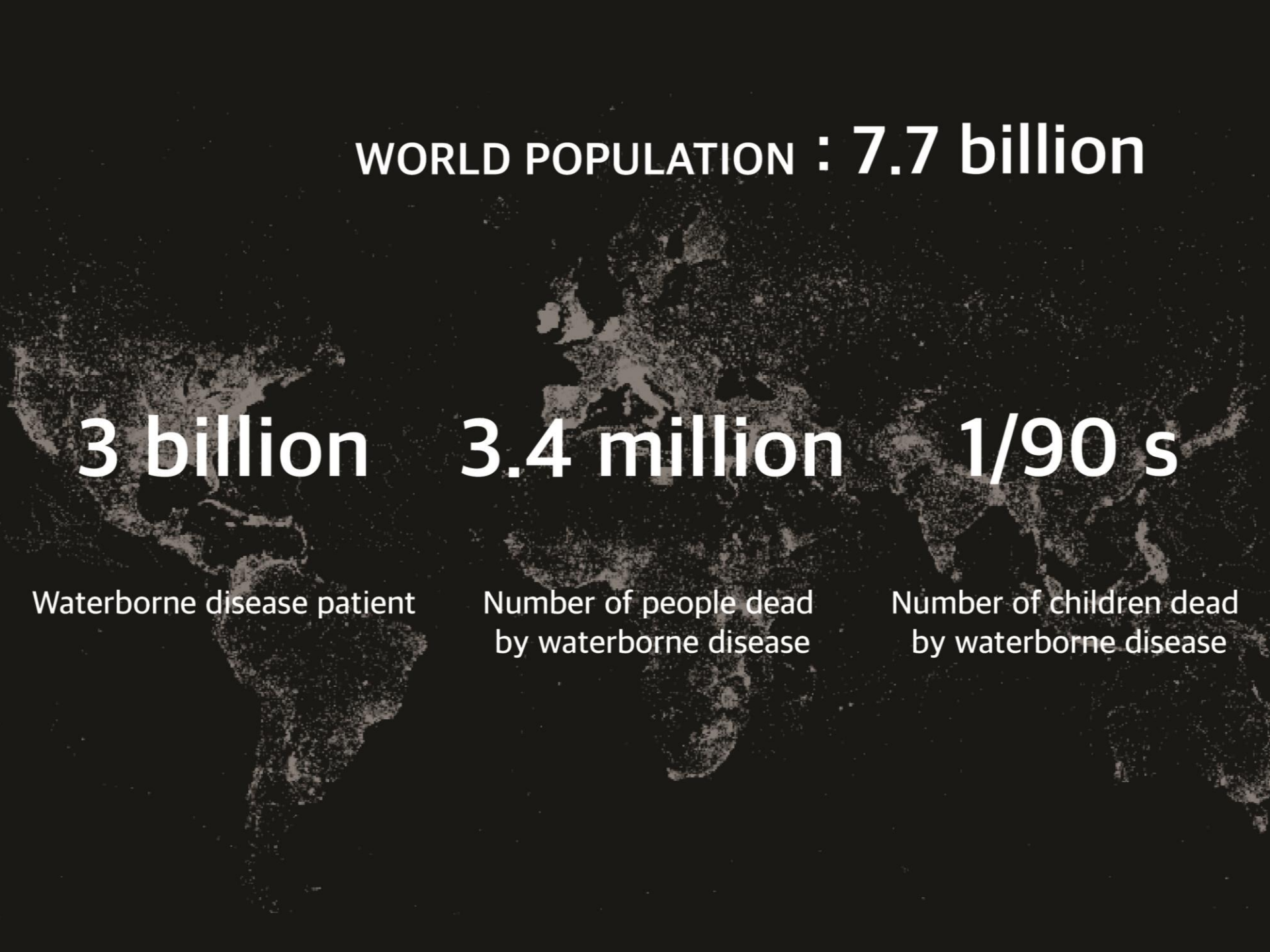
PiQuant

A portable smart IoT bacteria detector and water quality integrated management system based on spectroscopy to detect contaminated water

Do you think the water your drinking is safe?


