

Real-time PCR beer screening

for a quick and GEN-IAL® result



For yeast propagation, in-process control and/or for online final product control



Reduce the risk of spoilage and avoid product recalls



Open system

More information:

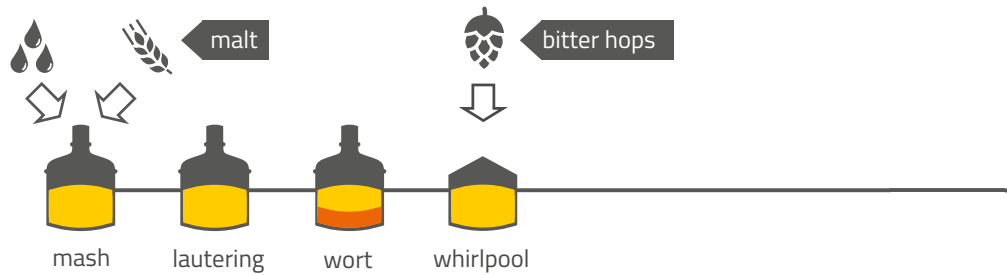


<https://r-b.io/beer>

Potential sources of microbiological spoilage in beer brewing

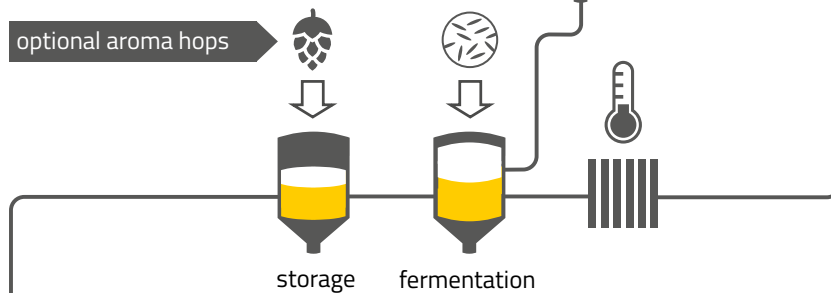
Potential sources of primary contamination

Brewing water:
e.g. *Enterobacteriaceae*



Yeast slurry: contamination with
e.g. *Lactobacillus*, non cultured yeast
as e.g. *S. diastaticus*

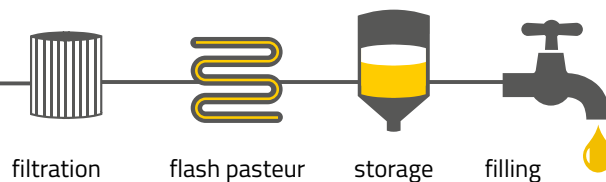
optional aroma hops



Potential sources of secondary contamination

After filtration: main sources for
detection of different beer spoilers

Filling station: e.g.
S. diastaticus



The GEN-IAL kits enable the detection and identification of beer spoilage bacteria and yeast in various sample types including in-process and final product samples.

Product: final quality product control, bacteria /yeast



Faster and more sensitive results with real-time PCR – customize your routine analysis

Either extremely fast or maximal sensitive detection or specific identification is possible by combining different methods of sample preparation and detection with real-time PCR.

Approaches for microbiological analysis in beer

Time requirement: ~ 2 hrs

Centrifugation and qPCR

- For in-process controls (yeast-containing samples and filtrate)
- Kit for detection of bacteria and (wild) yeast in yeast containing samples (yeast propagation or fermentation tank)



- Extremely fast
- Screening and/or identification
- Only two hours to result

- Volume maximum 30 mL
- Sensitivity 10 - 100 cfu/30 mL (without enrichment)
- High sensitivity with enrichment

Time requirement: ~ 2 hrs

Filtration and qPCR

- Fast screening approach for specific applications



- Extremely fast
- Screening and/or identification
- Only two hours to result

- Volume maximum 1 L (depending on sample type)
- Sensitivity approx. 100 cfus

Time requirement: ~ 50 hrs

Enrichment and qPCR

- Pre-enrichment and qPCR: minimum 2 days and 2 hours from sample to result
- Modern established approach for beverage analytic



- Fast
- Screening and/or identification
- Ensure absence of **low cfu/sample volume**




Precoated PCR strips – a unique solution for convenient handling

Different combinations of screening and identification possibilities are available, thus allowing a cost effective and customized routine analysis.

The QuickGEN kits contain 8-well strips which are precoated with the reagents for up to 4 different parameters per tube. Each tube of a 8-well strip may contain different parameters: this allows a multiplex panel for up to 4 x 8 parameters for one sample in a 8-well strip.

