BIO-KEY

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ONE-STOP SOLUTION FOR AQUATIC PATHOGENS

BIO-KEY

FAST

EASY

ANYTIME

ANYWHERE

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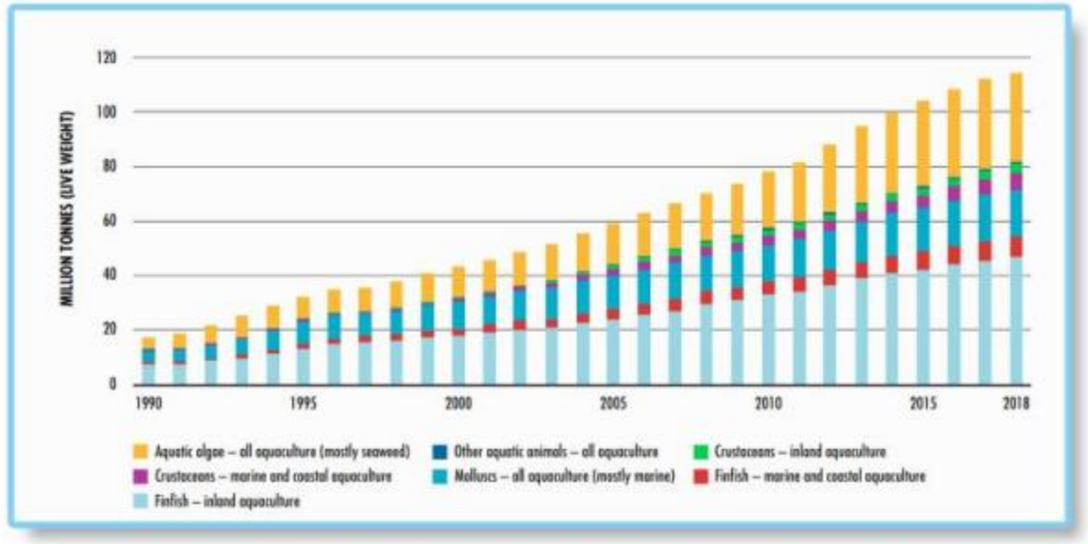
COMPANY PROFILE

Biokey Health is a high-tech enterprise with integrating R&D, production and sales&marketing in Guangzhou. Since 2003. Bio Key was founded by the "Thousand Talents Program" entrepreneurial team and the overseas senior automation equipment development engineer team.

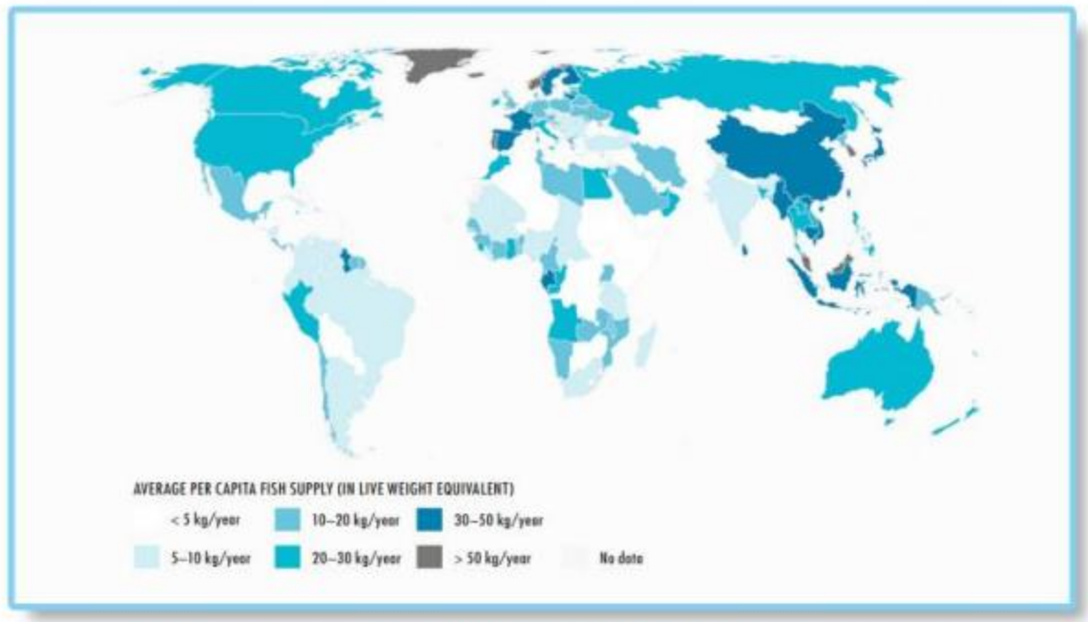
The company's core team has been in the field of IVD research and entrepreneurship for more than 10 years, and has mastered a wealth of molecular diagnostic POCT industrial application technology, SmartTRF immune detection technology, RT qPCR nucleic acid detection technology and independent research and development capabilities of instruments.

