GENESIS

CE IVD

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KaiBiLi™ Norovirus Antigen Rapid Test Device

Rapid test for the qualitative detection of Norovirus in human feces.

INTENDED USE

The KaiBiLi™ Norovirus Antigen Rapid Test Device is an in vitro immunochromatographic assay for the qualitative detection of norovirus antigen in human feces specimen. It is useful as an aid in management and monitoring of viral gastroenteritis. For *in vitro* diagnostic use only.

BACKGROUND

Norovirus is one of the major causes of nonbacterial gastroenteritis world-wide, accounting for 19%-42% of non-bacterial diarrheal outbreaks. Illness due to this virus was initially described in 1929 as “winter vomiting disease” due to its seasonal predilection and the frequent preponderance of patients with vomiting as a primary symptom.

Noroviruses are single-stranded positive-sense RNA viruses classified as the genus *Norovirus* within the family *Caliciviridae*. Noroviruses are currently classified into five genogroups. Three of these, genogroup I, II and IV (GI, GII and GIV), occur in human infections though most noroviruses affecting humans belong to GI or GII.

The norovirus is widely distributed and occurs in the form of outbreaks, with schools, hospitals and factories as the main outbreak sites. Outbreaks particularly of Norovirus associated with Winter Vomiting Disease can occur in the winter months in the western hemisphere but sporadic cases, and community and food borne outbreaks can occur throughout the year. Transmission is predominantly fecal-oral but may be airborne due to aerosolization of vomitus, which typically contains abundant infectious virus particles.

There are no age or gender differences among the outbreak patients, while the sporadic cases are mainly concentrated in children under 2 years of old and the elderly. General symptoms of norovirus infection mainly include abdominal pain, diarrhea, vomiting, low-grade fever, systemic muscle pain and so on.

PRINCIPLE

KaiBiLi™ Norovirus Antigen Rapid Test Device is a qualitative lateral flow immunochromatographic assay for the detection of norovirus antigen in human feces specimens.

This product consisting of three parts: the lower part of the sample, the reagent part, and the expansion part, and has a long square-shaped carrier.

The reagent part comprises a colloidal gold-labeled anti-norovirus antibody. In the expanded part, the membrane is pre-coated with anti-norovirus antibody on the T test line region of the test. After the sample is dropped from the lower portion of the test plate, the colloidal gold-labeled antibody is dissolved to form an immune complex with the norovirus antigen in the sample.

The immune complex moves due to the capillary phenomenon of the developing portion, and is captured by the anti-norovirus antibody fixed on the membrane and generates a colored line. The presence of norovirus is then determined by visual inspection of the presence of the red line. Meanwhile, anti-norovirus antibody conjugated colloidal gold, which was not consumed in the reaction, is bound to the anti-immunoglobulin antibody fixed on the control portion to generate a red line, showing that reaction on the test strip was successful.

CONTENTS

20	Norovirus Antigen Rapid Test Devices
20	Stool Collection Tubes (with sampling rod and extraction solution)
1	Package insert

WARNINGS AND PRECAUTIONS

1. For *in vitro* Diagnostic Use.
2. For professional use only.
3. Do not use the device components beyond the expiration date.
4. Pathogenic microorganisms may be present in clinical specimens. All specimen and the related contaminated items need to be handled, stored, and disposed following “Standard Precautions” and institutional guidelines.
5. Wear protective clothing such as laboratory coats, masks, disposable gloves, and eye protection when specimens are handled.
6. Ensure foil pouch containing test device is not damaged before opening for use.
7. The test device should be used immediately after opening the packaging. When it absorbs moisture, the quality deteriorates and an accurate result cannot be obtained.
8. Please do not touch the sample drop and the judgment part of the test board directly by hand.
9. Do not reuse the device.
10. Please ensure that appropriate samples are used for testing. Too much or too little sample size may lead to deviation of results.
11. If the test is invalid, one should consider the possible improper handling, inaccurate operation procedure, or device quality. Repeat the test with a new device ensuring that the test procedure has been followed accurately.

