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Kylt[®]

Kylt[®] Infectious Spleen & Kidney Necrosis Virus

Real-Time PCR Detection

www.kylt.eu



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Real-Time PCR Detection

A. General

- Kylt® Infectious Spleen & Kidney Necrosis Virus kits are intended for the specific detection of bacterial DNA of *Infectious Spleen & Kidney Necrosis Virus* (ISKNV). The kits are suitable for the analysis of samples from fish, such as tissues and organs (especially: kidney, spleen, but also liver, gills, heart, intestine), material derived from cultural enrichment processes and swabs of the aforementioned samples.
- The qualitative testing with Kylt® Infectious Spleen & Kidney Necrosis Virus kits is based on a duplex Real-Time PCR: In one reaction setting, the target genes for *Infectious Spleen & Kidney Necrosis Virus* as well as for the endogenous control are amplified in parallel by respective primer pairs in the Polymerase Chain Reaction (PCR). Amplified target gene fragments are detected via fluorescently labeled probes during the PCR reaction in real-time (Real-Time PCR). The probes specific for detection of amplified *Infectious Spleen & Kidney Necrosis Virus* as well as for the endogenous control target genes are labeled with fluorescent dyes FAM and HEX, respectively, and their emitted fluorescence is separately optically measured by the Real-Time PCR thermal cycler. By means of all individual analyses in one reaction vessel per sample and the Negative Control and Positive Control per run the *Infectious Spleen & Kidney Necrosis Virus* -specific status of a sample can be evaluated in the end. This way, results can be achieved within a few hours after sample receipt.
- These kits were developed for use by trained laboratory personnel following standardized procedures. This Direction For Use must be followed strictly.

B. Reagents and Materials

- The following Kylt® Infectious Spleen & Kidney Necrosis Virus kits are available and comprise the following reagents:

Reagent	Colour of Lid	100 Reactions Article No 31632	25 Reactions Article No 31633	Store at
2x qPCR-Mix	○ transparent	4 x 280 µl	1 x 280 µl	≤ -18 °C
Primer-Probe-Mix	● green	4 x lyophilizate (final 150 µl each)	1 x lyophilizate (final 150 µl each)	≤ -18 °C
Positive Control	● red	4 x lyophilizate (final 50 µl each)	2 x lyophilizate (final 50 µl each)	≤ -18 °C
Negative Control	● blue	1 x 1 ml	1 x 1 ml	≤ -18 °C

- After receipt, the components are immediately stored at ≤ -18 °C. Avoid repeated freezing and thawing of all the reagents and keep them thawed as short as possible. If occasional processing of few samples only is expected you may prepare appropriate aliquots of reagents before storage at ≤ -18 °C. Prepare aliquots in such a way that freeze-thaw-cycles are reduced to a maximum of three. The Negative Control can alternatively be stored at +2°C to +8°C.
- The components are to be used within the indicated shelf life (see box label). The components of different batches may not be mixed.
- Before its first use, rehydrate the Positive Control: add 50 µl of Negative Control per vial, briefly incubate at room temperature and mix thoroughly by repeated vortexing. It is recommended to generate aliquots of suitable volumes and store them at ≤ -18 °C.
- The Primer-Probe-Mix needs to be stored protected from abundant light. Do not expose to direct (sun)light. Before first use, rehydrate the lyophilized Primer-Probe-Mix: add 150 µl of the Negative Control per vial of Primer-Probe-Mix, briefly incubate at room temperature and mix by pulse-vortexing. Generate aliquots of suitable volumes and store them at ≤ -18 °C.

C. Equipment and Reagents not included

- This detection method can be used on all commercially available Real-Time PCR thermal cyclers that detect the emitted fluorescence of the fluorescent dyes FAM and HEX (emission 520 and 550 nm, respectively). Note that default normalization option against ROX (e.g. using ABI cyclers) must be deactivated.
- Apart from the disposables, the following further devices are needed and are not included in the Kylt® Infectious Spleen & Kidney Necrosis Virus kits:
 - DNA preparation kit / protocol (e.g. Kylt® RNA / DNA Purification products)
 - Table top microcentrifuge
 - Vortex
 - Micropipettes covering volumes of 1 µl to 1000 µl
 - Centrifuge for PCR tubes or plates
- Accessory Kylt® products: see chapter F “Related and Accessory Products”.
- We recommend the exclusive use of certified Nuclease-free disposables as well as powder-free protective gloves. Please wear gloves during the entire experimental procedure. Gloves need to be changed frequently, especially after spillage or suspected contaminations.

