THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH

TANZANIA MEDICINES AND MEDICAL DEVICES AUTHORITY

PUBLIC ASSESSMENT REPORT FOR KAS MALARIA PF/PAN ANTIGEN RAPID TEST

Version number 0.1, 29/03/2024

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1. Introduction

KAS Malaria PF/PAN Antigen Rapid Test is a class C in-vitro diagnostic device belonging to the microbiology specialty category. KAS Malaria PF/PAN Antigen Rapid Test is approved in Tanzania as a kit for use by healthcare professionals.

1.1. Administrative Information

Registration number	TAN 23 MDR 0229
Brand Name (if relevant)	KAS Malaria PF/PAN Antigen Rapid Test
Common name	Malaria Pf/Pan Antigen Rapid Test
Class of the device and rule applied	Class C according to Rule 3 of classification for In Vitro Diagnostic Devices
GMDN code and term	52336 Plasmodium falciparum antigen IVD, kit, rapid ICT, clinical
Name and complete address of the Market Authorization Holder	Kas Biotech Limited, P. O. Box 7856, GF 09, Plot No. 11, Umoja Complex Vingunguti, Area Along Nyerere Road, Dar es Salaam, Tanzania. Contact person: Jaykumar Kamli Email: kasregulatory2@artemislife.com
Name and address(es) of local responsible person (LRP).	Kas Biotech Limited, P. O. Box 7856, GF 09, Plot No. 11, Umoja Complex Vingunguti, Area Along Nyerere Road, Dar es Salaam, Tanzania. Contact person: Jaykumar Kamli Email: kasregulatory2@artemislife.com

1.2. Assessment Procedure

The application for registration of KAS Malaria PF/PAN Antigen Rapid Test was submitted on 11/07/2022. The product underwent abridged assessment. Assessment was completed in 3 rounds of evaluation. KAS Malaria PF/PAN Antigen Rapid Test was registered on 31/10/2023.

2. Technical information

2.1. Intended use

The intended use of KAS Malaria PF/PAN Antigen Rapid Test as declared by the manufacturer and approved by TMDA is screening for the detection of Histidine-Rich Protein II (HRPII) of Plasmodium falciparum (P.f) and plasmodium lactate dehydrogenase (pLDH) of Plasmodium species in human whole blood. KAS Malaria PF/PAN Antigen Rapid Test is approved for use in healthcare settings by trained professionals only.

2.2. Device details and features

KAS Malaria PF/PAN Antigen Rapid Test has been registered as a kit which consists of test cassette, clearing buffer bottles alcohol swab, blood lancet, package insert, pictorial test procedure, dropper.

KAS Malaria PF/PAN Antigen Rapid Test is an in vitro diagnostic device used to aid diagnosis of malaria. KAS Malaria PF/PAN Antigen Rapid Test operates by the principle of immunochromatography. The test out-put is qualitative.

The type of specimen used is whole blood which is collected by venous blood or capillary blood specimen collection.

Device Description

The test contains a membrane strip coated with P.f antibody and Pan antibody on the test line, goat anti-mouse antibody on the control line, and a dye pad which contains colloidal gold coupled with P.f antibody and Pan antibody. Materials provided with the kit include test cassette, package insert, buffer and dropper.

The Malaria P.f/Pan Antigen Rapid Test is an immunoassay based on the principle of the double antibody-sandwich technique.

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2.3. Commercial presentation

There is one approved commercial presentation as follows: one test cassette in an aluminum foil pouch. 25 pouches are placed in the secondary packaging material.

Additional contents include

a) 1 clearing Buffer 4mls
b) 1 Package insert
c) Dropper
d) 25 alcohol swabs pouched
e) 25 blood lancets pouched

2.4. Items required but not submitted

a) Specimen collection container
b) Timer
c) Alcohol swab

3. Storage instructions

3.1.1. Shelf-life

The approved shelf-life is 24 months.