WORLD POPULATION : 7.7 billion
3 billion
Waterborne disease patient
3.4 million
Number of people dead by waterborne disease
1/90 s
Number of children dead by waterborne disease

4,500 CHILDREN WILL DIE TODAY FROM WATER-RELATED ILLNESSES

663 million
Number of people who can not drink clean water

2.4 billion
Number of people who lives without sanitation

946 million
Number of people who can not use toilet

About 4,500
Daily number of children dead by waterborne disease

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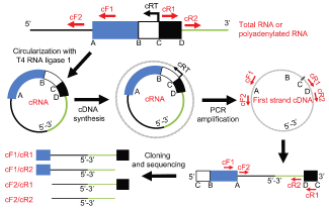
Tradition method of detecting bacteria

TIME CONSUMING
EXPENSIVE

PCR



Need 2~3days for result

Over $1800 in expenses

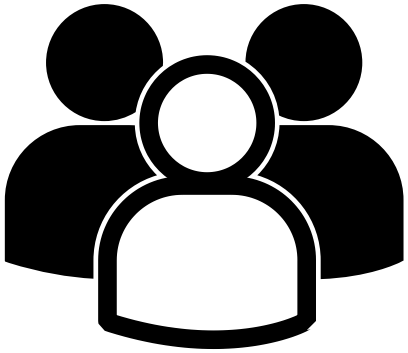
Need high-quality manpower

Diagnostic kit

Need 1 day for result

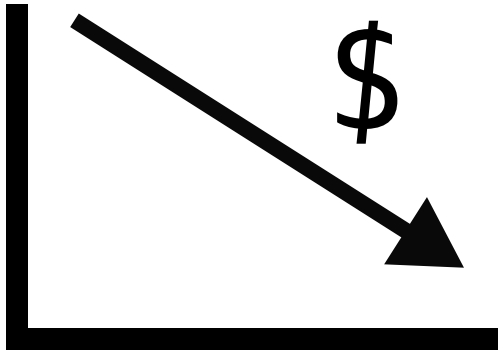
Fast and convenient to diagnose
but incorrect

