1565	.1782	.2018	.2273	.2546	.2836	.3140	.3456	.3783	.4116	.4453
9.2	.1763	.2008	.2273	.2558	.2861	.3180	.3512	.3855	.4204	.4557	.4909	.5258	.5599
9.4	.2533	.2847	.3180	.3526	.3884	.4249	.4618	.4985	.5348	.5702	.6045	.6373	.6685
9.6	.3496	.3868	.4249	.4633	.5016	.5394	.5762	.6117	.6456	.6777	.7078	.7358	.7617
9.8	.4600	.5000	.5394	.5778	.6147	.6499	.6831	.7140	.7428	.7692	.7933	.8153	.8351
10.0	.5745	.6131	.6498	.6844	.7166	.7463	.7735	.7983	.8207	.8408	.8588	.8749	.8892
10.2	.6815	.7152	.7463	.7746	.8003	.8234	.8441	.8625	.8788	.8933	.9060	.9173	.9271

Source: Emerson, K., R.C. Russo, R.E. Lund, and R.V. Thurston. 1975. *Aqueous ammonia equilibrium calculations: effect of pH and temperature*. Journal of the Fisheries Research Board of Canada. 32:2379-2383.

Table 1. Water quality guidelines for un-ionized ammonia for the protection of aquatic life.

Aquatic life	Guideline value (mg·L)
Freshwater	0.019
Marine	NRG[1]



CANADIAN WATER QUALITY- AMMONIA, CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT, 2010

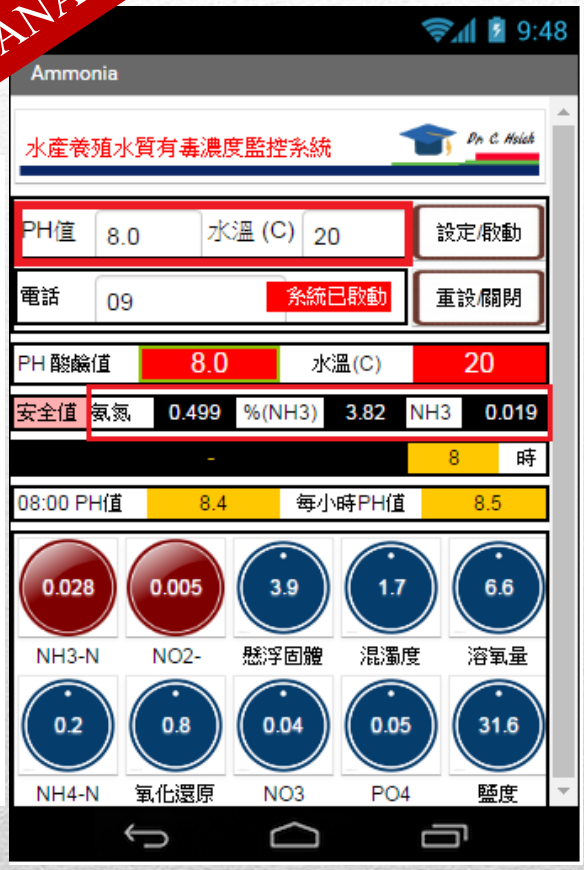
Total Ammonia-Nitrogen

Data Comparisons

Water quality guidelines for total ammonia for the protection of aquatic life (mg/L=ppm).

CANADA

Temp (°C)	pH							
	6.0	6.5	7.0	7.5	8.0	8.5	9.0	10
0	231	73.0	23.1	7.32	2.33	0.749	0.250	0.042
5	153	48.3	15.3	4.84	1.54	0.502	0.172	0.034
10	102	32.4	10.3	3.26	1.04	0.343	0.121	0.029
15	69.7	22.0	6.98	2.22	0.715	0.239	0.089	0.026
20	48.0	15.2	4.82	1.54	0.499	0.171	0.067	0.024
25	33.5	10.6	3.37	1.08	0.354	0.125	0.053	0.022
30	23.7	7.50	2.39	0.767	0.256	0.094	0.043	0.021



