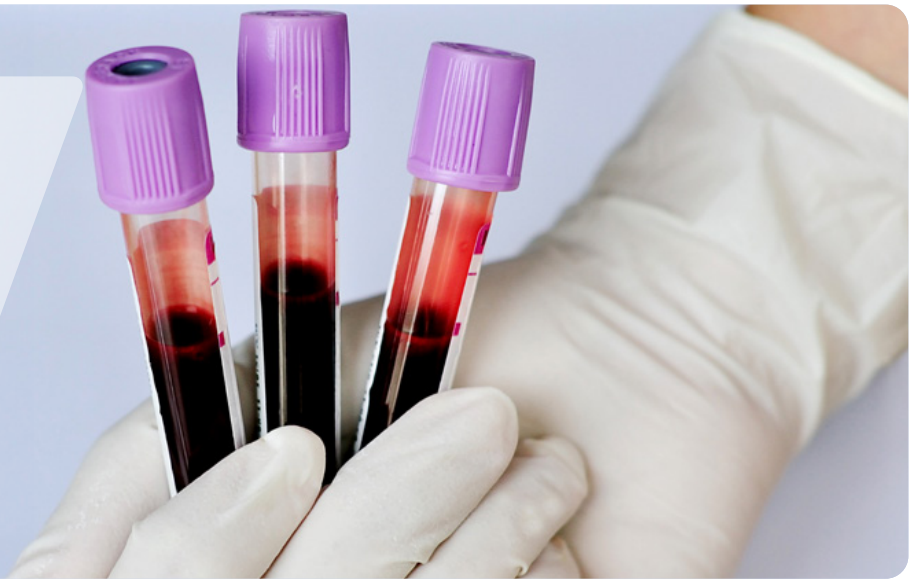
Air-Dryable Direct Blood

For ambient-temperature stable assays using whole blood, serum or plasma samples without extraction



Air-Dryable™ Direct DNA qPCR Blood and Air-Dryable™ Direct RNA/DNA qPCR Blood mixes are glycerol-free and contain optimized excipients that are compatible with air and oven drying. The mixes have been designed for the direct detection of DNA and RNA from whole blood, serum or plasma without extraction.

Blood is one of the most common specimens used for laboratory diagnostic testing and it is useful for evaluating the function of vital organs (kidneys, liver, thyroid and heart) and for diagnosing diseases such as bacterial and viral infections, cancer, cardiovascular disease, and metabolic disorders such as diabetes. However, whole blood specimens, serum and plasma contain a number of inherent PCR inhibitors including immunoglobulin G, hemoglobin, lactoferrin and leukocyte DNA. In addition, PCR inhibitors can be found in the anticoagulants used to stabilize blood samples (e.g. EDTA, citrate or heparin). Traditional methods have relied on removing these inhibitors by DNA or RNA extraction prior to testing, however, these methods are problematic, can cause sample loss and are not 100% effective at removing all the inhibitors.

Air-Dryable™ Direct DNA qPCR and Direct RNA/DNA qPCR Blood mixes are designed to be inhibitor-tolerant and to directly amplify DNA and RNA from whole blood, serum or plasma. In addition, they contain excipients and an optimized buffer system that is compatible with oven or air drying. To create an ambient-temperature stable assay, primers and probes need to be added to the air-dryable mix and the reagent preparation should be aliquoted into the final assay vessel (e.g. PCR tubes) before oven or air-drying (please see the product guide and FAQs for recommendations on oven drying parameters). Patient blood sample can be used directly on the dried assay, and does not require nucleic acid purification.