Subjective and very large error range

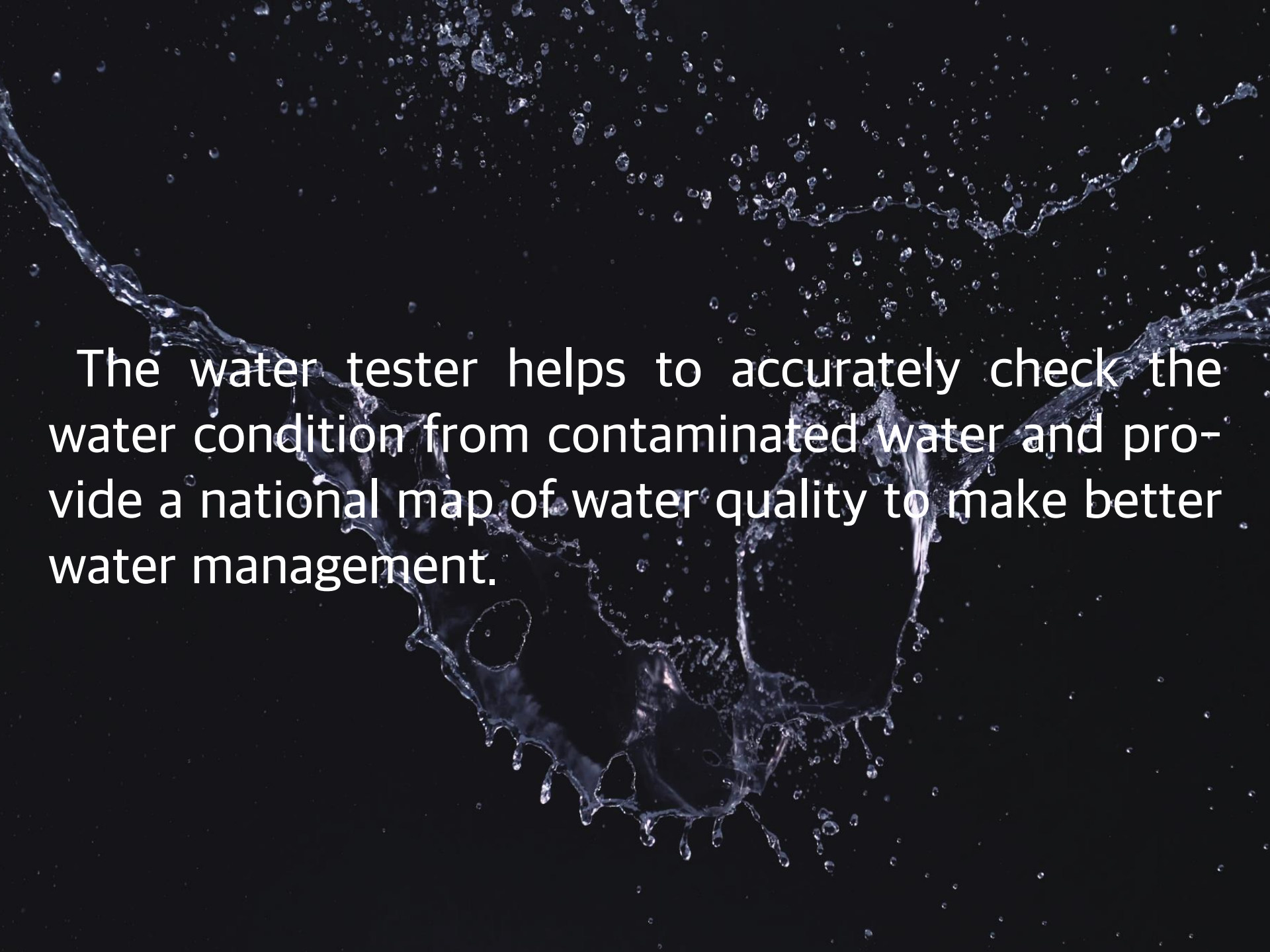


Can be used right away

Non-expert can easily use

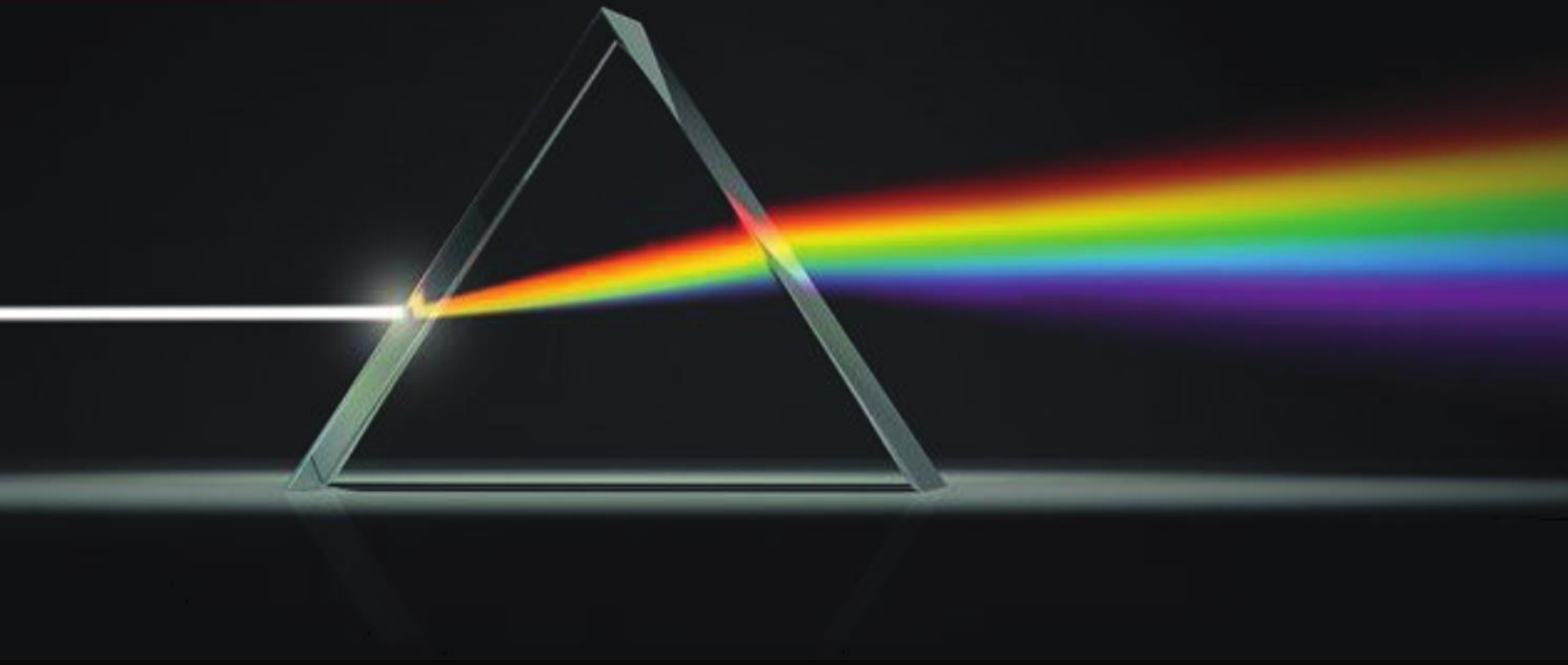


Affordable price

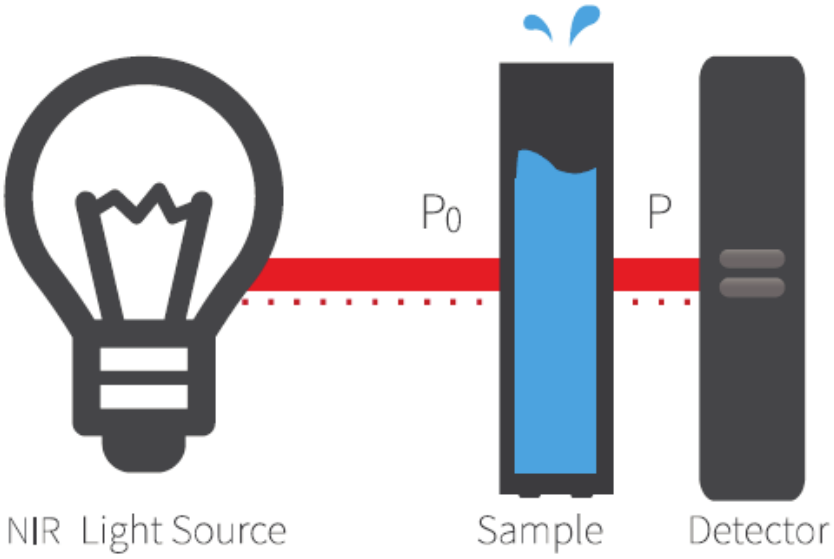


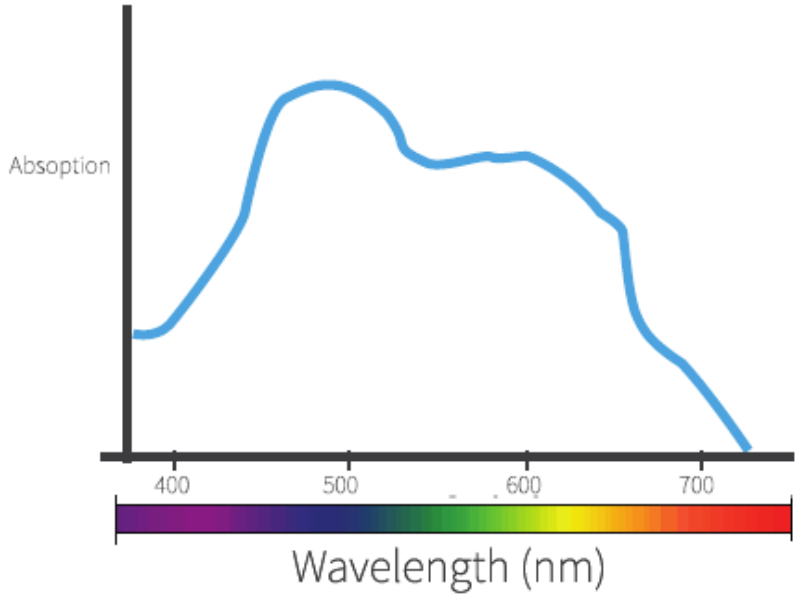
The water tester helps to accurately check the water condition from contaminated water and provide a national map of water quality to make better water management.

SPECTROSCOPY



What is Spectroscopy?





NIR light from the light source is absorbed in part by the sample and arrives in part at the detector to be measured.