3.1.2. Storage conditions

The recommended storage conditions are 4-30℃ or 40- 86℉

3.1.3. Shipping conditions

The recommended shipping conditions is Not indicated.

4. Manufacturing site audit

The manufacturer of the device is KAS Biotech Limited, GF 09, Plot No. 11, Umoja Complex Vingunguti, Area Along Nyerere Road Dar Es Salaam. Quality audit of the manufacturing facility was conducted through site visit on 17th January 2024. The site was found to be compliant to ISO 13485 requirements.

5. Performance Evaluation

5.1. Analytical Performance

The analytical performance characteristics of the device was established through the following test parameters: accuracy, analytical sensitivity and analytical specificity.

5.2. Clinical Performance

Clinical performance was conducted at the Muhimbili National Hospital (Central Pathology Laboratory) P.O. Box 65000, Dar es Salaam. Telephone: +255 22 2151367 - 9. Email: info@mnh.or.tz. These parameters were tested Specificity and Sensitivity.

Based on results of the performance studies conducted in house at the Muhimbili National Hospital, it was concluded that the test sensitivity and specificity is 99.58% and 99.89% respectively. The studies further concluded that KAS Malaria PF/PAN Antigen Rapid Test is capable of consistently producing accurate and reliable test output.

6. Product label and instructions for use

The content of the primary and secondary pack labels is in line with TMDA labeling requirements in terms of content, layout and design. The label contains sufficient information for proper identification of the device and post marketing follow up of the product.

The instructions for use include all the relevant information to ensure correct and safe use of the device by the healthcare provider.

6.1. Primary pack

6.2. Secondary pack

6.3 Instructions for use/Package insert

Instructions for use can be accessed at KAS Malaria PF/PAN Antigen Rapid Test instruction for use link.

7. Risk – Benefit Analysis

On basis of the data submitted, the current state of knowledge and compliance of the manufacturer to ISO 13485, the benefit of the product outweighs the risks associated with its use when used in accordance to the manufacturer's instruction. KAS Malaria PF/PAN Antigen Rapid Test was recommended for registration.

8. Post-approval updates

8.1. Variation applications

Reference number	Date submitted	Change requested	Recommendation	Granting date
NA	NA	NA	NA	NA

8.2. Feedback from pharmacovigilance, post marketing surveillance and enforcement activities

Type of feedback	Impact	Response
No any recorded Adverse Events	NA	NA

8.3. Re-registration applications

NA

CHANGE HISTORY

Version number	Date	Description of update	Section(s) Modified	Approval date

KAS Biotech Limited **Malaria P.f Antigen Rapid Test Cassette (WB)**

English

For professional and in vitro diagnostic use only.

[INTENDED USE]

The Malaria P.f Antigen Rapid Test Cassette is a lateral flow immunoassay for the qualitative detection of Histidine-Rich Protein II (HRP-II) of Plasmodium falciparum (P.f) in human whole blood. It provides an aid in the diagnosis of infection with Malaria.

[SUMMARY]

Malaria is caused by a parasite called Plasmodium, which is transmitted via the bites of infected mosquitoes. In the human body, the parasites multiply in the liver, and then infect red blood cells.
Symptoms of malaria include fever, headache, and vomiting, and usually appear between 10 and 15 days after the mosquito bite. If not treated, malaria can quickly become life-threatening by disrupting the blood supply to vital organs. In many parts of the world, the parasites have developed resistance to a number of malaria medicines. Malaria P.f Antigen Rapid Test Cassette is a simple, visual qualitative test that detects HRP-II in human whole blood. The test is based on immunochromatography and can give a result within 15 minutes.

[PRINCIPLE]

The Malaria P.f Antigen Rapid Test Cassette is a qualitative membrane strip based immunoassay for the detection of HRP-II in human whole blood. In this test procedure, P.f antibody is immobilized in the test line region of the cassette. After a whole blood specimen is placed in the specimen well, it reacts with P.f antibody coated particles that have been applied to the specimen pad. This mixture migrates chromatographically along the length of the test strip and interacts with the immobilized P.f antibody. If the specimen contains HRP-II, a colored line will appear in the test line region indicating a positive result. If the specimen does not contain HRP-II, a colored line will not appear in this region indicating a negative result. To serve as a procedural control, a colored line will always appear at the control line region indicating that proper volume of specimen has been added and membrane wicking has occurred.