It has a number of independent core technologies in the fields of automation engineering, micro-precision manufacturing, immunofluorescence, nucleic acid detection and gene sequencing. Since its establishment, the company has applied for more than 60 patents and currently has 17 authorized patents. The company has two R&D centers for diagnostic reagents and instruments and equipment, totaling more than 500 square meters; it has established more than 2,000 square meters of GMP workshops and equipment production plants; it has SmartTRF new immune detection technology, nucleic acid detection technology (POCT) and three scientific services.

STATE OF WORLD AQUACULTURE



WORLD AQUACULTURE PRODUCTION OF AQUATIC ANIMALS AND ALGAE, 1990–2018



APPARENT FISH CONSUMPTION PER CAPITA, AVERAGE 2015–2017

MOLECULAR DETECTION , QPCR

Quantitative Real-time PCR

Quantitative Real-time PCR is a method of using fluorescent chemicals to detect the total amount of product after each polymerase chain reaction (PCR) cycle in a DNA amplification reaction. A method for quantitative analysis of specific DNA sequences in a sample to be tested by using an internal or external reference method.
Quantitative Real-time PCR is to monitor the PCR process in real time by detecting the fluorescent signal during the PCR amplification process. Since there is a linear relationship between the Ct value of the template and the initial copy number of the template in the exponential period of PCR amplification, it becomes the basis for quantification.

qPCR

Principle of quantitative detection

During the initial cycle of PCR, the fluorescent signal hardly changes, thus defining the baseline in the amplification curve. The increase in fluorescence beyond the baseline is the detection of cumulative target molecules.
A fixed fluorescence threshold line, which can be set above the baseline, and the number of cycles when the fluorescence exceeds the fixed threshold is the parameter CT (threshold cycle).

What is quantitative detection?

The quantitative assay is a real-time PCR (qPCR) assay. Quantitatively measure the amount of target nucleic acid fragments detected in each PCR amplification cycle. The target molecule can be DNA, cDNA or RNA. This method guide mainly discusses the following three quantitative assays:

- Quantification of DNA/cDNA
- Quantification of RNA using one-step reverse transcription polymerase chain reaction (RT-PCR)
- Quantification of RNA using two-step RT-PCR

Quantitative Analysis Common Terminology

Amplicon: A short fragment of DNA produced by the PCR process.
Nucleic acid target: DNA or RNA sequence to be amplified.
Amplification curve: A curve prepared from fluorescence signal versus cycle number.
Baseline: The few cycles in which the fluorescent signal has not changed at the start of PCR.
Ct (threshold cycle): The number of cycles at which the fluorescent signal exceeds a fixed threshold of NTC (no template control sample), used to verify the quality of the amplification.

▼ Aquatic pathogen nucleic acid detection ▼

Source control: pathogen detection of broodstock, larvae, fry, flea-like shrimp, larvae, algae, Artemia, etc.