The measured light is then compared with the emitted light from the light source, and the sample's spectrum can be plotted as a function of frequency, wavelength, or wavenumber. This in turn defines the spectral signature of the material.

Water Scanner

- Semi-automated bacterial detector
- Salmonella and E. C oli can be detected.
- Easy to use by ordinary people
- Automatically sends the data from town well to server
- Save more than $2000 compared to existing products
- Needs less than one house to analysis.
- $9 ~ $10 for one case to analysis
- Central data can be collected and analyzed

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Comparative advantage

Classification	Existing Tech	Developed Technology	Saving
Detection limit	250/25g level	1/25g level	250 fold increase sensitivity
Analysis time	96 hours	Within 1 hour	96hours reduction
Price competitiveness	Expensive $2600 / per	Low price less than $440	Saves more than $2000
Analysis cost	$500 / per	$10 / per	Saves $490 / per
Activity	Need advanced manpower	Everyone can easily use it	Efficient / Soft Fast response

PiQuant's initial 'Proof of Concept' for spectroscopy IoT

Specification

- Affordable
- Quick Result
- Handheld
- Simple to Use

· 1,000,000 tested : 99.7% Reliability
(0.3% failure due to user mistakes)

· Sensitivity : 100 nano mol / l detectable
(Chinese FDA states 10% contamination is fatal dose)

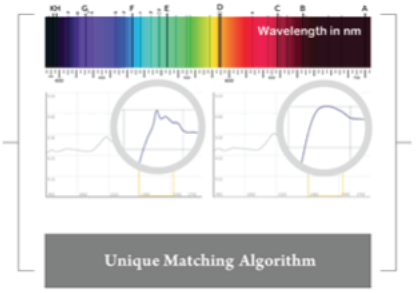
· Connection : Bluetooth 4.0
(Connected to Mobile Phone for results display)