D. Control Reactions

- The Positive Control allows for control of the specificity and efficiency of the reagents and the reaction itself, including the performance of the Real-Time PCR and of the Real-Time PCR thermal cycler.
- The Negative Control allows for exclusion of contaminations. The sample testing is only valid if both, Positive and Negative Controls, are used and verified for validity in every Real-Time PCR run.
- The Internal Control is based on detection of a fish housekeeping gene, which is ubiquitous in the cells of the host that the sample is derived from. The DNA target gene is co-amplified (channel HEX) with every single reaction and allows for evaluation of sufficient sampling, sample storage and shipment, sample preparation and the Real-Time PCR run itself.

E. Protocol *(see also „Protocol At A Glance“ at the end of this Direction For Use)*

- The overall protocol of the analysis consists of the following main workflow:
 1. Sample Preparation
 2. DNA Preparation
 3. Reaction Setup and Amplification (Real-Time PCR)
 4. Data Analysis – Validity and Qualitative Result
- We recommend proceeding through the protocol without interruption to avoid potential degradation of the processed samples and reagents. If necessary, you may store the final DNA preparation at ≤ -18 °C until further processing. Avoid repeated freezing and thawing of the DNA preparations.

1. Sample Preparation

- We recommend pooling of at most five samples or samples from five individuals, respectively, per DNA preparation.
- Pool swabs in a sufficient volume of sterile buffer (e.g. 1 ml of Normal Saline or 0.1 x TE), let the swabs soak for an adequate period of time and finally wash out the swabs by thorough pulse-vortexing.
- The supernatant is used for DNA preparation.
- Small swabs may directly be immersed in lysis buffer, if applicable.
- Tissue and organ samples are homogenized thoroughly in sterile buffer (see above) and a suitable volume is used for the DNA preparation.
- Material derived from cultural processes, i.e. cell culture supernatant, can be used directly for DNA preparation.

2. DNA Preparation

a) Kylt® RNA/DNA Purification products

- All kinds of sample matrices, including swabs, tissues and organs may be processed with Kylt® RNA/DNA Purification products (please refer to chapter F “Related Products”).
- For detailed information on the DNA preparation process, please refer to the respective Direction For Use.

b) Alternative methods

- The aforementioned sample matrices may be processed with appropriate DNA preparation kits or appropriate in-house methods.

3. Reaction Setup and Amplification (Real-Time PCR)

- Before its first use, rehydrate the Positive Control (add 50 µl of Negative Control) and the Primer-Probe-Mix (add 150 µl of Negative Control).
- Before each use, briefly vortex and spin down the 2x qPCR-Mix, rehydrated Primer-Probe-Mix and Negative Control.
- To determine the total number of reactions needed, count the number of samples and add two more for the Negative Control and the Positive Control.
- Prepare the Master-Mix using the components listed below. A larger volume of a ready to use Master-Mix can be prepared and stored at ≤ -18 °C for convenient use over a longer period of time up to the expiry date given on the label. In case of frozen storage the Master-Mix should be aliquoted in such a way that freeze-thaw-cycles are reduced to a maximum of three.
- Vortex, spin down and add 16 µl of the finalized Master-Mix to each of the PCR tubes or plate wells ("cavities").

Reagent	Volume (µl)	
	per Reaction	e.g. n=7
2x qPCR-Mix	10 µl	70 µl
Primer-Probe-Mix	6 µl	42 µl
Total Master-Mix	16 µl	112 µl dispense 16 µl per reaction
DNA (Negative Control / sample DNA / Positive Control)	4.0 µl	
Total Reaction	20.0 µl	

- Keep exposure of the 2x qPCR-Mix, Primer-Probe-Mix and prepared Master-Mix to (sun)light as short as possible and return it back to appropriate storage temperature right after application. Avoid the formation of bubbles when pipetting the Master-Mix, samples and controls.
- Add 4 µl of the Negative Control to the corresponding cavity and seal it individually, if possible.
- To minimize risk of potential cross-contaminations, 4 µl of the Positive Control are added to the corresponding cavity after all previous samples and control reactions are set up. Before each use, briefly vortex and spin down the rehydrated Positive Control (see also chapter B "Reagents and Materials").
- If not already done, finally seal the cavities. It is recommended to briefly spin them down before the start of the Real-Time PCR run.
- Place the cavities in the Real-Time PCR thermal cycler and run the test with Kylt® Profile II as given below.