12. All samples and used accessories should be treated as infectious and discarded according to local regulations.

STORAGE CONDITIONS

Test devices must be stored at 2~30°C. DO NOT FREEZE. Devices must be at ambient room temperature at time of testing.

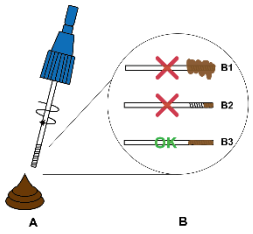
SAMPLE COLLECTION AND PREPARATION

DOs and DON'Ts of Sample Collection

- Stool specimens should be collected in a clean container that do not contain media, preservatives or detergents as any of these additives may interfere the results.
- The feces samples need to be performed as soon as possible after collection. If not, the specimen collected may be stored for one week at 2~8°C or stored a longer period at -20°C.
- Do test sample immediately.
- Use only stool collection tube provided with the kit.

Prepare test samples with stool collection tube (with extraction buffer) for immediate testing after collection. If immediate testing is not possible, collected samples can be held refrigerated (2~8°C) for up to 48 hours prior to testing. Inadequate sample collection or improper sample handling may yield a false-negative result.

1. Label information of studied specimens on the stool collection tube.
2. Sample Preparation
   (1) Open the stool collection tube by unscrewing the top and use the collection stick to randomly pierce in 2~5 different sites, to collect the stool specimen 50mg (A), too more (B1) or too less (B2) are both not available. Put the "collection stick" back to the stool collection tube.



   (2) For the liquid or semi-liquid specimen, use pipette (not provide) to transfer 80μL specimen into stool collection tube containing the extraction buffer.
3. Tighten the cap onto the specimen collection tube, then shake the specimen collection tube vigorously to mix the specimen.

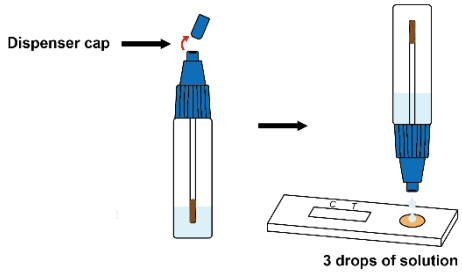
Note: All the specimen should be mixed into solution.

4. Do not leave specimen at room temperature for prolonged periods. Specimens can temporarily store at 2~8℃ for 7 days. For longer storage, the extracted specimen may be frozen at -20°C. Avoid multiple freeze-thaw cycles.

PROCEDURE

Reagents, specimens and devices must be at room temperature (15–30 °C) for testing.

1. Bring the specimen and test components to room temperature if refrigerated or frozen.
2. Once the specimen is thawed, mix well prior to performing the assay.
3. Remove a test cassette from its foil pouch and place it on a flat surface.
4. Shake the stool collection tube vigorously to ensure a homogenous liquid suspension.
5. Twist off (or cut) the blue tip on the top of the sample preparation tube and dispense 3 drops of the extracted specimen (approximately 80μL) to the sample well of the cassette.
6. Do not overload the solution.



7. Avoid trapping air bubbles in the sample well.
8. Read results at 15 minutes and disregard after 30 minutes. A positive result may be visible at 3 minutes. However, the complete reaction time of 15 minutes is required to confirm a negative result.

INTERPRETATION OF RESULTS

Allow the samples to react according to the procedure and read the red lines that appear in the reading area.

Positive Result:

A colored line appears in the control region (C) and another colored line appears in the test region (T).

Negative Result:

One red line appears in the control region (C). No line appears in the test region (T).

Invalid Result:

The control line (C) fails to appear; insufficient specimen volume or incorrect procedural techniques are the most likely reasons for control line failure.

Review the procedure and repeat the test with a new test device.
If the problem persists, discontinue using the kit and contact your local distributor.