Product Highlights

- Inhibitor-tolerant and designed for the direct detection of viruses, bacteria and cell-free nucleic acids at very low titers from crude blood samples
- Suitable for singleplex or multiplex assays
- Mixes can be used as a liquid or dry format, reducing the cost and complexity of creating ambient-temperature stable assays
- Compatible with a range of air-drying protocols

PRODUCT	CAT NO.	VOLUME	REACTIONS
Air-Dryable™ Direct DNA qPCR Blood	MDX092	5 mL	1,000 Rxn
		50 mL	10,000 Rxn
Air-Dryable™ Direct RNA/DNA qPCR Blood	MDX121	5 mL	1,000 Rxn
		50 mL	10,000 Rxn

VERITAS 株式会社 ベリタス
〒105-0013 東京都港区浜松町1丁目10-14 住友東新橋ビル3号館5階
TEL.03-5776-0078(代) FAX.03-5776-0076
E-mail: veritas@veritastk.co.jp
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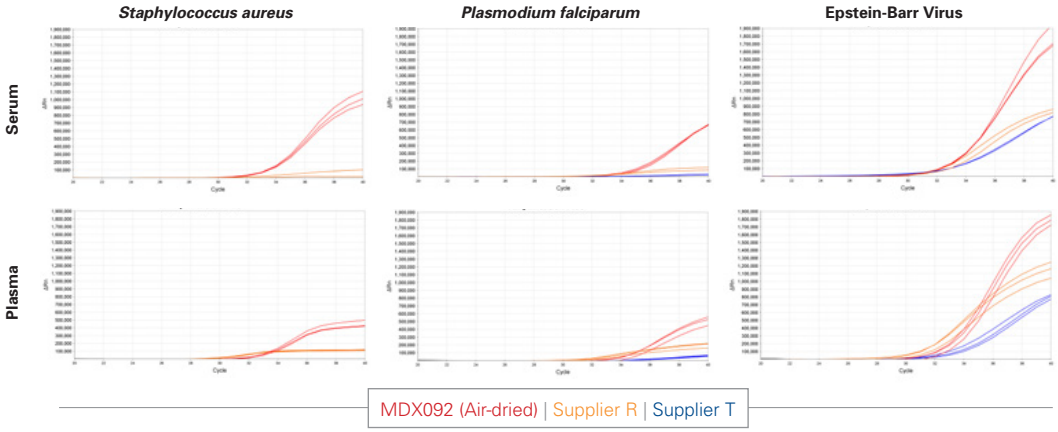
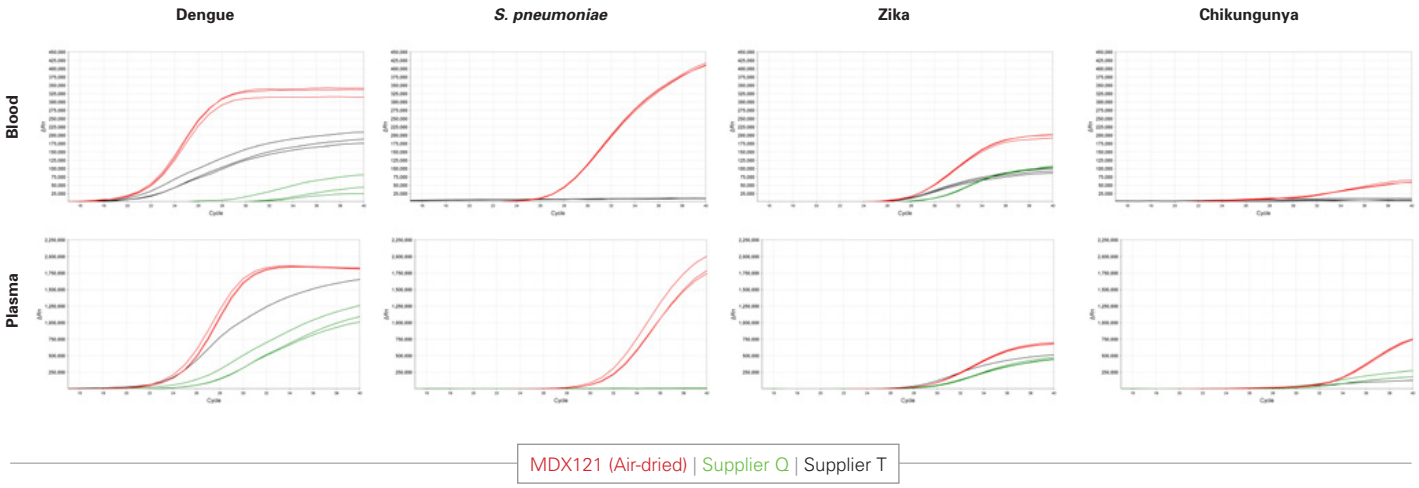
High reaction efficiency with plasma, serum or whole blood samples containing anticoagulant K2-ETDA

