

Camel IgG ELISA

Life Diagnostics, Inc., Catalog Number: IGG-16

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INTRODUCTION

Three major IgG isotypes are found in camel: IgG₁, IgG₂, and IgG₃. IgG₁ resembles IgG from other species in that it is comprised of two heavy chains and two light chains. IgG₂ and IgG₃ each consist of two heavy chains, but both lack light chains. The heavy chains of IgG₂ and IgG₃ lack the CH1 domain present in IgG₁. The hinge region between the CH2 and VH domain is longer in IgG₂, giving it a slightly higher molecular weight (ref 1).

This ELISA kit uses anti-camel IgG₃ for solid phase (microtiter wells) immobilization and horseradish peroxidase (HRP) conjugated anti-camel IgG₃ for detection. It recognizes IgG₁, IgG₂ and IgG₃ and can be used for measurement of total IgG in camel serum. Reactivity with IgM is negligible or nonexistent¹. Cross-reactivity with immunoglobulins from other species has not been investigated².

PRINCIPLE OF THE TEST

Test samples are diluted and incubated in the microtiter wells for 45 minutes alongside camel IgG standards. The microtiter wells are subsequently washed and HRP conjugate is added and incubated for 45 minutes. IgG molecules are thus sandwiched between the immobilization and detection antibodies. The wells are then washed to remove unbound HRP-labeled antibodies. TMB Reagent is added and incubated for 20 minutes at room temperature. This results in the development of a blue color. Color development is stopped by the addition of Stop Solution, changing the color to yellow. Optical density is measured spectrophotometrically at 450 nm. The concentration of IgG is proportional to the optical density of the test sample and is derived from a standard curve.

MATERIALS AND COMPONENTS

Materials provided with the kit:

- Anti Camel IgG Coated 96-well Plate (12 strips of 8 wells)
- HRP Conjugate Reagent, 11 ml
- Reference Standard (lyophilized)
- 20x Wash Solution: TBS50-20, 50 ml
- 10x Immunoglobulin Diluent: RD25-10, 25 ml
- TMB Reagent (One-Step): TMB11-1, 11 ml
- Stop Solution (1N HCl): SS11-1, 11 ml

Materials required but not provided:

- Precision pipettes and tips
- Distilled or deionized water
- Polypropylene or glass tubes
- Vortex mixer
- Absorbent paper or paper towels
- Micro-plate incubator/shaker mixing speed of 150 rpm
- Plate washer
- Plate reader with an optical density range of 0-4 at 450 nm
- Graph paper (PC graphing software is optional)

¹ No significant reactivity was observed with crude camel IgM isolated by size exclusion chromatography.

² The kit recognizes Llama IgG but because of nonlinearity with dilution it cannot be used to accurately measure Llama IgG levels.

STORAGE OF THE TEST KIT

The test kit will remain stable for six months from the date of purchase provided that the components are stored at 2-8°C. The microtiter plate should be kept in a sealed bag with desiccant to minimize exposure to damp air.

GENERAL INSTRUCTIONS

1. Please read and understand the instructions thoroughly before using the kit.
2. All reagents should be allowed to reach room temperature (25°C) before use.
3. Optimum results are achieved if, at each step, reagents are pipetted into the wells of the microtiter plate within 5 minutes.

DILUENT PREPARATION

The diluent is provided as a 10x stock. Prior to use, estimate the final volume of diluent required for your assay and dilute one (1) volume of the 10x stock with nine (9) volumes of distilled or deionized water.

WASH SOLUTION PREPARATION

The wash solution is provided as a 20x stock. Prior to use, dilute the contents of the bottle (50 ml) with 950 ml of distilled or deionized water.

STANDARD PREPARATION

1. The camel IgG standard is provided as a lyophilized stock. Reconstitute with distilled or deionized water as directed on the vial label (*the reconstituted standard is stable at 4°C for at least one day but should be aliquoted and frozen at -20°C after reconstitution if future use is intended*).
2. Label 8 polypropylene or glass tubes as 75, 37.5, 18.75, 9.38, 4.69, 2.34, 1.17 and 0 ng/ml.
3. Into the tube labeled 75 ng/ml, pipette the volume of diluent detailed on the IgG standard vial label. Then add the indicated volume of IgG standard (shown on the standard vial label) and mix gently. This provides the 75 ng/ml standard.
4. Dispense 250 µl of diluent into the tubes labeled 37.5, 18.75, 9.38, 4.69, 2.34, 1.17 and 0 ng/ml.
5. Prepare a 37.5 ng/ml standard by diluting and mixing 250 µl of the 75 ng/ml standard with 250 µl of diluent in the tube labeled 37.5 ng/ml.
6. Similarly prepare 37.5, 18.75, 9.38, 4.69, 2.34 and 1.17ng/ml standards by serial dilution.