Canadian Water Quality Guidelines for the Protection of Aquatic Life-
Canadian Environmental Quality Guidelines, Canadian Council of Ministers of the Environment, 2010

Dissolved Oxygen

Data Comparisons

USA

TEMPERATURE (°C)	SALINITY (g/kg)								
	0	5	10	15	20	25	30	35	40
20	9.092	8.828	8.572	8.323	8.081	7.846	7.617	7.395	7.180
21	8.914	8.658	8.408	8.166	7.930	7.701	7.479	7.262	7.052
22	8.743	8.493	8.250	8.014	7.785	7.785	7.561	7.344	6.929
23	8.578	8.334	8.098	7.867	7.644	7.426	7.214	7.009	6.809
24	8.418	8.181	7.950	7.725	7.507	7.295	7.089	6.888	6.693
25	8.263	8.032	7.807	7.588	7.375	7.168	6.967	6.771	6.581
26	8.113	7.888	7.668	7.455	7.247	7.045	6.849	6.658	6.472
27	7.968	7.748	7.534	7.326	7.123	6.926	6.734	6.548	6.366
28	7.827	7.613	7.404	7.201	7.003	6.810	6.623	6.441	6.263
29	7.691	7.482	7.278	7.079	6.886	6.698	6.515	6.337	6.164
30	7.558	7.354	7.155	6.961	6.772	6.589	6.410	6.236	6.066
31	7.430	7.230	7.036	6.846	6.662	6.483	6.308	6.137	5.972

Dissolved oxygen is measured in mg/L.
0-2 mg/L: not enough oxygen to support life.
2-4 mg/L: only a few fish and aquatic insects can survive.
4-7 mg/L: good for many aquatic animals, low for cold water fish
7-11 mg/L: very good for most stream fish

Product Type 1- Portable

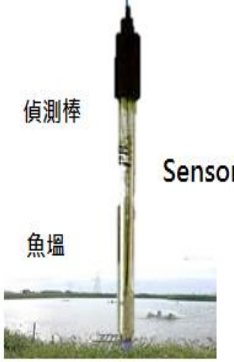
Monitoring System 監測系統

放在魚塭現場 (In fish Pond)