[WARNINGS AND PRECAUTIONS]

- For *in vitro* diagnostic use only.
- For healthcare professionals and professionals at point of care sites.
- Do not use after the expiration date.
- Please read all the information in this leaflet before performing the test.
- The test cassette should remain in the sealed pouch until use.
- All specimens should be considered potentially hazardous and handled in the same manner as an infectious agent.
- The used test cassette should be discarded according to federal, state and local regulations.

[COMPOSITION]

The test contains a membrane strip coated with P.f antibody on the test line, goat anti-mouse antibody on the control line, and a dye pad which contains colloidal gold coupled with P.f antibody.
The quantity of tests was printed on the labeling.

Materials Provided

- Test cassette
- Package insert
- Buffer
- Dropper

Materials Required But Not Provided

- Specimen collection container
- Timer

[STORAGE AND STABILITY]

- Store as packaged in the sealed pouch at temperature (4-30℃ or 40-86℉). The kit is stable within the expiration date printed on the labeling.
- Once open the pouch, the test should be used within one hour. Prolonged exposure to hot and humid environment will cause product deterioration.
- The LOT and the expiration date were printed on the labeling.

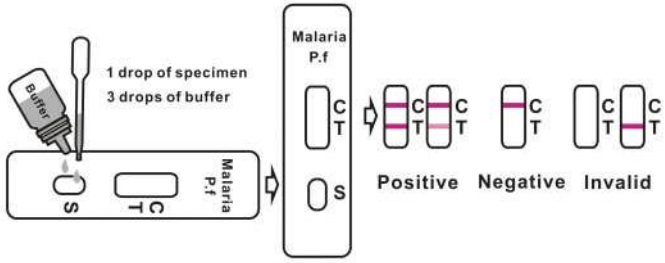
[SPECIMEN]

- The test can be used to test human whole blood.
- Collect blood specimen (containing EDTA, citrate or heparin) by vein puncture following standard laboratory procedures.
- Store specimens at 2-8℃ (36-46℉) if not testing immediately. Store specimens at 2-8℃ up to 7 days. The specimens should be frozen at -20℃(-4℉) for longer storage.
- Avoid multiple freeze-thaw cycles. Prior to testing, bring frozen specimens to room temperature slowly and mix gently.

[TEST PROCEDURE]

Allow the test device and specimens to equilibrate to temperature (15-30℃ or 59-86℉) prior to testing.

1. Remove the test cassette from the sealed pouch.
2. Hold the dropper vertically and transfer 1 full drop (approximately 10 μL) of specimen to the "S" well of the test cassette, add 3 drops of buffer (approximately 70 μL) to the "S" well after the specimen is added, and then begin timing. See the illustration below.
3. Wait for colored line(s) to appear. Interpret the test results at 15 minutes. Do not read results after 20 minutes.



(The picture is for reference only, please refer to the material object.)

Notes:

Applying sufficient amount of specimen is essential for a valid test result. If migration (the wetting of membrane) is not observed in the test window after one minute, add one more drop of buffer to the specimen well.

[INTERPRETATION OF RESULTS]

Positive: Two lines appear. One line should always appear in the control line region (C), and another one apparent colored line should appear in the test line region.
Negative: One colored line appears in the control region (C). No apparent colored line appears in the test line region.
Invalid: Control line 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 cassette. If the problem persists, discontinue using the test kit immediately and contact your local distributor.

[QUALITY CONTROL]

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

[LIMITATIONS]

- The Malaria P.f Antigen Rapid Test Cassette is limited to provide a qualitative detection. The intensity of the test line does not necessarily correlate to the concentration of the antigen in the blood.
- The results obtained from this test are intended to be an aid in diagnosis only. Each physician must interpret the results in conjunction with the patient's history, physical findings, and other diagnostic procedures.
- A negative test result indicates that antigens to Malaria are either not present or at levels undetectable by the test.