SAMPLE PREPARATION

General Note: We find that IgG is present in camel serum or plasma at concentrations of ≈6 mg/ml. In order to obtain values within range of the standard curve, we suggest that samples initially be diluted 200,000-fold using the following procedure for each sample to be tested:

1. Dispense 998 µl and 798 µl of 1x diluent into separate tubes.
2. Pipette and mix 2.0 µl of the serum/plasma sample into the tube containing 998 µl of diluent. This provides a 500-fold diluted sample.

- Mix 2.0 μl of the 500-fold diluted sample with the 798 μl of diluent in the second tube. This provides a 200,000-fold dilution of the sample.
- Repeat this procedure for each sample to be tested.
Tissue extracts and body fluids other than serum or plasma will likely have lower IgG levels. Optimal dilutions of such samples should be determined empirically.

ASSAY PROCEDURE

- Secure the desired number of coated wells in the holder.
- Dispense 100 μl of standards and diluted samples into the wells (we recommend that samples be tested in duplicate).
- Incubate on an orbital micro-plate shaker at 100-150 rpm at room temperature (18-25°C)³ for 45 minutes.
- Aspirate the contents of the microtiter wells and wash the wells 5 times with 1x wash solution using a plate washer (400 μl /well). The entire wash procedure should be performed as quickly as possible.
- Strike the wells sharply onto absorbent paper or paper towels to remove all residual wash buffer.
- Add 100 μl of enzyme conjugate reagent into each well.
- Incubate on an orbital micro-plate shaker at 100-150 rpm at room temperature (18-25°C) for 45 minutes.
- Wash as detailed in steps 4 to 5 above.
- Dispense 100 μl of TMB Reagent into each well.
- Gently mix on an orbital micro-plate shaker at 100-150 rpm at room temperature (18-25°C) for 20 minutes.
- Stop the reaction by adding 100 μl of Stop Solution to each well.
- Gently mix. *It is important to make sure that all the blue color changes to yellow.*
- Read the optical density at 450 nm with a microtiter plate reader *within 5 minutes*.

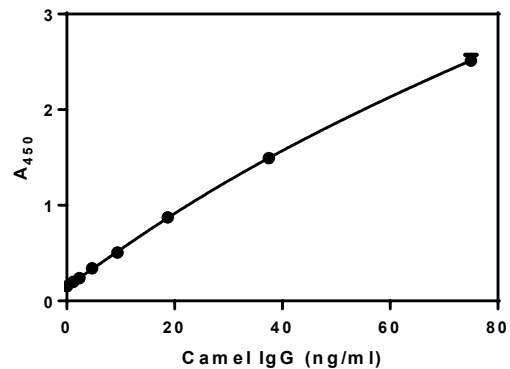
CALCULATION OF RESULTS

- Calculate the average absorbance values (A_{450}) for each set of reference standards and samples.
- Construct a standard curve by plotting the mean absorbance obtained from each reference standard against its concentration in ng/ml on linear graph paper, with absorbance values on the vertical or Y-axis and concentrations on the horizontal or X-axis.
- Using the mean absorbance value for each sample, determine the corresponding concentration of IgG in ng/ml from the standard curve.
- Multiply the derived concentration by the dilution factor to determine the actual concentration of IgG in the sample.
- PC graphing software may be used for the above steps. We recommend a fit using a second order polynomial equation.
- If the OD_{450} values of samples fall outside the standard curve, samples should be diluted appropriately and re-tested.

TYPICAL STANDARD CURVE

A typical standard curve with optical density readings at 450 nm on the Y-axis against IgG concentrations on the X-axis is shown below. This curve is for the purpose of illustration only and should not be used to calculate unknowns. A standard curve should be generated in each experiment.

IgG (ng/ml)	A_{450}
75	2.515
37.5	1.494
18.75	0.873
9.38	0.507
4.69	0.341
2.34	0.238
1.17	0.199
0	0.155



LIMITATIONS OF THE PROCEDURE

- Reliable and reproducible results will be obtained when the assay procedure is carried out with a complete understanding of and in accordance with the instructions detailed above.
- The wash procedure is critical. Insufficient washing will result in poor precision and falsely elevated absorbance readings.

REFERENCES

- Hamers-Casterman C, et al. Naturally occurring antibodies devoid of light chains. Nature 363:446-448 (1993)

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For technical assistance please email us at
techsupport@lifediagnosics.com

³The ELISA was validated using a shaking incubator at 150 rpm and 25°C. Operation of the assay at lower temperatures and mixing speeds will likely give lower absorbance values.