Templates are available for MyGo Pro and BioRad CFX 96. These prepared templates contain the settings for dedicated kits and allow a direct start of the real-time PCR without the need to program the settings:

- 1 Open the template of dedicated kit/parameter
- 2 Add the sample names
- 3 Start run

		
High	Low	White
<ul style="list-style-type: none"> • Agilent MX3005P • Applied Bioscience ABI 7500 or higher • ThermoFisher QuantStudio®5 or higher 	<ul style="list-style-type: none"> • IT-IS MyGo Pro, MyGo ESR* • ABI 7500 FAST or higher 	<ul style="list-style-type: none"> • Roche Lightcycler® 480 II • BioRad CFX Opus 96™ and CFX 96™ • Analytik Jena qTOWER³
Qxy1	Qxy2	Qxy3

* 4plex assays for MyGo Pro and ESR requires a specific kit (Qxy4, e.g. Q024, Q044).

1. Group specific screening

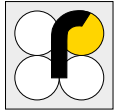
An initial screening gives a group specific answer of for example yeast and bacteria in one assay. Different group specific screening combinations are available:

	FAM	HEX	ROX	Cy5	Art. No.
3plex	Lactobacillus/ Pediococcus	Megasphaera/ Pectinatus	–	Internal Amplification Control, IAC	Q03z kits
4plex	Lactobacillus/ Pediococcus	Megasphaera/ Pectinatus	1) Yeast 2) <i>S. diastaticus</i> 3) <i>Dekkera</i> spp.	Internal Amplification Control, IAC	1) Q02z kits 2) Q04z kits 3) Q09z kits

2. Screening and differentiation in one assay

The most relevant beer spoilage bacteria and yeast can be identified in one assay for example with kit Q081 - Q083. 12 strips of 8 wells allows for the detection of the most relevant spoilage organisms for 12 samples in one assay.

Tube	FAM	HEX	ROX
1	NTC	NTC	IAC
2	Enterobacteriaceae	<i>P. anomala</i>	<i>Saccharomyces cerevisiae</i> var. <i>diastaticus</i>
3	<i>P. damnosus</i>	<i>P. acidilactici/pentosaceus/parvulus/inopinatus</i>	<i>P. clausenii</i>
4	Pectinatus spp.	Megasphaera spp.	<i>L. rossiae</i>
5	<i>L. brevis/L.parabrevis/L.brevisimilis</i>	<i>L. lindneri</i>	<i>L. casei/L.paracasei</i>
6	<i>L. buchneri/L. parabuchneri</i>	<i>L. collinoides/L. paracollinoides</i>	<i>L. perolens/L. harbinensis</i>
7	<i>L. plantarum/L. paraplantarum</i>	<i>L. coryniformis</i>	IAC
8	<i>L. acetotolerans</i>	<i>L. backii</i>	PTC



Detection of bacteria and yeasts: the kit Q571-Q573 allows the detection of bacteria and wild yeast screening in **yeast containing samples**.

Tube	Sample	FAM	HEX	ROX
1	NTC	–	–	IAC
2	PTC	Positive Control	–	–
3	1	Lactobacillus/ Pediococcus	Megasphaera/ Pectinatus	Acetic acid bacteria
4	1	–	Wild yeast 1*	IAC
5	1	–	Wild yeast 2*	–
6	2	Lactobacillus/ Pediococcus	Megasphaera/ Pectinatus	Acetic acid bacteria
7	2	–	Wild yeast 1*	IAC
8	2	–	Wild yeast 2*	–

Detection of bacteria and yeasts: the kit Q071-Q073 allows the detection of bacteria and wild yeast screening for **filtered samples**.

Tube	Sample	FAM	HEX	ROX
1	NTC	–	–	IAC
2	PTC	Positive Control	–	–
3	1	Entero- bacteriaceae	Lactobacillus/ Pediococcus	Pediococcus
4	1	Wild yeast 1*	Bottom ferment- ed yeast	IAC
5	1	Wild yeast 2*	Top fermented yeast	Acetic acid bacteria
6	2	Entero- bacteriaceae	Lactobacillus/ Pediococcus	Pediococcus
7	2	Wild yeast 1*	Bottom ferment- ed yeast	IAC
8	2	Wild yeast 2*	Top fermented yeast	Acetic acid bacteria

3. Detection and identification of yeast or bacteria only

Several kits are available for the detection of specific bacteria or yeast only. The kit Q541-Q543 allow the identification of 12 yeast species per sample. 12 samples can be tested per kit (12 strips).

