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TECO®

Fast Aspergillus Galactomannan Antigen Lateral Flow Assay

Instructions for use
English

CE

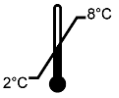
Catalogue No. TE 1069
UDI-DI 7640146270108

TE1069_AA-E_11/2024

TECOmedical AG

www.tecomedical.com

Symbol Description

REF *TE1069*	LOT *Lot number*	UDI-DI *Unique Device Identifier*
IVD *In Vitro Diagnostics*	 *Manufacturer*	 *Read electronic kit instructions*
 *50* *50 tests*	 *Expiry date*	 *Storage temperature*
CE	 *Not intended for self-testing* *Or near-patient testing*	

Professional Use only
Not intended for self-testing or near-patient testing

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Any serious incident that has occurred in relation to this product shall be reported to TECOmedical AG and the competent authority of the Member State in which the user and/or the patient is established

CONT **Reagents and Materials Supplied:**

SYMBOL	DESCRIPTION	FORMAT
1	**Test Cassette** ready to use Cassette is for single use only DO NOT REUSE	**50 bags** (1 test cassette/bag)
2	**Sample treatment solution** Ready to use	**4 x 2.5 mL**
C1	**Positive Control Serum** Ready to use Range as indicated on data sheet	**1 x 2.0 mL**
C2	**Negative Control Serum** Ready to use Range as indicated on data sheet	**1 x 2.0 mL**
	**eIFU indicator** on kit box Login address for electronic kit instructions	
	QR code lot-specific, for standard curve import	

Storage

Store the kit in a dry space at 2-8°C. Do not freeze.

Intended use

TECO® *Fast* Aspergillus Galactomannan Antigen Lateral Flow Assay (LFA) is used for the detection of Aspergillus galactomannan antigen (Ag) in human serum and bronchoalveolar lavage fluid (BAL), offering a diagnostic reference for Aspergillus infection.

Clinical use

With the wide application of broad-spectrum antibiotics, corticosteroid, immunosuppressant, anti-tumor drugs, as well as the prevalence of AIDS and the development of organ transplantation, the invasive fungal diseases (IFD), with a high mortality, is increasing and complicated. The Invasive Aspergillosis (IA) is rapidly increasing. The susceptible population is mainly people who receive immunosuppressive therapy, such as hematopoietic stem cell transplantation patients, hematic malignant carcinoma patients, solid organ transplantation patients, bone marrow transplantation patients as well as long -term chemotherapy and corticosteroid therapy patients and severe AIDS patients.

The clinical symptom of IA is non-specific. There are no identical features in CT scan and X-ray. The difficulty of early diagnosis and timely treatment results in a high mortality of 60%~100% [1]. The presence of galactomannan antigen against Aspergillus indicates a prior Aspergillus infection [2-5].

Limitations

The TECO® *Fast* Aspergillus Galactomannan Ag LFA is a prescription-use laboratory assay that provides aid to the diagnosis of Invasive Aspergillosis.
Positive results obtained with this assay should be considered in conjunction with other diagnostic procedures such as microbiological culture, histological examination of biopsy samples and radiographic evidence.

The following conditions may cause false positive results:

a. Use of β-lactam antibiotics: such as piperacillin / tazobactam, amoxicillin / clavulanic acid, cefepime, cefoperazone / sulbactam etc. [6]
b. Cross reaction with other fungi: such as Histoplasma [7], Fusarium [8] and Penicillium [9].
c. Administration of blood products such as albumin, immunoglobulin, and coagulation factors [10].
d. Neonatal Bifidobacterium Colonization: The presence of high concentrations of bifidobacteria in the intestines of newborns and children results in positive serum GM tests in newborns [11,12].
e. Cereals: Galactomannans are present in some cereals and enter the blood through damaged intestinal mucosa [13].
f. Other factors: The presence of epitopes that cross-react with GM in cotton swabs used during surgery [14].

The following conditions may cause false negative results:

a. Preventive treatment against mold will significantly affect the GM test results [15,16].
b. Local infections, including chronic granulomas [17].
c. In some patients with Aspergillus infection, galactomannans can be broken down or neutralized by antibodies to cause false negatives.

The test results for the same patient may be different at different stages of the disease, under different physiological conditions and under different medications.

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Assay principle

The TECO® *Fast* Aspergillus Galactomannan Ag LFA uses double antibody sandwich fluorescence immunochromatography to detect Aspergillus galactomannan in human serum and BAL samples.

The Aspergillus Anti-galactomannan monoclonal antibody labeled with fluorescent microspheres and the chicken IgY antibody labeled with fluorescent microspheres are coated on a fluorescent pad, and the Test Line (T) and Quality Control Line (C) are coated with Aspergillus Anti-galactomannan monoclonal antibody and goat anti-chicken IgY antibody, respectively.

