



## Collection & Preservation of Saliva, Swabs and Stool

High quality samples for excellent results

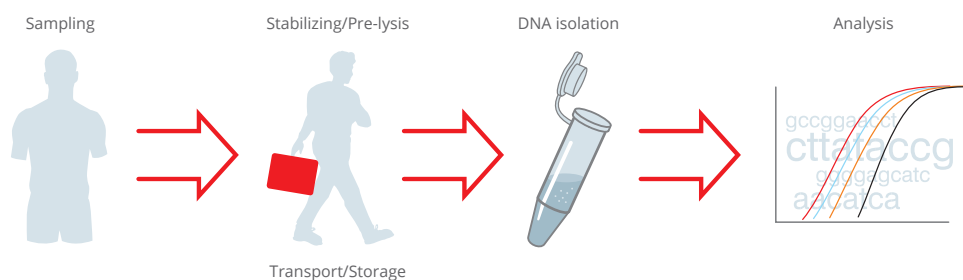
**INVITEK**  
Molecular

# Non-invasive collection of DNA samples

The number of high-throughput studies in which DNA from many individuals is analysed is rapidly increasing. Non-invasive methods and techniques that allow self-collection are often preferred because they increase compliance rates and reduce costs. In addition, they can be used by untrained study participants, including children and the elderly.

A major challenge for genetic testing and microbiome studies is the complexity of samples with a broad spectrum of bacteria and other microorganisms like fungi present in saliva or stool samples. Validated methods for sample transport and storage in combination with sound extraction procedures generate reliable results and avoid bias.

Invitek Molecular offers products for stool, saliva and swab sample collection, stabilization and transport as well as DNA extraction kits for manual and automated use. All products can be customized to your requirements for studies, projects, or OEM purposes according to your special needs.



Samples can be taken at home or in a lab surrounding under medical supervision. Sample stabilization and pre-lysis of cells and bacteria allow transport and storage at room temperature until DNA is isolated and used for analysis like qPCR or NGS.

## Advantages of collectors with sample stabilization

- ✓ **Practical and cost saving:** Long-term sample storage at room temperature, eliminate costs for temperature-controlled shipping
- ✓ **Suitable for everyone:** Easy, intuitive self-collection, no special training required
- ✓ **Reliable results:** Minimize bias introduced by microbial growth after sampling, no DNA degradation
- ✓ **High compliance:** non-invasive sampling, reduce puncture-associated infection risks
- ✓ **Flexible extraction methods:** Integrate seamlessly with the Invitek Molecular isolation kits

# Stool samples

With the Stool Collection Tubes Invitek Molecular offers a versatile tool for microbiome analysis. The product has already become popular with many studies for classical microbiome characterization of bacteria [1,2] and fungi [3], as well as in research on microbiome-associated diseases, nutrigenomics [4] and veterinary studies [5]. The main applications for Invitek Molecular stool products are qPCR, 16S rRNA sequencing or Shotgun Metagenomics. Optionally the product can be combined with a faeces catcher.

## Stool Collection Tubes with DNA Stabilizer



**Practical and accurate:** rapid homogenization and stabilization at the point-of-collection, reduction of foul odours

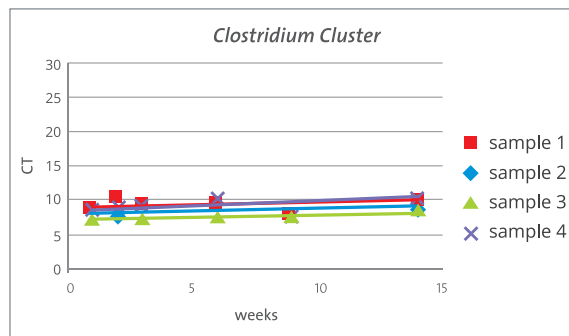
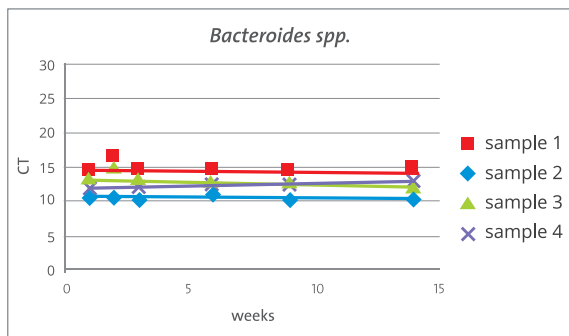
**Long term stability of samples:** transport and storage of stabilized DNA at ambient temperature for up to 3 months, no cooling required

**Traceability:** unique barcodes on each sample

**Reliable:**  $\alpha$ -diversity comparable to direct freezing of samples [1,2]

## Long term stability of DNA in stool samples

Samples were collected with the Stool Collection Tubes with DNA Stabilizer, stored at room temperature, and extracted with the PSP® Spin Stool DNA Basic Kit at several time points with a maximum time period of up to 105 days. The qPCR assay, specific for common gut bacteria, proves the preservation of DNA in all stool samples throughout the long term study.