Air-Dryable™ Direct DNA qPCR Blood (MDX092)



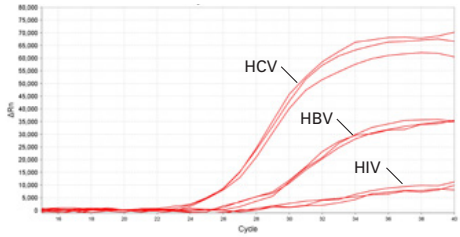
Plasmid DNA containing the targets *S. aureus, P. falciparum* and Epstein Barr virus was spiked into 10% serum or 10% K2-EDTA plasma and amplified in a triplex reaction using air-dried MDX092 (red) (dried in a Memmert Universal oven UF260plus) and kits from supplier R (orange) and supplier T (blue). The results illustrate higher end florescence and better sensitivity with MDX092 than with mixes from supplier R and T.

Air-Dryable™ Direct RNA/DNA qPCR Blood (MDX121)



Three viral RNA targets (Dengue, Zika and Chikungunya) and one DNA target (*S. pneumonia*) were amplified in a quadruplex reaction using air-dried MDX121 (red) and liquid mixes from supplier Q (green) and supplier T (black) in the presence of 5% K2-EDTA blood or 5% K2-EDTA plasma. Air-Dryable™ Direct RNA/DNA qPCR Blood has higher multiplexing capacity than mixes from supplier R and T.

High tolerance to high concentrations of blood (20% K2-EDTA whole blood)

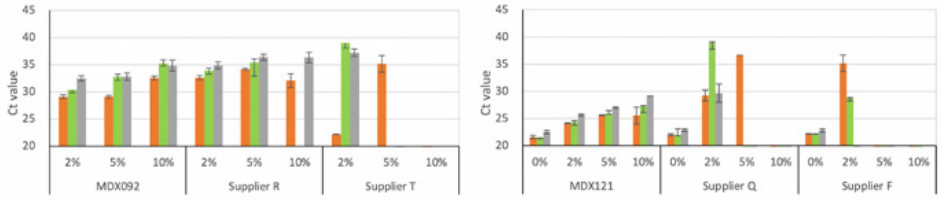


Two viral RNA targets (Human Immunodeficiency Virus (HIV-1) and Hepatitis C virus (HCV)) and one DNA target (Hepatitis B virus (HBV)) were amplified in a triplex reaction using Air-Dryable™ Direct RNA/DNA qPCR Blood (MDX121) in the presence of 20% K2-EDTA whole blood. The results illustrate the robust and reproducible performance achieved with Air-Dryable™ Direct RNA/DNA qPCR Blood in the presence of high concentrations of whole blood.

High tolerance to whole blood stabilized with anticoagulants (K2-EDTA, sodium heparin, and sodium citrate)

A) Air-Dryable™ Direct DNA qPCR Blood (MDX092)

B) Air-Dryable™ Direct RNA/DNA qPCR Blood (MDX121)



