For *in vitro* Veterinary Diagnostics only.

Kylt®

Kylt® Standard for *Lawsonia intracellularis*

Quantitative Standard for Real-Time PCR Detection

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A. General

- Kylt® Standard for *Lawsonia intracellularis* is used for quantification of *Lawsonia intracellularis* positive samples by Real-Time PCR.
- Kylt® Standard for *Lawsonia intracellularis* comprises a set of reference controls solely for the purpose of quantification of bacterial DNA of *Lawsonia intracellularis*. These controls are to be combined with the Kylt® PIA (*Lawsonia intracellularis*) Real-Time PCR Detection products, for further information please refer to the respective Direction For Use.
- For a quantitative application the sample of interest is analyzed in a PCR run including the set of seven Quantitative Standards; this set consist of a dilution series with defined Genome Equivalents (GE)/µl. The generated standard curve is then used to determine the concentration of *Lawsonia intracellularis* in the sample (GE/ml or g).
- This kit was developed for use by trained laboratory personnel following standardized procedures. This Direction For Use must be followed strictly.

B. Reagents and Materials

- Kylt® Standard for *Lawsonia intracellularis* contains the following reagents:

Reagent	Concentration (GE = Genome Equivalent)	Quantity in Kit (10 assays)	Reconstitution	Store at
Quantitative Standard 1	1x 10^6 GE/µl	each Quantitative Standard 1 x lyophilizate (final 50 µl)	add 50 µl of Negative Control	≤ -18 °C
Quantitative Standard 2	1x 10^5 GE/µl			
Quantitative Standard 3	1x 10^4 GE/µl			
Quantitative Standard 4	1x 10^3 GE/µl			
Quantitative Standard 5	1x 10^2 GE/µl			
Quantitative Standard 6	1x 10^1 GE/µl			
Negative Control	-	1 x 1 ml	-	≤ -18 °C

- The Quantitative Standards are stored at ≤ -18 °C. Avoid repeated freezing and thawing of the components.
- Before the first use the lyophilized Quantitative Standards are rehydrated: 50 µl of the Negative Control (Nuclease-free water) are added per vial of Quantitative Standard, briefly incubated at room temperature and mixed thoroughly by repeated vortexing. Make sure that the pellet is completely solved; insufficient rehydration and/or mixing will lead to an invalid standard curve derived from the Quantitative Standards (see also chapter C.3 "Data Analysis").
- This Quantitative Standard is to be used together with Kylt® PIA (*Lawsonia intracellularis*) Real-Time PCR Detection products and can be used on all commercially available Real-Time PCR thermal cyclers that detect the emitted fluorescence of the fluorescent dyes Cy5 (emission 670 nm) and HEX (emission 550 nm).
- Apart from the disposables, the following further devices are needed:
  - Kylt® PIA (*Lawsonia intracellularis*) Real-Time PCR Detection
  - Table top microcentrifuge
  - Vortex
  - Micropipettes covering volumes of 1 µl to 1000 µl
  - Centrifuge for PCR tubes or plates
  - Real-Time PCR thermal cycler
- Accessory Kylt® products: see chapter D "Related and Accessory Products".
- We recommend the exclusive use of certified Nuclease-free disposables as well as powder-free protective glove. Please wear gloves during the entire experimental procedure. Gloves need to be changed frequently, especially after spillage or suspected contaminations.

C. Protocol

- The overall protocol for Quantification of *Lawsonia intracellularis* consists of the following steps:

1. Sample Processing and DNA Preparation
2. Reaction Setup and Amplification (Real-Time PCR)
3. Data Analysis - Validity and Quantitative Result

1. Sample Processing and DNA Preparation

- For Quantification of *Lawsonia intracellularis* from feces samples we recommend to grind 200 mg of feces sample in 1 ml of sterile 0.9 % sodium chloride solution, spin it down briefly and use the whole supernatant for DNA/RNA preparation. By this, the concentration of *Lawsonia intracellularis* (in GE/ml) in the supernatant roughly correlates to the concentration of *Lawsonia intracellularis* in 200 mg of ground feces sample.
- If other sample matrices or volumes are used for initial sample preparation, take respective dilution factors into consideration when calculating the concentration.
- For quantitative applications pooling of samples is not recommended.
- Ground samples may be processed with appropriate DNA preparation kits, such as Kylt® RNA/DNA Purification products (please refer to chapter B. "Reagents and Materials") or appropriate in-house methods.
- For detailed information on the DNA preparation process, please refer to the Direction For Use or Standard Operating Procedure of the respective DNA preparation kit or in-house method, respectively, and to the Direction For Use of Kylt® PIA (*Lawsonia intracellularis)* Real-Time PCR Detection Kit.

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

- Follow the Direction For Use of the Kylt® PIA (*Lawsonia intracellularis)* Real-Time PCR Detection and add the reactions for all six Quantitative Standards for *Lawsonia intracellularis* to the assay.
- To minimize risk of potential cross-contaminations, 4 µl of each Quantitative Standard 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 Quantitative Standards (see also chapter B "Reagents and Materials").
- Avoid formation of bubbles when pipetting Reaction-Mix, samples, Controls and Standards. It is recommended to always centrifuge cavities before the 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 Cy5 and HEX		

4. Data Analysis – Validity and Quantitative 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 Cy5-curve and the HEX-curve in the linear increase of their slope (log scaling of the y-axis). By setting the threshold, the crossing points with the - 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.
- If available, use specific quantitation tool in the software of your Real-Time PCR thermal cycler and define concentration of applied Quantitation Standard 1 to 6 as given in tabella in chapter B "Reagents and Materials". By this, regression analysis, i.e. quantitation of GE/ µl of sample, can automatically be conducted.

Test Evaluation

- Based on the PCR-derived data the concentration of *Lawsonia intracellularis* in the initial sample material can be calculated with the following formula:
  - GE/ml = PCR quantification (GE/µl) * [EV(µl)/SV(µl)] * 1000

    GE = genome equivalents
    EV = elution volume in µl
    SV = sample volume used for DNA preparation in µl
- To correlate the GE/ml to the GE/g feces take into consideration potential dilution factors during the sample preparation process.

D. Related and Accessory Products

Product	Article No	Reactions	Description
Kylt® PIA (*Lawsonia intracellularis)*	31213 / 31214	100 / 25	Real-Time PCR detection of *Lawsonia intracellularis*
Kylt® RNA / DNA Purification	31314 / 31315	250 / 50	Combined RNA and DNA purification from veterinary samples
Kylt® RNA / DNA Purification HTP	31826	4x96	Combined, magnetic beads-based purification of RNA and DNA from veterinary samples, suitable for automated high throughput processing

Production:

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

Management System ISO 9001:2015
TÜVRheinland CERTIFIED
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