

Cowpox virus - Real Time DNA

50 / 100 /150 tests (Ready to use kit)

OneVetqPCR-realtim™ Cowpox DNA Real Time PCR Kit is a screening assay for a rapid and accurate detection of Cowpox virus

Principles of the test:

One Step Bioingentech® PCR Kits provide components for “onestep” real time PCR detection in a convenient format that is compatible with both rapid and standard qPCR cycling conditions.

The One Universal qPCR DNA Master Mix include Bioingentech® all reagents for an optimized qPCR.

The Cowpox virus specific primer and probe mix are provided in the kit and these can be detected through your real time Platform by the 5' nuclease PCR detection method. During PCR amplification, forward and reverse primers hybridize to the Cowpox virus target genomic DNA generated. Fluorogenic probe is included in the same reaction mixture which consists of a DNA probe labeled with a 5-reporter kelly ZZ™ and 3-quencher kurü Zy™ which can be detected through green channel.

To confirm extraction of a valid biological template an Internal control primer and probe mix is included, consists of a DNA probe labeled with a 5-reporter Chods ZX™ and a 3-quencher kurü Zy™ which hybridize inside a specific housekeeping endogenous target gene. During PCR amplification, the probe is cleaved and the reporter dye and quencher are separated. As a result, a fluorescence increase can be detected on a range of real time PCR platforms through yellow channel. Our kits also include Positive and Negative Control which are details in FAQ section.

Principle and use:

This amplification kit has been manufactured by Bioingentech Ltd. Chile to detect Cowpox virus in real time PCR. This is a possibility absolute quantification or qualitative assay. Real time PCR is based on fluorogenic dyes. Ct value between 12 - 36 should be taken positive. Value between 36 - 40 Ct should be taken as marginal positive. Ct above 40 must be considered as negative (**for more details see Table 5**).

This kit needs DNA as a template which can be isolated from blood, serum, faeces, respiratory fluid, cerebrospinal fluid, digestive system, tissue, Heptopancreas, Gills, Pleopods, Cloacal, Egg Yolk, Milk, swabs, Lee, bacterial culture, cell lines and others. All our kits contain reagents for a really good quality DNA extraction. We discarded use of affinity columns because a lot report that indicate purification problems due to the lipids present in the biological samples quickly clog the column decreasing its performance.

Table 1. Kit Components:

| Reactions Tubes | 50 test | 100 test | 150 test |
|---|----------|----------|----------|
| Universal qPCR Master Mix | (1 vial) | (1 vial) | (1 vial) |
| Primer, Probes and Internal Control Universal Mix | (1 vial) | (1 vial) | (1 vial) |
| Cowpox Positive Control | (1 vial) | (1 vial) | (1 vial) |
| Cowpox Negative Control | (1 vial) | (1 vial) | (1 vial) |
| PCR grade Water | (1 vial) | (1 vial) | (1 vial) |

* Remember that all our OneVetqPCR-realtim™ Cowpox DNA Real Time PCR Kits include reagents and procedures for DNA extraction. Also we always can offer you a complete technical support for your different sample type.

Table 2. Instrument Compatibility:

| | |
|---------------------|-----------------------------|
| * ABI 7300 | * LightCycler 2.0 |
| * ABI 7500FAST | * LightCycler 480 |
| * ABI 7900 | * Mastercycler® ep realplex |
| * AB Step One | * Mx3000P QPCR System |
| * AB Step One Plus | * Mx3005P QPCR System |
| * Agilent Mx3005P | * RotorGene 3000 |
| * CFX96 & CFX384 | * RotorGene 6000 |
| * ExiCycler™ 96 | * RotorGeneQ |
| * iQ5 & MyiQ Cycler | * SLAN® Real-Time PCR |
| * Illumina Eco | * Smartcycles II |
| * LightCycler Nano | * Applied 7300 and 7500 |

For more details you can download a complete compatibility panel from our web site: <http://www.bioingentech.com/pdf/Instruments%20Real%20Time.pdf>

Procedure:

Please read through the entire procedure before starting.

Before Starting

- Pulse-spin each tube in a centrifuge before opening.
- Homogenize the solutions for 5 seconds prior to pipetting
- You must consider use different tips in order to avoid cross contamination.
- Use only sterile, RNAses, DNAases and pyrogens free tips.