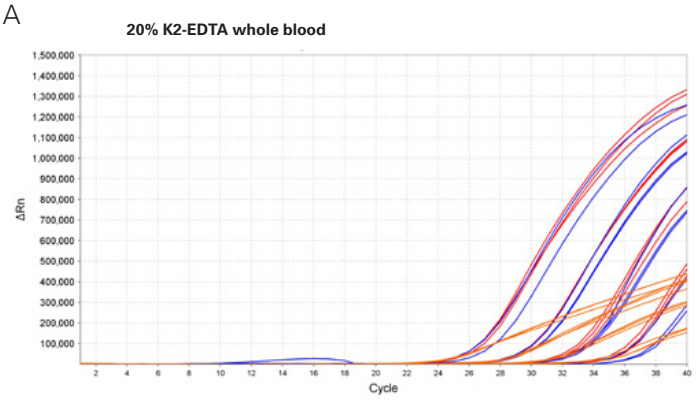
K2-EDTA | Sodium heparin | Sodium citrate

Anticoagulants and high concentrations of whole blood are known to inhibit qPCR efficiencies. 0% 2%, 5% and 20% human whole blood in the presence of K2-EDTA (orange), sodium heparin (green) and sodium citrate (grey) was tested with (A) Air-Dryable Direct DNA qPCR Blood (MDX092) against mixes from supplier R and supplier T and (B) Air-Dryable Direct RNA/DNA qPCR Blood (MDX121) against mixes from supplier Q and supplier F. The results demonstrate that the reaction efficiencies of the Air-Dryable Direct Blood mixes are higher both in the presence of anticoagulants and high concentrations of blood than of other suppliers' mixes.

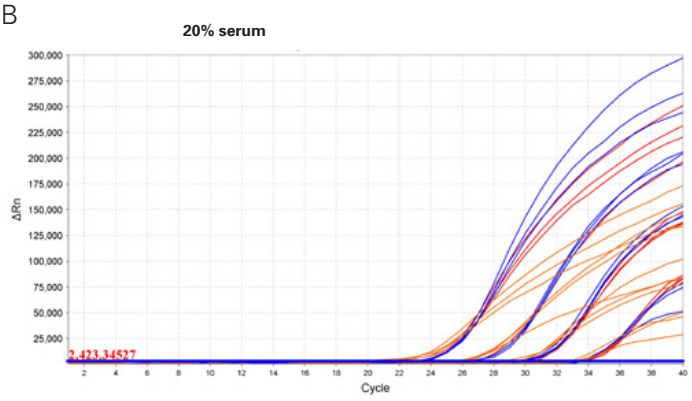
Air-drying does not impact assay efficiency or sensitivity

Air-Dryable™ Direct DNA qPCR Blood (MDX092)

A



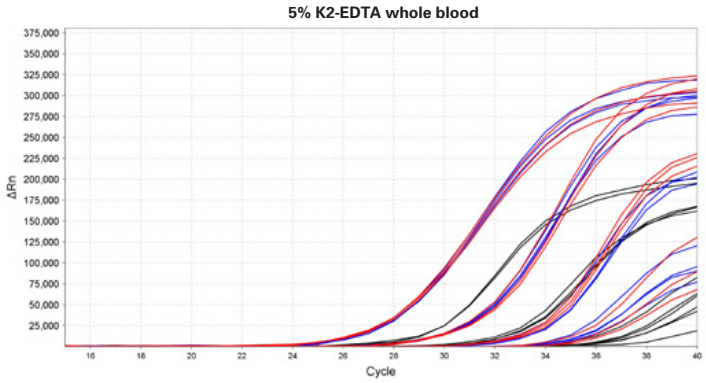
B



Air-dried Mix | Liquid Mix | Supplier R (liquid mix)

Activity of Air-Dryable Direct DNA qPCR Blood (MDX092) in both air-dried (red) and liquid (blue) formats were compared to a liquid mix from supplier R (orange) in a multiplexing qPCR assay, using a 10-fold serial dilution of plasmid DNA (10,000, 1000, 100 and 10 copies respectively) for *Plasmodium falciparum*, in the presence of (A) 20% K2-EDTA whole blood and (B) 20% K2-EDTA serum. The results illustrate that the air-dried Air-Dryable Direct DNA qPCR Blood retains the ability to efficiently amplify to the same level as the liquid mix and shows higher end florescence and sensitivity than the supplier R mix.