Tube	FAM	HEX
1	NTC	IAC
2	Rhodotorula spp.	<i>Saccharomyces exiguus</i>
3	Candida spp.	<i>Saccharomyces cerevisiae</i> var. <i>diastaticus</i>
4	<i>Saccharomycodes ludwigii</i>	<i>Debaromyces hansenii</i>
5	<i>Torulaspota delbrückii</i>	<i>Saccharomyces bayanus/pastorianus</i>
6	<i>Kluyveromyces marxianus</i>	Hanseniaspora spp.
7	Dekkera spp.	IAC
8	Pichia spp.	PTC

* **Wild yeast 1:** *Dekkera anomala*, *Dekkera bruxellensis*, *Dekkera custersiana*, *Dekkera naardenensis*, *Debaromyces hansenii*, *Hanseniaspora guillemontii*, *Hanseniaspora osmophila*, *Hanseniaspora uvarum*, *Issotchenkia orientalis*, *Kazachstania Exigua*, *Kluyveromyces marxianus*, *Metschnikowia pulcherrina*, *Pichia anomala*, *Pichia fermentans*, *Pichia membranaefaciens*, *Saccharomyces cerevisiae* var. *diastaticus*, *Saccharomycodes ludwigii*, *Torulaspota delbrückii*

* **Wild yeast 2:** *Candida glabrata*, *Candida albicans*, *Candida kefyr*, *Candida intermedia*, *Candida parapsilosis*, *Candida sake*, *Candida tropicalis*, *Naumovozyma dairenensis*, *Pichia guillemontii*, *Zygosaccharomyces bailii*, *Zygosaccharomyces rouxii*

The kit Q201-203 allows the **identification and differentiation of bacteria** that are usually classified as beer spoilage bacteria. Other relevant but often not directly as spoilage classified Lactobacillus bacteria are not included in this screening.

Tube	Sample	FAM	HEX	ROX
1	NTC	Negative Control	–	IAC
2	PTC	Positive Control	–	–
3	1	<i>L. rossiae</i>	<i>L. backii</i>	IAC
4	1	<i>L. brevis/ parabrevis/ brevismillis</i>	<i>L. lindneri</i>	<i>L. casei/paracasei</i>
5	1	Pediococcus spp.	Lactobacillus spp.	Megasphaera/ Pectinatus
6	2	<i>L. rossiae</i>	<i>L. backii</i>	IAC
7	2	<i>L. brevis/ parabrevis/ brevismillis</i>	<i>L. lindneri</i>	<i>L. casei/paracasei</i>
8	2	Pediococcus spp.	Lactobacillus spp.	Megasphaera/ Pectinatus

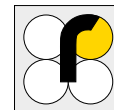
* **Pediococcus spp.:** *P. damnosus*, *P. clausenii*, *P. acidilactici*, *P. pentosaceus*, *P. parvulus*, *P. inopinatus*

* **Lactobacillus spp.:** *L. collinoides / paracollinoides*, *L. coryniformis*, *L. plantarum/paraplantarum*, *L. perplens/harbinesis*, *L. acetolarans*, *L. buchneri/parabuchneri*