Step 1

Prepare a Master mix according to the reaction table.

Table 3. Reaction components for PCR

| Reaction Tubes | Sample and Internal Control | Positive Control | Negative Control |
|---|-----------------------------|------------------|------------------|
| Universal qPCR Master Mix | 10 µL | 10 µL | 10 µL |
| Primer, Probes and Internal Control Universal Mix | 2 µL | 2 µL | 2 µL |
| PCR grade Water | 6 µL | 6 µL | 6 µL |
| DNA Sample | 2 µL | | |
| Cowpox Positive Control | | 2 µL | |
| Cowpox Negative Control | | | 2 µL |
| Total Volume | 20 µL | 20 µL | 20 µL |

Step 2

Place the tubes in a thermal cycler and perform One Step qPCR according to the program outlined in Table 2.

Table 4. Recommended PCR Cycling table

| Cycles | Steps | Time | Temp. (°C) |
|-----------|----------------------|--------|------------|
| 1 Cycle | Initial Denaturation | 5 min | 95 °C |
| 40 Cycles | Denaturation | 30 seg | 95 °C |
| | Annealing | 30 seg | 60 °C |
| | Extension | 30 seg | 72 °C |
| | Hold | - | 4 °C |

Interpretation of the test

1) Qualitative analysis:

Ct (Threshold cycle) value of each sample can be read as follows.

Table 5. Ct value result

| Ct value | Result |
|----------|-------------------|
| 0 - 11 | Negative |
| 12 - 36 | Positive |
| 36 - 40 | Marginal Positive |
| > 40 | Negative |

* Is important mentioned that Ct value over 40 is considered Negative result. If Ct value is in a 12 - 36 range, it must be considered as Positive result. This is depending of the sample initial concentration used for each reaction. You should consider that sample real concentration could be modify by the sample purity when this is quantifier

* For more technical information you must request the quality control for each kits. Also you can request more information writing to our email info@bioingentech.com

2) Quantitative analysis:

Table 6. Preparation of standard curve dilution series. Cowpox positive control:

| Average Positive Control Concentration | |
|--|---------------------|
| Cowpox | See Quality Control |

| Standar curve | Preparation series a fresh dilution | Concentration | Copy Number |
|---------------|--|---------------------|---------------------|
| Tube N°1: | 2uL Cowpox Positive Control (0,1 ng/µL) + 18 µL de PCR grade Water | See quality control | See quality control |
| Tube N°2: | 2uL Tube N°1 + 18 µL de PCR grade Water | See quality control | See quality control |
| Tube N°3: | 2uL Tube N°2 + 18 µL de PCR grade Water | See quality control | See quality control |
| Tube N°4: | 2uL Tube N°3 + 18 µL de PCR grade Water | See quality control | See quality control |
| Tube N°5: | 2uL Tube N°4 + 18 µL de PCR grade Water | See quality control | See quality control |
| Tube N°6: | 2uL Tube N°5 + 18 µL de PCR grade Water | See quality control | See quality control |
| Tube N°7: | 2uL Tube N°6 + 18 µL de PCR grade Water | See quality control | See quality control |

Important Note: Don't forget Homogenize the tubes.

* We will send a Quality Control report for each purchase.
 ** For reaction mix you must use Universal qPCR Master Mix.
 *** If you want to obtain less DNA copies you must include a new dilution tube (Tube N° 8). Note: Final DNA copy number will depend of the DNA concentration (you can see it in Quality Control Report).