Monitoring during aquaculture: pathogen detection of juvenile shrimp, adult fish, adult shrimp, aquaculture water, bait, etc.

Supervision and inspection: government department supervision, inspection, research, monitoring, emergency warning, etc.

DETECTION OF AQUATIC PATHOGENS BY QPCR

AQUACULTURE

In recent years, in order to cope with various frequent outbreaks of diseases in aquaculture, aquaculture farmers have continuously improved their aquaculture awareness and inspection techniques. More farmers are not only judging the quality of shrimp fry/fry from appearance or microscopic inspection, but also expect shrimp fry/fry to be free of pathogens, or know the pathogen-carrying amount of shrimp fry/fry. In the process of aquaculture, farmers should conduct disease detection on aquatic animals, detect potential diseases as soon as possible, and take timely prevention and control measures to reduce losses. Therefore, high-efficiency scientific farming gradually replaces the low-efficiency traditional empirical farming method and becomes the mainstream, while creating greater economic benefits. From seedling selection to regular pathogen detection in the breeding process, qPCR can help us better scientific breeding.

FOUR MAJOR PROBLEMS

1. Strong supervision
2. Long detection time and high cost
3. Lack of professional technicians
4. Inaccurate detection results lead to serious losses

ONE-STOP SOLUTION

"No need for a professional PCR laboratory, with rapid nucleic acid detection capabilities"

ONE-STOP SOLUTION

"No need for a professional PCR laboratory, with rapid nucleic acid detection capabilities"

The one-stop solution can help aquaculture farmers to solve two major problems in nucleic acid detection: professional PCR laboratory and professional nucleic acid detection capabilities.

SCHEME ONE

Nucleic acid-free extraction solution: nucleic acid-free extraction detection kit + nucleic acid detection work box

- 5 minutes to complete the sample processing, you can immediately start the operation
- 45 minutes to get sample nucleic acid test results

Advantages: Portable and mobile small molecular detection platform, realizing instant, fast and flexible detection of a small amount of samples.

SCHEME TWO

Batch nucleic acid extraction solution: nucleic acid extraction instrument + detection kit + nucleic acid detection work box

- Reduce human interference and work intensity
- Realize batch processing of samples and provide efficient solutions for centralized detection

SCHEME THREE

Integrated, automated nucleic acid detection

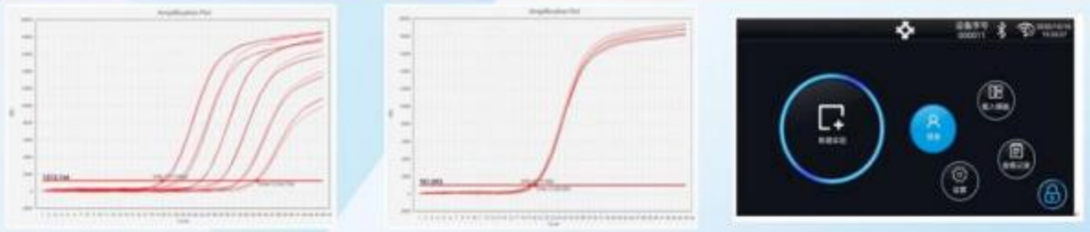
- Only one AutoFast inspection platform is required
- Fully automated and fast nucleic acid detection and immunoassay
- Simple operation scheme that can realize "sample in, result out"

STATE OF WORLD AQUACULTURE

Focus on technological innovation, more professional and rigorous.

- **Medical grade:** CE certification, NMPA certification, etc.
- **Simple operation:** The minimal nucleic acid extraction solution can be completed in 5 minutes.
- **High-precision detection results:** The classic PCR amplification technology is more accurate than constant temperature amplification.
- **Excellent performance test:** The repeatability and sensitivity indicators are compared with ABI 7500, r=0.9838, the results are comparable.
- **7-inch touch screen friendly operation interface:** the interface is simple and generous. From new experiments to program settings, there is no tedious operation, and it is easy to learn.