1

Put milk or milk powder in to the device

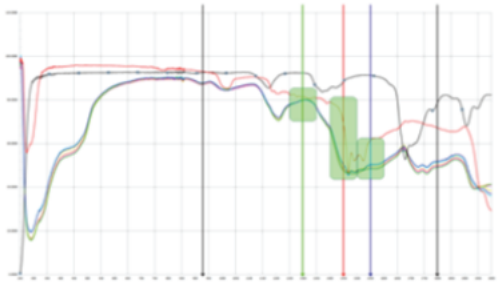
2

By using IR LED, Photo Diode Sensor measure food



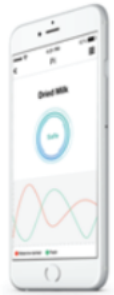
3

Compare the data and algorithms held by the food with the unique spectral values



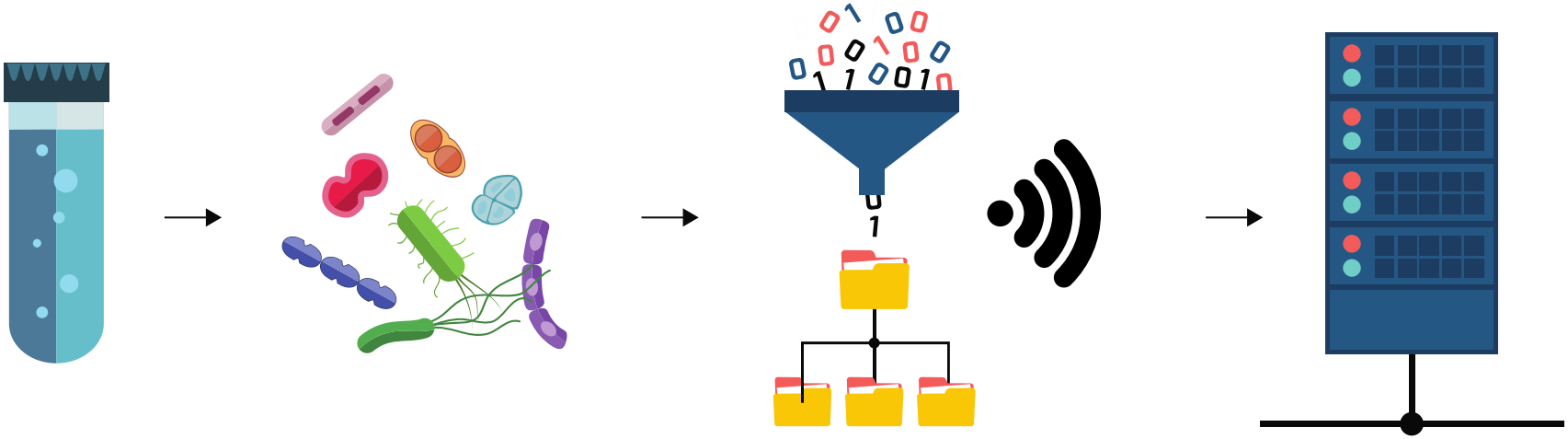
4

It can be seen that the actual difference between melamine-containing milk powder and ordinary milk powder contrasts is significantly different.



5

App enables users to check



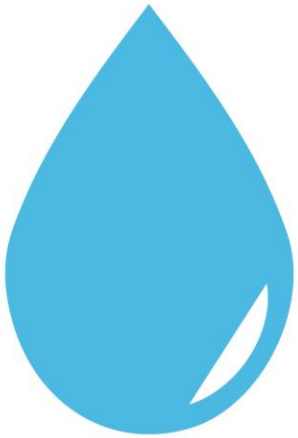
Water test

Bacterial detection

Collect / Send Data

Data is collected in central database

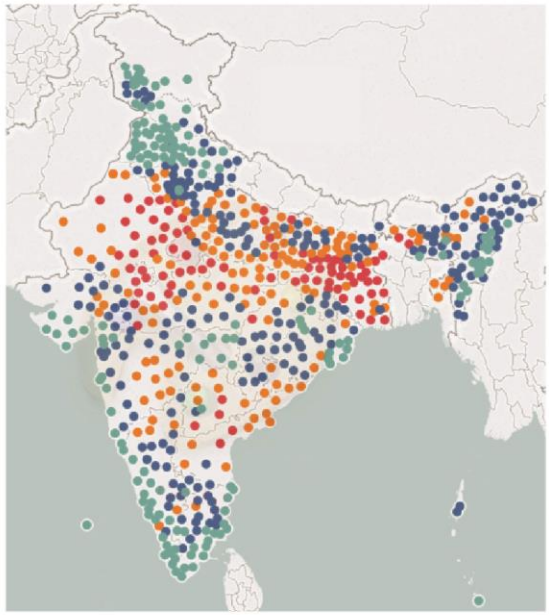
Analyze pollution data and improve water quality



Town well

Incubate and analyze by using spectroscopy (BACTERIA DETECTED)

GPS based



Central Water Data Management
Create a Water Map

Automatic water measuring network

- Collection method : WEB service (SOAP)
- Collected Data : Water quality measurement data (EC, T-P, T-N etc)

Collected TMS

- Collection method : DB Link
- Collected Data : Water quality measurement DATA (COD, SS, pH etc)

Communication

RS 232 / 422/ 485
Wifi
Bluetooth

(Wired / Wireless)
both possible and it's easy to transport long distances.