- If the sample is positive, the Aspergillus galactomannan antigen will combine with the fluorescent microsphere-labeled Aspergillus galactomannan antibody to form a complex and migrate further along on the nitrocellulose membrane. Anti-Galactomannan antibodies coated on the Test line (T) interact with the above complexes and display fluorescent band, fluorescently labeled chicken IgY antibodies display fluorescence bands on the Quality Control Line (C) in combination with goat anti-chicken IgY antibody.
- If the test sample is negative, no immune complex will be formed, no band will appear at the Test line (T), and only a band will appear at the Quality Control Line (C). The control line (C) should always display a fluorescent band during the test: it is a way to check if the test work correctly also as an internal control standard. Read the detection area with a fluorescence immunoassay analyzer to get a fluorescence signal, interpreting the Index value.

Materials required and not supplied

- Pipettes 100 µL – 1000 µL
- Polypropylene centrifuge tubes, 1.5 mL with screw caps or safety lock caps
- Centrifuge (10 000 x g)
- Vortex mixer
- Water bath or Heat block (100-110°C required)
- Timer
- Fluorescence Immunoassay Analyzer FIC-Q100N

Warnings and precautions

This kit is intended for in vitro diagnostics use by professionals only.

Follow the instructions carefully.

Observe expiry dates stated on the labels. Use cassettes within 30 minutes after opening of the bag. Refer to ”Materials Safety Data Sheet” for more detailed safety information.

Material of animal origin used in the preparation of this kit has been obtained from animals certified as healthy, but these materials should be handled as potentially infectious.

TECOmedical AG is not liable for loss or harm caused by non-observance of the kit instructions.

1. For in vitro diagnostic use.
2. Treat all specimen samples as potentially biohazardous material.
   Follow General Precautions when handling the contents of this kit and any patient samples.
3. Disposal of containers and unused contents should be done in accordance with federal and local regulatory requirements.
4. Use the supplied components as an integral unit prior to the expiration date indicated on the package label.
5. Store assay components as indicated.

Preparation and stability of samples

Collect samples according to standard laboratory procedures. Avoid cross-contamination among samples. Sample labeling should be clear and correct without mistake. Avoid using samples with severe hemolysis, microbial contamination, and hyperlipidemia.

Sample Type

The assay is validated for serum and BAL.

Sample transportation

Sample transportation should comply with national biosafety requirements.

Stability

Maximum 72 hours at 2-8°C

Maximum 12 months at -20°C

Maximum 5 freeze/thaw cycles

Assay procedure

All samples are assayed in singlicate. Test should be performed as quickly as possible. Long-time exposure of test cassette to air and moisture will cause invalid results.

Allow all components to stand at room temperature (20–25°C). Test cassette should be used within 0.5 hour after opening the bag. **Sample treatment solution is stable 4 weeks at 2-8°C after opening.**

Prepare the FIC-Q100N fluorescence immunoassay analyzer according to the Operational Guide.
Note: Scan the QR code on the box to import the correct standard curves.

1. Sample treatment

- Add 300 µL serum/BAL into 1.5 ml reaction tubes.
- Add 100 µL Sample Treatment Solution into the tubes containing serum/BAL.
- Vortex for 10 seconds to mix well, spin down in a centrifuge for 5 seconds at 10,000 × g
- Heat the tubes at **110°C (Heat Block) or at 100°C (Water Bath) for 3-4** minutes.
- Centrifuge the tubes at 10,000 × g for 10 min. (4°C is recommended if the centrifuge is refrigerated).
- Collect supernatant and use it for testing. The supernatant may be collected and stored at 2-8°C for up to 8 hours prior to testing. If analysis of the results indicates that retesting is required, another aliquot of the sample must be treated for testing.
- **NOTE: the controls do not need treatment**

2. Lateral Flow Procedure

- Carefully refer to the instruction for use before performing the test.
- Before test, ensure that tests and samples are at room temperature.
- Place test cassettes on a flat and clean bench; slowly dispense 100 µL of sample supernatant or untreated control solution into the sample pad.
- Make sure the batch specific QR code has been uploaded to the reader and is activated and select the correct sample type (serum or BAL, controls are treated as serum samples).
- Read and record the Index results with the fluorescence immunoassay analyzer after 20 minutes (No longer than 25 minutes, as abnormal results may occur).

3. Quality Control

- The fluorescence immunoassay analyzer will calculate the signal of the Control Line (C) automatically. If it fails, it will show “Invalid”. The test needs to be repeated.
- Recommendations are at least one control measurement per kit, or at least one control run per month.

Interpretation of results

- The following cut off limits were identified in the population studied to obtain the performance characteristics; however, each laboratory may wish to establish their own cut offs values and negative and positive interpretation with their patient population:

- Index ≥ 0.5 is considered to be positive for galactomannan antigen.
  Note: For all positive patients, it is recommended that a new aliquot of the same sample (serum/BAL) be repeated.
- Index < 0.5 is considered to be negative for galactomannan antigen.
  Note: A negative result may indicate that the patient’s result is below the detectable level of the assay. Negative results do not rule out the diagnosis of Invasive Aspergillosis. Repeat testing is recommended if the result is negative, but the disease is suspected.