Kylt® Profile II				
Step No	Description	Temperature	Duration	
1	Activation of Polymerase	95 °C	10 min	
2	Denaturation	95 °C	15 sec	} 42 cycles
3	Annealing & Extension	60 °C	1 min	
4	Fluorescence Detection	channels FAM and HEX		

- Kylt® Profile II allows for combined run of this and most other Kylt® qPCR detection methods.
- Alternatively, the [Kylt® Profile I](#) given below can be applied. Kylt® Profile I allows for combined run of this and most other Kylt® qPCR detection methods as well as Kylt® RT-qPCR detection products that need Reverse Transcription, such as those for detection of viral RNA.

Kylt® Profile I				
Step No	Description	Temperature	Duration	
1	Reverse Transcription	50 °C	10 min	
2	Activation of Polymerase	95 °C	1 min	
3	Denaturation	95 °C	10 sec	} 42 cycles
4	Annealing & Extension	60 °C	1 min	
5	Fluorescence Detection	channels FAM and HEX		

- In the event of a combined Real-Time (RT)-PCR run, make sure all necessary channels are detected.
- Please follow the specified instructions of your Real-Time PCR thermal cycler as recommended by the manufacturer.

[4. Data Analysis – Validity and Qualitative Result](#)

General

- The amplification data can be processed automatically using the specific software tool of your Real-Time PCR thermal cycler. Alternatively, the threshold can be set manually considering the following directions: The threshold should cross the FAM- and HEX-curves in the linear increase of their slope (log scaling of the y-axis). By setting the threshold, the crossing points with the FAM- and HEX-curves determine the respective cycle threshold (Ct), which is negatively correlated with the initial concentration of copies of the target genes in the Real-Time PCR reaction.
- Only curves with the typical exponential amplification, meaning the curve of the raw data shows a flat baseline at the beginning, followed by a clear (exponential) slope in fluorescence and possibly reaching a plateau-phase (y-axis in log scaling), should be regarded as positive.
- The actual test analysis starts with the validity check of the entire Real-Time PCR run. Afterwards, by means of the Internal Control the validity of each sample reaction and its true test result can be verified according to the Ct-value of the Internal Control channel (HEX). Finally, the *Infectious Spleen & Kidney Necrosis Virus*-specific status of each sample is analyzed (FAM).

Test Evaluation - Control Reactions

- The **Real-Time PCR test run** is only **valid** if the curves of the control reactions can be evaluated as follows:

Control Reactions	Channel			
	HEX		FAM	
Negative Control	negative	Ct > 35	negative	Ct > 42
Positive Control	positive	Ct > 15 and ≤ 35	positive	Ct > 15 and ≤ 35

Test Evaluation - Samples

Target	Channel	Signal		
Internal Control	HEX	positive	positive / negative	negative
<i>Infectious Spleen & Kidney Necrosis Virus</i>	FAM	negative	positive	negative
The sample is <i>Infectious Spleen & Kidney Necrosis Virus</i>		negative	positive	inhibited

- A **sample** is **negative for *Infectious Spleen & Kidney Necrosis Virus***, if its HEX-curve is positive (Ct ≤ 35), but its FAM-curve is negative.
- A **sample** is **positive for *Infectious Spleen & Kidney Necrosis Virus***, if its FAM-curve is positive (Ct ≤ 42), independent of the FAM-curve.
- A **sample** is **inhibited**, if neither the HEX-curve nor the FAM-curve is positive.
- **Recommendation:** In the case of an inhibited sample the test may be repeated with a dilution of the DNA preparation at e.g. 1:10 (9 volumes Negative Control + 1 volume DNA Extract or eluted DNA). The Negative Control is used as the diluting agent. Preferably, the entire DNA preparation process is repeated using Kylt® RNA/DNA Purification products or appropriate alternative.
- Convenient and reliable sample data entry, Real-Time PCR start, final qualitative analysis and documentation can be conducted with the Kylt® Software, please inquire.