偵測棒

Sensor Stick

魚塭



無線傳輸

監測資料傳送

Wireless Communication-
Data Transmission

Portable Box

平板 Pad

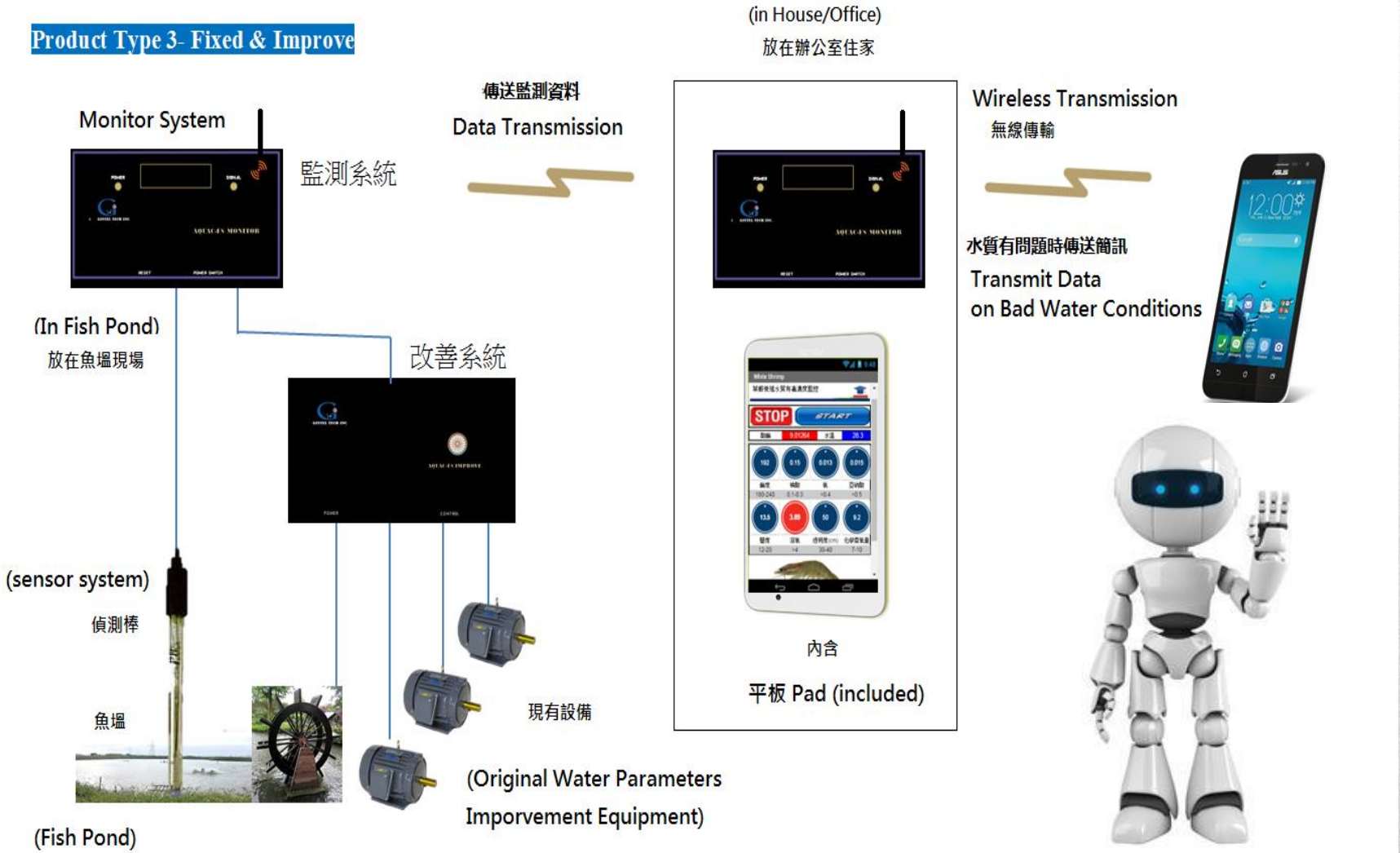
(in house/Office)

Product Type 1- Portable

Smart Phone

自備手機
可以選擇性的將偵測的
資訊傳到自己的手機存
檔備份

Prototype


Product Type 3- Fixed & Improve
(in House/Office)
放在辦公室住家
傳送監測資料
Data Transmission
Monitor System
監測系統
Wireless Transmission
無線傳輸
水質有問題時傳送簡訊
Transmit Data
on Bad Water Conditions
(In Fish Pond)
放在魚塭現場
改善系統
(sensor system)
偵測棒
魚塭
現有設備
內含
平板 Pad (included)
(Original Water Parameters
Imporvement Equipment)
(Fish Pond)
Aqua Farming ROBOT

- ✓ First Prize- 2017 Tic 100 Startup Competition
- ✓ First Prize- 2017 International Big Data e-System Innovation Competition
- ✓ First Prize- 2016 National Smart Agricultural Innovation Entrepreneurship Competition
- ✓ First prize - 2016 National Information Application Service Innovation Competition
- ✓ First Prize- 2016 National Innovation Products Competition
- ✓ Gold Medal Award- 2016IIIC International Innovation Invention Competition
- ✓ National Top 100 Innovative Product Award
- ✓ Gold Medal- International Invention Technology & Trade Fair, 2015
- ✓ GOLD prize - National Information Application Service Innovation Competition 2015
- ✓ GOLD Medal-International Invention Competition 2015
- ✓ First Prize - National Science and Technology R & D Competition Press, Ministry of Education , Taiwan, 2015

Competition Award

- ***Future Vision- To Rescue Life***
- ***Future research will focus on Intelligent Technology Product to secure the safety of Food, Water and Air***

Passion

- *Large Amount of Fish Die Inexplicably*

Vision


APPRECIATE
IT IS THE RIGHT TIME
TO DO THE RIGHT THING
Gintel Tech Inc.
EXPECT TO MAKE SOME CONTRIBUTIONS TO THE WORLD.