Test performance

Diagnostic sensitivity and specificity

The TECO® *Fast* Aspergillus Galactomannan Ag LFA uses a clinical research method that compares the assessment reagents with an established reference method on the same serum or BAL samples and compares the consistency of the results. The clinical agreement study evaluated a total of 267 serum samples and a total of 179 BAL samples.

Test result: *Serum*	Reference method result		Total
	Positive	Negative	
Positive	97	4	101
Negative	10	156	166
Total	107	160	267

Test result: *BAL*	Reference method result		Total
	Positive	Negative	
Positive	73	5	78
Negative	6	95	101
Total	79	100	179

The results of the clinical agreement study show

- a positive coincidence rate of 90,7 % and a negative coincidence rate of 97,5 % for serum. The general coincidence rate is 94,8 %.
- a positive coincidence rate of 92,4 % and a negative coincidence rate of 95,5 % for BAL. The general coincidence rate is 93,9 %.

Analytical sensitivity

To determine the assay's Limit of Detection (LoD), negative serum and negative BAL samples spiked with 4 different concentrations of Galactomannan were measured 20 times each, using 3 different kit batches.

For both serum and BAL, a LoD of 1 ng/ml was determined.

Precision

(Intra and Inter assay)

on 4 clinical serum and 4 clinical BAL samples (1 negative, 1 low positive, 1 medium positive, and 1 high positive sample), within and between-lot precision tests were performed for 5 days, 5 replicates per sample, using 3 different kit lot, this results in a total of N = 75 values per sample.

Serum samples

- CVs of the repeatability, indoor precision and batch precision of the Medium positive serum samples and the High positive serum samples are all < 15%
- The positive detection rate of Low positive serum samples is 98.7%
- The negative detection rate of negative serum samples is 100%

BAL samples

- CVs of the repeatability, indoor precision and batch precision of the Medium positive BAL samples and the High positive BAL samples are all < 15%
- The positive detection rate of Low positive BAL samples is 97.3%
- The negative detection rate of negative BAL samples is 100%

Interferences

Controlled test of potential interfering substances showed that there was no interference in the under-mentioned concentrations.

Substance	Concentration
Hemoglobin	<7 mg/ml
Bilirubin	<300 mg/l
Cholesterol	<10 mg/ml
Triglyceride	<7.5 mmol/l
Voriconazole	40 µg/ml
Amphotericin b	1 mg/ml
Capsofungin	0.27 mg/ml

Cross reaction
No false positive Aspergillus test results were observed on specimens from the following disease states or specific conditions.

Cross reactant	Number of serum samples	Number of positive values
Candida Antigen	10	0
Cryptococcus Antigen	10	0
Mycoplasma pneumoniae-IgG Ab	10	0
Rheumatoid factor	10	0
Antinuclear antibody	10	0
Anti-double stranded DNA	10	0

Hook effect
The galactomannan antigen was diluted to the following concentrations of 10, 20, 50, 100, 200, 500, and 1000 ng/mL with either a serum that excludes Aspergillus infection or a BAL that excludes Aspergillus infection, then tested in three batches of reagents to check whether there is a hook effect.

Galactomannan concentration in serum matrix (ng/mL)	Batch Nr 191001 (Index)	Batch Nr 191002 (Index)	Batch Nr 191003 (Index)
10	0.612	0.621	0.633
20	1.239	1.294	1.284
50	2.188	2.213	2.233
100	3.753	3.734	3.456
200	4.119	4.214	4.362
500	4.890	4.834	4.273
1000	5.098	5.132	5.301

Galactomannan concentration in BAL matrix (ng/mL)	Batch Nr 191001 (Index)	Batch Nr 191002 (Index)	Batch Nr 191003 (Index)
10	0.812	0.710	0.802
20	1.228	1.025	1.377
50	2.183	2.404	2.172
100	3.966	3.782	4.043
200	4.296	4.345	4.215
500	4.697	4.627	5.041
1000	4.833	5.398	4.923

It can be seen from the above experimental results that there is no hook effect up to the concentration of galactomannan in serum or BAL of 1000 ng/mL.

Notes:

TECO® *Fast* Aspergillus Galactomannan Ag Lateral Flow Assay

Assay Procedure – Quick Guide

Bring samples and components to room temperature (20-25°C) for 30 min. Mix the samples well and prepare the FIC-Q100N according to the Operational Guide.

1. Sample treatment:

Add 300 µL serum/BAL in 1.5 ml reaction tubes, **NOTE: controls do not need treatment**

Add 100 µL Sample treatment solution into the tubes.

Vortex for 10 seconds to mix well, spin down in a centrifuge for 5 seconds

Heat the tubes at 100°C (water bath) or at 110°C (heat block) for 3-4 min.

Centrifuge the tubes at 10,000 x g for 10 min and collect supernatants.

2. Lateral Flow Procedure:

Place the test cassette on a bench.

Dispense slowly 100 µL of sample supernatant or control solution on the sample pad.

Incubate for 20 minutes.

Read and record the Index results with the Fluorescence Immunoassay System.

Please read Kit instruction before using the Quick Guide