Air-Dryable™ Direct RNA/DNA qPCR Blood (MDX121)

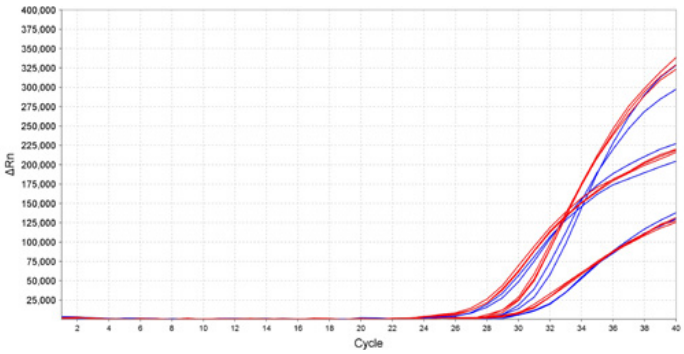


Air-dried | Liquid Mix | Supplier Q

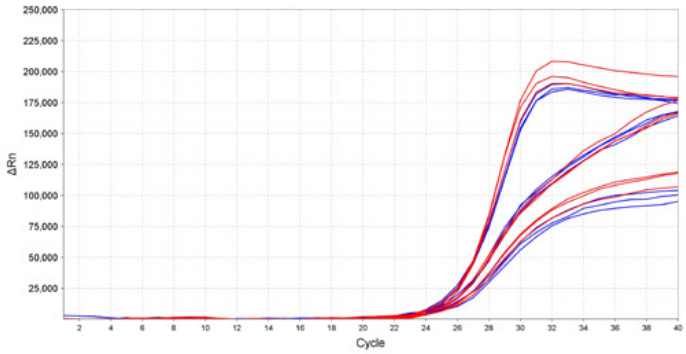
Activity of air-dried Air-Dryable Direct RNA/DNA qPCR Blood (MDX121) in both air-dried (red) format and liquid format (blue) were compared to supplier Q (**black**) in a multiplexing qPCR assay, using a 10-fold serial dilution of mammalian RNA (10,000, 1000, 100 and 10 copies respectively), in the presence of 5% K2-EDTA whole blood. The results illustrate that the Air-Dryable Direct RNA/DNA qPCR Blood retains the ability to efficiently amplified and shows higher end florescence and sensitivity than the supplier Q mix.

Air-dried mixes maintain their shelf-life for up to 12 months

A) Air-Dryable™ Direct DNA qPCR Blood (MDX092)



B) Air-Dryable™ Direct RNA/DNA qPCR Blood (MDX121)



Air-dried Mix | Liquid Mix

The Air-Dryable Direct Blood mixes were air dried and their stability was tested in an accelerated stability study. (A) Three DNA targets were amplified with Air-Dryable Direct DNA qPCR Blood (MDX092) and (B) Three mammalian targets were amplified with Air-Dryable Direct RNA/DNA qPCR Blood (MDX121) that was air-dried (red) and incubated a 37 °C for 1 month and tested against the fresh liquid mix (blue) in assays with 5% K2-EDTA whole blood. Results suggest that the air-dried mixes are active following accelerated stability tests with projected 12 months stability at ambient temperature.

Ordering information:

USA
5171 Wilfong Road
Memphis, Tennessee 38134
Fax: +1 901-333-8223
Toll Free: +1 800 327 6299

Email: info@meridianlifescience.com
Orders: orders@meridianlifescience.com
www.MeridianLifeScience.com

株式会社
ベリタス
〒105-0013 東京都港区浜松町1丁目10-14
住友東新橋ビル3号館5階
TEL.03-5776-0078(代) FAX.03-5776-0076
E-mail: veritas@veritastk.co.jp
https://www.veritastk.co.jp/

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