Table 7. Standard curve set up

| | Tube A | Tube B | Tube C | Tube D | Tube E | Tube F | Tube G |
|---|--------|--------|--------|--------|--------|--------|--------|
| Universal qPCR Master Mix | 10 µL | 10 µL | 10 µL | 10 µL | 10 µL | 10 µL | 10 µL |
| Primer, Probes and Internal Control Mix | 2 µL | 2 µL | 2 µL | 2 µL | 2 µL | 2 µL | 2 µL |
| PCR grade Water | 6 µL | 6 µL | 6 µL | 6 µL | 6 µL | 6 µL | 6 µL |
| Tube N° 1 (Positive Control) | 2 µL | | | | | | |
| Tube N° 2 | | 2 µL | | | | | |
| Tube N° 3 | | | 2 µL | | | | |
| Tube N° 4 | | | | 2 µL | | | |
| Tube N° 5 | | | | | 2 µL | | |
| Tube N° 6 | | | | | | 2 µL | |
| Tube N° 7 | | | | | | | 2 µL |
| Total Volume | 20 µL | 20 µL | 20 µL | 20 µL | 20 µL | 20 µL | 20 µL |

2.1.-Assess the Ct value when amplification curve of Standard tube 1, 2, 3, 4, 5, 6 passes the threshold line. However, four tubes are sufficient for standard curve. (tube1-tube4).

2.2.- Calculate quantitative value to compare with Ct value of unknown samples and curve of Standard tube 1, 2, 3, 4, 5, 6.

2.3.- When you visualized result in the Real Time PCR platform you must see just one amplification curve for Positive Control. You must not see an Internal Control amplification curve.

3) Test validation:

3.1.- Each Ct value standard should be as follows.

Standard 1 < Standard 2 < Standard 3 < Standard 4 < Standard 5 < Standard 6.

3.2.- R-value of standard curve should be 0.900 - 0.999. R-value represent how well the experimental data fit the regression line. A significant difference in observed Ct values between replicates will lower the R-value.

3.3.- The standard curve slope result should be all negative.

3.4.- The desired amplification efficiencies vary from 90% to 110%. The theoretical maximum of 100% indicates that the polymerase enzyme is functioning at its maximum capacity. Low reaction efficiencies may be caused by poor primer design or by suboptimal reaction conditions. Reaction efficiencies >110 may indicate pipetting error in your serial dilutions or coamplification of nonspecific products, such as primer-dimers.

Visual explanation FAQ:

1.-Positive control:

The Positive control assay uses a kellú ZZ™ dye and should be detected through the Green channel of your real time PCR instrument (**see table 8 and 9**).

For copy number determination and as a positive control for the PCR set up, the kit contains a positive control template. This can be used to generate a standard curve of Cowpox virus copy number / Ct value.

Alternatively, the positive control can be used at a single dilution Cowpox virus on where full quantitative analysis of the sample is not required. Each time the kit is used, at least one positive control reaction must be included in the run.

Particularly, due to amount of this reagent, you should run a positive control for each 12 samples. A positive result indicates that the primer and probes for detecting the target Cowpox virus gene worked properly in that particular experimental scenario. If a negative result is obtained the test results should be invalid and must be repeated (**see Table 11**). Sealing all other samples and negative controls before pipetting the positive control into the positive control well tube.

2.-Internal Control:

The internal control is included in Primer, Probes and Internal Control Mix along to the target pathogen detection. In order to interpreted results, read the yellow channel. The internal control assay uses a Chods ZX™ dye and should be detected through the Yellow channel of your real time PCR instrument and gives a Ct value of 28 (+/-5) depending on the level of sample dilution and concentration. A positive result through the Yellow channel therefore indicates that PCR conditions are suitable for detection of the target pathogen gene. If a negative result is obtained through the Yellow channel the results should be analyzed by combination of result, follow the **Table 11** data.

3.-Negative control:

To confirm absence of contamination a negative control reaction should be included every time the kit is used. Particularly, due to amount of this reagent, you should run a negative control for each 12 samples. In this instance the PCR grade water should be used in place of template. A negative result indicates that the reagents have not become contaminated. If a positive result and Ct value less than 36 is obtained, the results should be analyzed and check if a correct amplification curve was obtained. When you obtain a clear amplification curve you should consider repeat your assay due to probably the sample was contaminated (**see Table 11**).

* Remember: Run a positive control and negative control for each 12 samples. For reaction mix you must use Universal qPCR Master Mix.