F. Related and Accessory Products

Product	Article No	Content	Description
Kylt® RNA / DNA Purification	31315	50	Combined RNA and DNA purification from all relevant sample matrices.
Kylt® RNA / DNA Purification HTP	31826	4 x 96	Combined, magnetic beads-based purification of RNA and DNA from all relevant sample matrices, suitable for automated high throughput processing
Kylt® Purifier	31436	1 unit	Purification system for magnetic bead based kits. Up to 96 samples are processed in under 30 minutes. Intended for high-throughput laboratories.
Kylt® Purifier 48	31748	1 unit	Purification system for magnetic bead based kits. Up to 48 samples are processed in under 30 minutes. Intended for low to medium throughput laboratories.
Kylt® Purifier Spin Tips	31434	5 Sets	Plate with 96 separate spin tips, used by the Kylt® Purifier to mix the well contents by stirring. Sufficient for 480 samples.
Kylt® Purifier Plates	31435	20 Plates	Plates to be used for the several reactions and reagents during automated nucleic acid purification. Sufficient for 320 to 480 samples (depending on device and protocol).

G. Ordering information

For a fast and efficient service please send your order to orders.kylt-de@san-group.com and please provide the following information:

- Delivery and Invoice address
- Purchaser contact telephone number
- End user name and telephone number (if different)
- Purchase order number
- Product name and catalogue number
- Quantity and size of products
- Indicate if your account is VAT exempt

Production:

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The development, manufacturing and distribution of Kylt® *In-Vitro* Diagnostica is certified to ISO 9001:2015.

Kylt® is a registered trademark.

For veterinary use only. For *in vitro* use only. Regulatory requirements vary by country, not all of the products described herein may be available in your geographic area.

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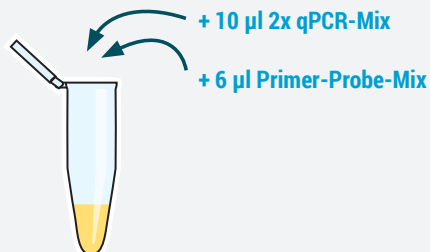


PROTOCOL AT A GLANCE

Real-Time PCR Setup

1

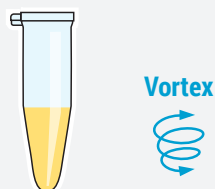
Prepare a Master-Mix*



* please refer to chapter 3

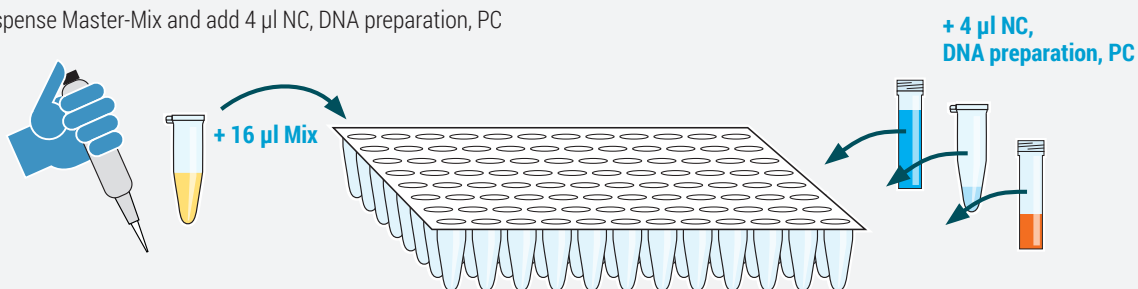
2

Pulse-vortex and spin down



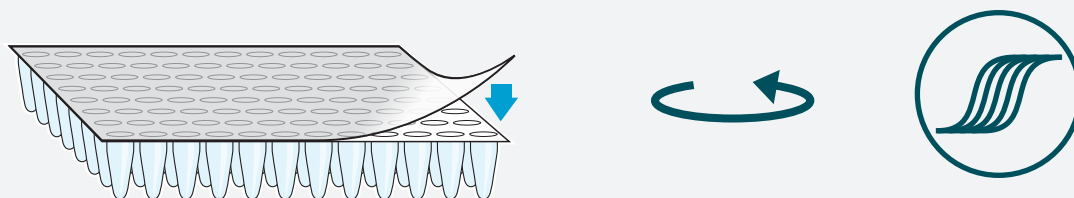
3

Dispense Master-Mix and add 4 µl NC, DNA preparation, PC



4

Seal cavities, spin down (recommended), and start cyclor



5

Analysis