Samples were taken using Stool DNA Collection Tubes with DNA Stabilizer on day 1, 2, 7, 18, 49 and day 105 from 4 candidates. For DNA isolation Invitek Molecular's PSP® Spin Stool DNA Kit was used. 2  $\mu$ l of each eluate was used for real-time PCR (RIDA®GENE Gut Balance real time PCR assay, R-Biopharm).

# Saliva & swab samples

With different options for saliva sampling as well as swabs, Invitex Molecular offers a sound portfolio for use in a variety of genetic testing [6,7], pharmacogenomic applications or oral microbiome studies [8]. DNA isolated from saliva and swabs is suitable for a broad range of applications like standard PCR methods, SNP genotyping, Whole Exome Sequencing, Whole Genome Sequencing, Next Generation Sequencing and arrays.

## SalivaGene Collector



**Highest safety with patented lyophilized stabilizing buffer:** simply give the sample in the collection tube up to the mark. The stabilization buffer dissolves due to the moisture of the sample, no leakage, spillage or danger of misuse

**Easy to use:** special funnel for intuitive and convenient sampling, non-invasive sampling

**Long term stability of samples:** transport and storage of stabilized DNA at ambient temperature for up to 1 year, no cooling required

**Traceability:** unique barcodes on each sample

## SalivaGene Collection Module II



**Convenient system with liquid stabilizing buffer:** simply give the sample in the collection tube up to the mark. Then add the liquid stabilization buffer

**Long term stability of samples:** transport and storage of stabilized DNA at ambient temperature for up to 1 year, no cooling required

**Economic:** cost-effective and simple version for saliva sample collection

## SalivaGene Swab Comfort



**Easy sampling:** after taking the sample, place the swab in the tube with buffer and break off the rod at the predetermined breaking point, close the tube

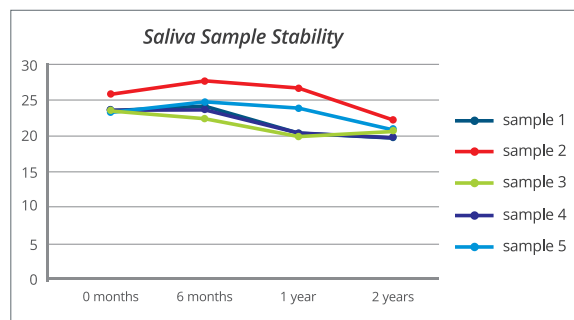
**Convenient removal of the swab:** the swab tip is screwed into the lid and can be easily removed from the liquid stabilization buffer

**Stability of samples:** transport and storage of stabilized DNA at ambient temperature for up to 6 months, no cooling required

**Traceability:** unique barcodes on each sample

## Long term stability of DNA in saliva samples

Samples were collected with the SalivaGene Collector, stored at room temperature, and extracted with the PSP® Spin SalivaGene DNA Kit over a time period of up to 2 years. The PCR assay proves the preservation of DNA in all saliva samples throughout the long term study.



Saliva was collected from 5 different human candidates with the Saliva Gene Collector. 500 µl of the preserved sample were extracted on day 1, after 6 months, 1 year and 2 years with the PSP® Spin SalivaGene DNA Kit. 2.5 µl of the isolated DNA were used for qPCR, specific for a single copy pseudogene of the human genome (GS), inhouse PCR.