QUALITY CONTROL

Internal procedural controls are included in the test. A colored line appearing in the control region (C) is an internal procedural control. It confirms sufficient specimen volume and correct procedural technique. Control standards are not supplied with this device; however, it is recommended that positive and negative controls be tested as a good laboratory practice to confirm the test procedure and to verify proper test performance.

PERFORMANCE CHARACTERISTICS

Sensitivity and specificity

The clinical performance for KaiBiLi™ Norovirus Antigen Rapid Test Device was compared with PCR method in a multi-center evaluation using 1231 stool samples collected from children and young adults with symptoms of diarrhea and/or gastroenteritis.

		PCR		
		+	-	Total
Norovirus Antigen Rapid Test Device	+	294	17	311
	-	15	905	920
	Total	309	922	1231

Positive percent agreement：95.15% (92.12%～97.26%)
Negative percent agreement：98.16% (97.06%～98.92%)
Positive predictive value：94.53% (91.39%～96.78%)
Negative predictive value：98.37% (97.33%～99.08%)
Overall percent agreement：97.40% (96.35%～98.22%)

Limit of detection

Type	Concentration
Norovirus GI	2.0×10^7 PFU/mL
Norovirus GII	1.0×10^7 PFU/mL

Cross-reactivity evaluation

No cross-reactivity was observed with the following pathogens.

1. Bacteria
   Staphylococcus aureus, *Pseudomonas aeruginosa*, *Salmonella Enteritidis*, *Group C Streptococcus*, *Escherichia coli*, *Enterococcus faecalis*, *Klebsiella pneumonia*, *Streptococcus pneumonia*, *Citrobacter freundii*, *Vibrio parahaemolyticus*, *Haemophilus influenza*, *Candida albicans*, *Proteus mirabilis*, *Streptococcus agalactiae*, *lactobacillus plantarum*, *Bacillus subtilis*
2. Viruses
   Influenza virus type A, Influenza virus type B, Rotavirus, Adenovirus, Enterovirus, Coxsackie virus
3. Mycoplasma or Chlamydia
   Mycoplasma pneumoniae, *Chlamydia pneumoniae*, *Chlamydia trachomatis*

Interfering Substances

1. Not disturbed by the color and viscosity of fecal specimens.
2. The concentration of the following substances in the sample below the level indicated in the list will not interfere with the test results.

Hemoglobin	1000 mg/dL
Bilirubin	60 mg/dL

3. Tests were conducted to investigate the influences of following drugs in the concentration of no less than 10 times of blood concentration after entering the body: aspirin, amoxicillin, metronidazole, acyclovir, berberine hydrochloride tablets and other drugs, which showed no influence on the assessment results.

LIMITATIONS OF THE PROCEDURE

1. The KaiBiLi™ Norovirus Antigen Rapid Test Device is a qualitative test and cannot determine the amount of antigen in the sample.
2. Positive test results do not rule out co-infections with other pathogens.
3. A false-negative test result may occur if the sample collected may contain antigen titers below the reagent's sensitivity threshold or if the sample was collected or transported improperly; therefore, a negative test result does not eliminate the possibility of the virus infection.
4. Specimen obtained early with sudden onset of symptoms will contain the highest viral titers, the amount of antigen in a sample may decrease as the duration of illness increases.
5. The results obtained with this test should be interpreted in conjunction with other diagnostic procedures and clinical findings.
6. Negative results should be treated as presumptive and confirmed with other assays, if necessary, for clinical management.
7. If the specimens are collected long after the onset of diarrheic symptoms, the quantity of antigen may not be sufficient to obtain a positive reaction or the antigens detected may not be linked to the diarrheic episode.

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AVAILABILITY

Product	Cat. No.	Contents
KaiBiLi™ Norovirus Antigen Rapid Test Device	P221101	20 tests

Index of Symbols

	Attention, see instructions for use		Tests per kit	EC REP	Authorized Representative
IVD	For *in vitro* diagnostic use only		Use by		Do not reuse
	Store between 2~30℃	LOT	Lot Number	REF	Catalog #

EC REP **Lotus NL B.V.**
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The Hague, Netherlands.
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