- Collection method : FEP collection -> DB Input
- Collected Data : Water quality monitoring data (Murky degree, DO, temperature etc)

Water pollution control information system

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Water Pollution Control Information System

Integration DB

Disseminate water pollution

- Department of environment
- Related organ
- Local government

Collected Water Quality Data

National Institute of Environmental Research

- WINS information link
- Flow rate / Water level information

Water Environment Information System

- Flow rate information
- Water level information
- 3 Dam operation information

K water

- Water quality information
- Water quality control

Co-Research Institutes

NEC

KOICA
Korea International Cooperation Agency

KRISS
Korea Research Institute of Standards and Science

PiQuant

KAIST

KIER
KOREA INSTITUTE OF ENERGY RESEARCH

UCDAVIS
UNIVERSITY OF CALIFORNIA

Patent 01

Application Date: 2015-07-08

[APP2015-0275KR]

Invention Name :

Food information supply method and device.

식품정보제공 방법 및 장치

Patent 02

Application Date: 2015-07-08

[APP2015-0274KR]

Invention Name :

Food condition measurement apparatus, food condition measurement module and smart apparatus comprising the same.

식품 상태 측정장치, 식품 상태 측정 모듈, 이를 포함하는 스마트 장치

Patent 03

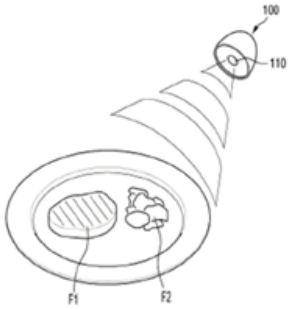
Application Date: 2015-07-08

[GP150076KR/AA]

Invention Name :

A food status determination device and a system for determining food status using the same.

식품의 상태 측정기 및 이를 이용한 식품의 상태 측정 시스템



Patent 04

Application Date: 2015-07-08

[APP2015-0275KR]

Invention Name :

Spectrometer for object compositional analysis and electronic apparatus comprising the same

대상체의 성분 분석이 가능한 분광 장치 및 이를 포함하는 전자장치

Patent 01

Application Date : 2015-07-29

[10-2019-0017711]

Invention Name :

APPARATUS, SYSTEM AND METHOD FOR ANALYZING COMPONENT

성분분석 장치, 시스템 및 방법

Patent 06

Application Date: 2019-02-15

[10-2019-0017717]

Invention Name :