## References

- [1] Comparison of DNA stabilizers and storage conditions on preserving fecal microbiota profiles. Chen et.al., JFMA 2020, Volume 119, Issue 12
- [2] Interpersonal Variations in Gut Microbiota Profiles Supersedes the Effects of Differing Fecal Storage Conditions. Bundgaard-Nielsen et. al. Sci Rep 2019, 8, 17367
- [3] DNA extraction and amplicon production strategies deeply influence the outcome of gut mycobiome studies. Alessandra Frau et.al. Sci Rep. 2019, 9, 9328
- [4] Effects of a diet based on inulin-rich vegetables on gut health and nutritional behavior in healthy humans. Hiel S, et al. Am J Clin Nutr. 2019;109(6):1683-1695
- [5] Effect of oral administration of omeprazole on the microbiota of the gastric glandular mucosa and feces of healthy horses. Cerri S. et.al. J Vet Intern Med. 2020 Nov;34(6):2727-2737
- [6] Genetic predisposition to salt-sensitive normotension and its effects on salt taste perception and intake. Pillic L, Mavrommatis Y. Br J Nutr. 2018 Oct;120(7):721-731
- [7] Oral mucosa and lung cancer: Are genetic changes in the oral epithelium associated with lung cancer? Kömerik et.al. Niger J Clin Pract. 2017 Jan;20(1):12-18
- [8] Dysbiosis of the Human Oral Microbiome During the Menstrual Cycle and Vulnerability to the External Exposures of Smoking and Dietary Sugar. Bostanci et.al. 2021, Front Cell Infect Microbiol. 2021 Mar 19;11:625229

# Ordering Information

## Collection modules

Product name	Package size	Catalogue number
Stool DNA Stabilizer	180 ml	1038111100
Stool Collection Tubes with DNA Stabilizer	50 tubes 250 tubes	1038111200 1038111300
SalivaGene Collector	50 pieces	1035211200
SalivaGene Collection Module II	50 container	1035212200
SalivaGene Swab Comfort	50 pieces 300 pieces	1035231100


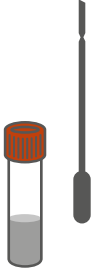
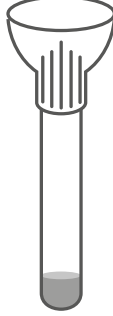



## Extraction kits

Product name	Extraction procedure	Package size	Catalogue number
<b>For stool samples</b>			
PSP® Spin Stool DNA Basic Kit	Manual spin format	50 preps 250 preps	1038120200 1038120300
InviMag® Stool DNA Kit/ KF96	Automated with magnetic beads	5x96 preps	7438300200
<b>For saliva &amp; swab samples</b>			
PSP® Spin SalivaGene DNA Kit	Manual spin format	50 preps 250 preps	1035200200 1035200300
PSP® SalivaGene DNA HTS 96 Kit/ C	96 well filter plate	4x96 preps 24x96 preps	7035360300 7035360400
InviMag® SalivaGene DNA Kit/ KF96 w/o plastic	Automated with magnetic beads	5x96 preps	7435060250
<b>For swab samples</b>			
Invisorb® DNA Swab HTS 96 Kit/ STARlet	Automated with 96 well filter plate	4x96 preps 24x96 preps	7135330300 7135330400

(C: Centrifuge KF: KingFisher Flex, Hamilton STARlet)

# Overview

	Stool Collection Tube	SalivaGene Swab Comfort	SalivaGene Collector	SalivaGene Collection Module II
				
Sample type	Stool	Oral swab	Saliva	Saliva
Volume of stabilizing agent	8 ml	650 µl	150 mg (lyophilized buffer)	2 ml
Sample volume	1 spoon / 1 g	swab	2 ml	2 ml
DNA yield/sample (using Invitek Molecular extraction kits)	up to 285 µg	up to 2 µg	20 – 400 µg*	10 – 200 µg*
DNA yield/extraction (using Invitek Molecular extraction kits)	up to 50 µg	up to 1 µg	up to 10 µg	up to 10 µg
Sample stability at RT	3 months	6 months	12 months	12 months
Shelf life	18 months	12 months	12 months	12 months
Barcode	yes	yes	yes	no
CE-IVD	no	yes	yes	yes

\*) The amount of DNA in saliva samples can naturally vary greatly among different individuals.

For manual and automated DNA purification from the stabilized samples Invitek Molecular offers various extraction kits in spin format or in 96-well format. Our collection and isolation systems guarantee an excellent performance in several downstream applications such as qPCR and NGS. Please refer to the ordering information for extraction kits (see page 5).



Compliance with EU Directive 98/79/EC on in vitro medical devices.  
Not for in-vitro diagnostic use in countries where the EU Directive 98/79/EC on  
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1D10/08/2021

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