[PERFORMANCE CHARACTERISTICS]

A side-by-side comparison was conducted using the Malaria P.f Antigen Rapid Test and commercially available Malaria P.f Antigen Rapid Test. 1400 clinical specimens from three Professional Point of Care sites were evaluated with the Malaria P.f Antigen Rapid Test and the commercial kit. The discrepant specimens were checked with a commercially available ELISA to confirm the presence of P.f antigen in the specimens. The following results are tabulated from these clinical studies:

Agreement with Commercial Malaria P.f rapid test

P.f test		Commercial Malaria P.f Antigen Rapid Test		Total
		Positive	Negative	
	Positive	474	1	475
	Negative	2	923	925
Total		476	924	1400

The agreement between these two devices is 99.58% for positive specimens, and 99.89% for negative specimens. This study demonstrated that the Malaria P.f Rapid Test is substantially equivalent to the commercial device.

Agreement with ELISA

P.f test		ELISA		Total
		Positive	Negative	
	Positive	474	1	475
	Negative	2	923	925
Total		476	924	1400

A statistical comparison was made between the results yielding a clinical sensitivity of 99.58%, a clinical specificity of 99.89% and an accuracy of 99.79%.

Cross-Reactivity and Interference

1. Potentially cross-reactive endogenous substances including common serum components, such as lipids, hemoglobin and bilirubin, were spiked at high concentrations into the Malaria positive and negative specimens and tested, separately. No cross-reactivity or interference was observed to the device.

Analytes	Conc.	Specimens	
		Positive	Negative
Albumin	20 mg/mL	+	-
Bilirubin	20 μg/mL	+	-
Hemoglobin	15 mg/mL	+	-
Glucose	20 mg/mL	+	-
Uric Acid	200 μg/mL	+	-

Lipids	20 mg/mL	+	-

2. Some other common biological analytes were spiked into the Malaria positive and negative specimens and tested separately. No significant interference was observed at the levels listed in the table below.

Analytes	Conc.	Specimens	
		Positive	Negative
Acetaminophen	200 µg/mL	+	-
Acetoacetic Acid	200 µg/mL	+	-
Acetylsalicylic Acid	200 µg/mL	+	-
Benzoylecgonine	100 µg/mL	+	-
Caffeine	200 µg/mL	+	-
EDTA	800 µg/mL	+	-
Ethanol	1.0%	+	-
Gentisic Acid	200 µg/mL	+	-
β - Hydroxybutyrate	20,000 µg/mL	+	-
Methanol	10.0%	+	-
Phenothiazine	200 µg/mL	+	-
Phenylpropanolamine	200 µg/mL	+	-
Salicylic Acid	200 µg/mL	+	-

Reproducibility

Reproducibility studies were performed for Malaria P.f Antigen Rapid Test at three physician office laboratories (POL). Sixty (60) clinical specimens, 20 negative, 20 borderline positive and 20 positive, were used in this study. Each specimen was run in triplicate for three days at each POL. The intra-assay agreements were 100% at two sites, and 99.4% at one site. The inter-site agreement was 99.8%.

[BIBLIOGRAPHY]

1. Bill McConell, Malaria Laboratory Diagnosis. January 2001
2. Cooke AH, Chiodini PL, Doherty T, et al, Comparison of a parasite lactate dehydrogenase-base immunochro-matographic antigen detection assay with microscopy for the detection of malaria parasite in human blood samples. Am J Trop Med Hyp,1999, Feb: 60(2):173-2

Index of Symbol

Do not reuse	*In vitro* diagnostic medical device
Store between 4-30℃	Consult instructions for use
Caution	Lot number
Use by	Contains sufficient for <n> tests
Keep away from sunlight	Keep dry
Manufacturer	Do not use if package is damaged

Version No.: 00

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