GEN-IAL® – products for beer analysis

Product	Description	No. of tests	Art. No.
Beer			
DNA preparation			
GEN-IAL® Simplex® Easy DNA kit *	DNA preparation of beverage samples	100 preparations	Q001
GEN-IAL® QuickGEN Sample preparation filtration	DNA preparation of beverage samples, filtration	100 preparations	Q004
GEN-IAL® QuickGEN Sample preparation centrifugation	DNA preparation of beverage samples, centrifugation	100 preparations	Q002
GEN-IAL® QuickGEN Sample preparation in yeast	For beverage samples mainly containing yeast	100 preparations	Q005
Automatic Magnetic DNA Extraction Kit	Automated extraction of bacteria- and yeast-DNA	50 preparations	Q007
Beer – bacteria & yeast			
Qualitative multiplex real-time PCR			
GEN-IAL® QuickGEN First-Beer Differentiation PCR Kit	Multiplex detection (30 species) and identification (19 species) of relevant beer spoilers See table page 4/5	96 reactions/12 samples	Q081 Q082 Q083
GEN-IAL® QuickGEN First-Beer Differentiation PCR Kit Screen, identification of spoilage bacteria	Multiplex detection of classified relevant beer spoilage bacteria See table page 4/5	96 reactions/24 samples	Q201 Q202 Q203 New
GEN-IAL® QuickGEN First-Beer yeast and bacteria differentiation	Multiplex detection and identification of beverage spoiling bacteria and yeasts See table page 4/5	96 reactions/24 samples	Q071 Q072 Q073
GEN-IAL® QuickGEN First-Beer yeast and bacteria differentiation for yeast containing samples	Multiplex detection and identification of beverage spoiling bacteria and yeasts See table, page 4/5	96 reactions/24 samples	Q571 Q572 Q573
GEN-IAL® QuickGEN P1 Screening of bacteria and yeast	DNA screening and differentiation of beer spoiling bacteria and yeasts (Lactobacillus, Pediococcus/Megasphaera, Pectinatus)	48 reactions	Q021 Q022 Q023 Q024
	DNA screening and differentiation of beer spoiling bacteria and yeasts (Lactobacillus, Pediococcus/Megasphaera, Pectinatus/yeast)	50 reactions	Q025
GEN-IAL® QuickGEN P1 Screening of bacteria and <i>S. diastaticus</i>	DNA screening and differentiation of beer spoiling bacteria and <i>Saccharomyces cerevisiae</i> var. <i>diastaticus</i>	48 reactions	Q041 Q042 Q043 Q044
	DNA screening and differentiation of beer spoiling bacteria and <i>Saccharomyces cerevisiae</i> var. <i>diastaticus</i>	50 reactions	Q045
GEN-IAL® QuickGEN P1 Screening of bacteria and <i>Dekkera</i> spp.	DNA screening and differentiation of beer spoiling bacteria and yeasts (Lactobacillus, Pediococcus/Megasphaera, Pectinatus/ <i>Dekkera</i> spp.)	48 reactions	Q091 Q092 Q093 Q094
GEN-IAL® QuickGEN* First-Biofilm	DNA detection of <i>Lactococcus lactis</i> , <i>Leuconostoc mesenteroides</i> and <i>Pichia anomala</i>	50 reactions	Q095
Beer – bacteria			
Qualitative real-time PCR			
GEN-IAL® QuickGEN P1 Screening of bacteria without yeast	DNA screening and differentiation of beer spoiling bacteria (Lactobacillus, Pediococcus/Megasphaera, Pectinatus)	48 reactions	Q031 Q032 Q033 Q034
GEN-IAL® QuickGEN P1 Screening of bacteria and Hop resistance	DNA screening and differentiation of beer spoiling bacteria and hop resistance genes <i>horA</i> / <i>horC</i>	48 reactions	Q051 Q052 Q053 Q054
GEN-IAL® QuickGEN Pectinatus spp./Megasphaera spp.	DNA detection and differentiation of Pectinatus and Megasphaera	50 reactions	Q927
GEN-IAL® QuickGEN Pectinatus spp./Megasphaera spp.	DNA detection and differentiation of Pectinatus and Megasphaera	48 reactions	Q112
GEN-IAL® QuickGEN Enterobacteriaceae	DNA detection of Enterobacteriaceae	50 reactions	Q145
GEN-IAL® QuickGEN Acetic acid bacteria	DNA detection of acetic acid bacteria	48 reactions	Q511 Q512 Q513 Q514





Product	Description	No. of tests	Art. No.
Beer – resistance genes			
Qualitative real-time PCR			
GEN-IAL® QuickGEN hop resistance genes hor A and hor C/hit A and orf5	DNA detection of hop resistance genes	50 reactions	Q105
Beer – yeast			
Qualitative real-time PCR			
GEN-IAL® QuickGEN First-Yeast PCR Kit Wild Yeast 1	DNA screening and differentiation of wild yeast 1	50 reactions	Q525
GEN-IAL® QuickGEN Yeast PCR Kit	DNA Detection of detection of <i>S. cerevisiae</i> var. <i>diastaticus</i> and Dekkera spp. in beverages	48 reactions	Q213
GEN-IAL® QuickGEN First-Yeast PCR Kit Wild Yeast 2	DNA screening and differentiation of wild yeast 2	50 reactions	Q535
GEN-IAL® QuickGEN First-Yeast differentiation PCR Kit	DNA screening and differentiation of 12 yeasts	96 reactions/ 12 samples	Q541 Q542 Q543
GEN-IAL® QuickGEN® Yeast Dekkera bruxellensis	DNA detection of <i>Dekkera bruxellensis</i>	48 reactions	Q371 Q372 Q373
GEN-IAL® <i>Pichia anomala</i> *	DNA detection of <i>Pichia anomala</i> (<i>Wickerhamomyces anomalus</i>)	50 reactions	Q175
GEN-IAL® <i>Saccharomyces diastaticus</i> *	DNA detection of <i>Saccharomyces cerevisiae</i> var. <i>diastaticus</i>	50 reactions	Q934
GEN-IAL® Bottom fermented yeast*	DNA detection of bottom fermented yeast	50 reactions	Q933
GEN-IAL® QuickGEN Bottom fermented yeast	DNA detection of bottom fermented yeast	48 reactions	Q161 Q162 Q163
GEN-IAL® Top fermented yeast*	DNA detection of top fermented yeast	50 reactions	Q931
GEN-IAL® QuickGEN Top fermented yeast	DNA detection of top fermented yeast	48 reactions	Q151 Q152 Q153
GEN-IAL® QuickGEN Yeast <i>Zygosaccharomyces bailii</i>	DNA detection of <i>Zygosaccharomyces bailii</i>	48 reactions	Q561 Q562 Q563
GEN-IAL® accessories			
Real-time PCR			
GEN-IAL® <i>Dekkera bruxellensis</i> Standards	DNA standards for <i>Dekkera bruxellensis</i> quantification	200.000 cfu	Q360
Color Compensation Kit LightCycler® 480	Color compensation kit for multiplex assays	5 reactions	Q800
Washing solution	Washing solution for Q300	43 ml	Q301