*You must use quencher and reporter dye to setup your software (**see table 8 and 9**) and run the following channel:

Table 8. Fluorogenic probes, Channels and Dyes

| Channel | Source | Detector | Dyes |
|---------|----------|----------|---|
| Green | 470 (Nm) | 520 (Nm) | FAM, Sybr green1, Fluorescein, Eva green, Alerxa flour 488, kellú ZZ™ |
| Yellow | 530 (Nm) | 550 (Nm) | Joe, Vic, Hex, Tet, Cal Fluorgold 540, YaKima Yellow, Chods ZX™ |
| Orange | 585 (Nm) | 610 (Nm) | Rox, Cal Fluor Red 610, Cy3.5, Texas Red, Alexa Fluor 568 |
| Red | 625 (Nm) | 660 (Nm) | Cy5, Quasar 670, Lightcycler, Red 640, Alexa Fluor 633, Aeon Zw™. |
| Crimson | 680 (Nm) | 710 (Nm) | Quasar 705, Lightcycler Red 705, Alexa Fluor 680 |



Table 9. Similarity of our fluorophores with HEX and FAM.

| | Channel | Dyes | |
|----------------------|---------|-----------|-----|
| 1.- Positive Control | Green | kellú ZZ™ | FAM |
| 2.- Internal Control | Yellow | Chods ZX™ | HEX |
| 3.- Sample Target | Green | kellú ZZ™ | FAM |

Important Note:

Probes for sample and controls mentioned in manuals are just a reference and it not imply that these probes will be the final fluorophores for a purchased kit. The probes combination will be depending of several factor and this information will be available in the Certificate of Analysis when you purchase one of our PCR Kits. kellú ZZ™ and Chods ZX™ fluorophores are just referential.

Is important mentioned that we can develop special request for other pathogens or multiplex detection according client's specifications.

We strongly recommend don't use or combine our products with reagents from another kits or unknown provenance. We can't assure good result if incompatibility problems occur.

Temperature

All our reagents are made through protein engineering and are stable at room temperature, the label temperature is just a recommendation after the product is open.

Table 10. Store Temperature Kits

| | | |
|--|----------------------|-----------------------|
| | Store temperature | The label temperature |
| | Shipping temperature | At room temperature |

Table 11. Interpretation of Results

| Sample | I.C | N.C | P.C | Result |
|--------|-----|-----|-----|-------------------------------------|
| + | + | - | + | POSITIVE |
| + | - | - | + | POSITIVE |
| + | + | + | + | Check Ct and Consider repeat assay* |
| + | - | + | + | Check Ct and Consider repeat assay* |
| + | - | - | - | NEGATIVE |
| + | + | - | - | NEGATIVE |
| - | +/- | +/- | +/- | NEGATIVE |

* * Sometimes amplification curves for Negative or Internal control with Ct < 30 is generate, but it's not necessary a Positive result. You should see and determinate if is a sigmoid curve. If the amplification curve isn't sigmoid you should consider as negative result.

Table 12. Other Products

| Products | Code |
|---|---------|
| Bioingentech - Genomic DNA Purification Kit 50 test | PU-A001 |
| Bioingentech - Genomic DNA Purification Kit 100 test | PU-A002 |
| Bioingentech - Genomic DNA Purification Kit 150 test | PU-A003 |
| OneVetqPCR-realtime™ Cowpox Cowpox virus Real Time 50 tests (Ready to use kit) / Cat. No: Oneq-V173-50D | |
| OneVetqPCR-realtime™ Cowpox Cowpox virus Real Time 100 tests (Ready to use kit) / Cat. No: Oneq-V173-100D | |
| OneVetqPCR-realtime™ Cowpox Cowpox virus Real Time 150 tests (Ready to use kit) / Cat. No: Oneq-V173-150D | |

Table 13. Products Specifications

| | |
|----------------------------------|---|
| Technology | 5' nuclease probe based real time PCR assay |
| Type of nucleic acid Kit | DNA |
| Kit storage | Shipped at room temperature, the label temperature is just a recommendation after the product is open. |
| Detection Limit | See Quality Control file. Request it! |
| Sensitivity & Specify | Ct value between 12 – 36 should be taken positive. Value between 36-40 Ct should be taken as marginal positive. Ct above 40 must be considered as negative. |
| Controls included | Internal control, Positive control and Negative control included. |
| Channels | Kellú / FAM Green channel detect pathogen amplicons. Chods / HEX Yellow channel detect internal control amplicons. Kellú / FAM Green channel detect Positive Control. |