APPARATUS, SYSTEM AND METHOD FOR ANALYZING COMPONENT

성분분석 장치, 시스템 및 방법

Appendix - Achivements and Accolades

2014	August	SeedStars World Startup Competition Top 5 (Embassy of Switzerland in Korea)
	September	KDB Startup program Mini-Competition Semifinal Winner (Korea Development Bank foundation, KOE)
	September	Startup Engine Program (MSIP, NIPA (Subsidiary of Government)
2015	March	Orange Fab Asia Acceleration Program (Orange Telecom, France)
	March	MWC 2015 Exhibition (GSMA, Spain)
	March	Sparklabs Acceleration Program (Sparklabs, Korea)
	October	KIC Silicon Valley Soaring Program (KIC, Silicon Valley)
	November	Tech Crunch London (Tech Crunch, UK)
	November	Hub Conference (Hub, Germany)
	Decemver	Ministry of Science, ICT and Future Planning No. 117 (MSIP. Korea)
2016	May	Pioneer Festival in Vienna (Pioneers, Germany)
	May	TNW in Amsterdam (TNW, Netherlands)
	May	Best idea Presentation 1st Prize (Prime CROWD Event 19, Germany)
	June	SeedStars Seoul 2016 1st Prize (SeedStars, Korea)
	July	Tencent Global Startup Competition Top 10 (Tencent, China)
	September	TechCrunch Disrupt San Francisco 2016 (TechCrunch, USA)
2017	January	Award Certificate (Smart Venture Institute, Korea)
	March	4YFN Internet of Things Finalist (4YFN, Spain)
	March	MWC / 4YFN (4YFN, Spain)
	April	Seedstars World 2017 Most Innovative Startup (Seedstars, Switzerland)
	November	Seoul Startup Expo Top 3 Company (SBA, Korea)
2018	January	Established research and development department
	May	Korea Foodcup grand prize (Ministry of SMEs and startups)
	July	Selected to receive grant from KOICA CTS (Ministry o f Foreign Affairs, Korea)
	October	HAIDIAN Internationalization Challenge Hackathon 1st Prize (WEWORK)
	October	Smart Device Competition 1st prize(K-ICT device lab)
	November	Pioneer Festival Seoul 1st prize & Selected for the national team Korea (Kotra, Austria IT government)
2019	March	MWC19 (Spain)
	March	7 New Patent Applications
	March	Certification of Venture Company

PiQuant

MEMBERS

Doyeon Pi
CEO
H/W and S/W developer
Developed variety of IoT products
Won Google Hackathon
2012 WOWZapp Worldwide
Hackathon

Boksoon Pi
Vice president
Daewon foreign high school
Korea University
Bachelor of Laws
Multilingualist
(BR, EN, CN, JP)

Byungil Lee
QA / QC
Nexon QA for 7 years
Sudden Attack, CartRider
Maple Story / Nexon SSO
Nexon play app

Sangjun Han
SuperVisor
Hyundai Power System
Head Researcher
Daewoo Telecom
Head Researcher
Spectroscopy, 3D camera
developer

Gunho Cha
Technical analyst
Seoul National University
Bachelor of Engineering
Patent attorney
Legal Corporation, KCL
Technical Division of the Korea
Institute of Science and Technology

Hyunchae Lim
Team Leader
Yonsei University BA
NYIT School of Management
Talent Award of Korea
Grand Prize Economic Olympiad
Startup career 6 years
Grand prize Startup contest

Heetae Jeon
Designer
Yonsei University
3D, Industrial Design
Startup career (3 years)

Jiwon Moon
Manager
Seoul National University
material engineering department
Planning
Development
Technical Research

Kihun Jeong
Principal Technical Advisor
Professor, Department of Bio and
Brain Engineering, KAIST
Ph.D. in Mechanical Engineering,
University of California, Berkeley,
Real Identity, Inc., CTO
VPIXTM Medical CTO

Seungsu Kim
Director
Hongik University Bachelor of
Business Administrtion & Engineering
InsightBridge Founder
Hongik Bridge Director
GR Alliance Director

YeonSang No
Advisor

S-Oil CEO
Kyungdong One Co., ltd CEO

Jay. W. Lee
Advisory Board Chairman

Jongmoon Choi
Advisor

The Korean Ambassador to France
Special Adviser to the Minister
of Foreign Affairs

Steve An
Advisor

Northwestern Pritzker School of Law
Chicago Sedgwick LLP Attorney
TriBeluga (Chief Legal Officer)
Senior Foreign Attorney at SEUM law firm
In-house counsel, litigation, transaction,
and M&A specialist

Co-Research Institutes

We are looking for Good Partners to work at India

We can use this device in tumblers, water purifiers, restaurants, agriculture, etc.

We are looking for synergy partners who wants to solve water problems not only in India but also around the world.

Until every people can release the concern from the water related disease, PiQuant will do our best.

Thank You

For Listening