Wild yeast 1: *Dekkera anomala*, *Dekkera bruxellensis*, *Dekkera custersiana*, *Dekkera naardenensis*, *Debaromyces hansenii*, *Hanseniaspora guilliermondii*, *Hanseniaspora osmophila*, *Hanseniaspora uvarum*, *Issotchenkia orientalis*, *Kazachstania Exigua*, *Kluyveromyces marxianus*, *Metschnikowia pulcherrina*, *Pichia anomala*, *Pichia fermentans*, *Pichia membranaefaciens*, *Saccharomyces cerevisiae* var. *diastaticus*, *Saccharomyces ludwigii*, *Torulaspora delbrückii*

Wild yeast 2: *Candida glabrata*, *Candida albicans*, *Candida kefyr*, *Candida intermedia*, *Candida parapsilosis*, *Candida sake*, *Candida tropicalis*, *Naumovozyma dairenensis*, *Pichia guilliermondii*, *Zygosaccharomyces bailii*, *Zygosaccharomyces rouxii*

* Please be aware, for non-QuickGEN detection kits, the DNA preparation kit Q001 must be used, not Q002-Q005.



Benefits

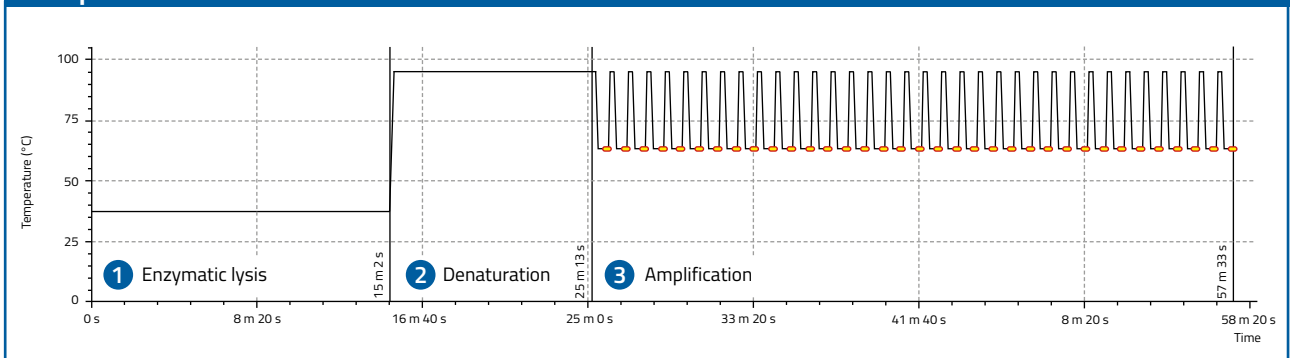
+ DNA Extraction – easy one-step DNA lysis method

- One DNA extraction method for the detection of bacteria and yeast
- The yeast lysis is integrated in the qPCR reaction - no external mechanical disruptor, ultrasonic bath or heating block is required.
- Reduced handling errors

+ Real-time PCR assays

- Ready to use consumables – tube stripes pre-coated with lyticase, primer and probes (depending on the thermocycler, different versions of kits are available, further information is available on request)
- Simultaneous detection of the most relevant beer spoiling bacteria and yeast in one assay

Temperature Profile



Contact your R-Biopharm sales representative for more information.