MINIMALIST OPERATION INTERFACE



PARAMETERS

MODEL	Micgene 242
DIMENSIONS	240×230×260mm (L×W×H)
WEIGHT	≤4kg
MEASUREMENT TIME	50 minutes/sample
MINIMUM DETECTION AMOUNT	$1*10^{-3}$ (ng/uL)
TEMPERATURE CONTROL ACCURACY	±0.2℃
TEMPERATURE UNIFORMITY	±0.25℃
TEMPERATURE CONTROL RANGE	Room temperature-99℃
TEMPERATURE CHANGE RATE	Heating rate: >6℃/s; Cooling rate: >4℃/s
LIGHT SOURCE LIFE	≥100,000 hours
COMMUNICATION MODULE	USB, Wifi mode
TOUCH SCREEN	7-inch capacitive touch screen

EASY TO OPERATE

1. SAMPLE COLLECTION

On-site sample collection,
choice of tissue or secretion.

4. COMPLETE

2. SAMPLE PROCESSING

No manual extraction is required, human interference factors and work intensity are reduced, and batch processing of samples is realized.

3. DETECTION

Use the corresponding nucleic acid detection kit for detection.

PRODUCT CODE	PRODUCT	SPECIFICATION
BIK-Q-W001	Shrimp White Spot Syndrome Virus (WSSV) Nucleic Acid Detection Kit	24T
BIK-Q-W002	Shrimp Infectious Subcutaneous and Hematopoietic Necrosis Virus (IHHNV) Nucleic Acid Detection Kit	24T
BIK-Q-W003	Shrimp Acute Hepatopancreatic Necrosis Disease (AHPND/EMS) Nucleic Acid Detection Kit	24T
BIK-Q-W004	Shrimp Enteroplasma Hepatitis (EHP) Nucleic Acid Detection Kit	24T
BIK-Q-W005	Shrimp Enteroplasma Hepatitis 18S (EHP-18S) Detection Kit	24T
BIK-Q-W006	Vibrio harveii (VH) nucleic acid detection kit	24T
BIK-Q-W007	Vibrio parahaemolyticus (Vpa) nucleic acid detection kit	24T
BIK-Q-W008	Shrimp Hemocyte Iridescent Virus (SHIV) Nucleic Acid Detection Kit	24T
BIK-Q-W009	Shrimp Hepatopancreatic Parvovirus (HPV) Nucleic Acid Detection Kit	24T
BIK-Q-W010	Penaeus monodon baculovirus (MBV) nucleic acid detection kit	24T
BIK-Q-W011	Shrimp Yellow Head Virus (YHV) Nucleic Acid Detection Kit	24T
BIK-Q-W012	Shrimp Taola Syndrome Virus (TSV) Nucleic Acid Detection Kit	24T
BIK-Q-W013	Shrimp infectious muscle necrosis virus (IMNV) nucleic acid detection kit	24T
BIK-Q-W014	Shrimp Stealing Nodamura Virus (CMNV) Nucleic Acid Detection Kit	24T
BIK-Q-W015	Shrimp Enteroplasma Hepatitis (EHP)/Shrimp Acute Hepatopancreatic Necrosis Disease (AHPND/EMS) Duplex Nucleic Acid Detection Kit	24T
BIK-Q-W016	Rana Iridescent Virus (RAV) Nucleic Acid Detection Kit	24T
BIK-Q-W017	Red point grouper nerve necrosis virus (RGNNV) nucleic acid detection kit	24T
BIK-Q-W018	Mandarin Fish Rhabdovirus (SCRV) Nucleic Acid Detection Kit	24T
BIK-Q-W019	Mandarin fish infectious spleen and kidney necrosis virus (ISKNV) nucleic acid detection kit	24T
BIK-Q-W020	Grouper Iridovirus (GIV) Nucleic Acid Detection Kit	24T