

Beer is quite restrictive to bacterial growth due to its characteristics (low pH, ethanol concentration, low oxygen content), but a few bacterial genera, including *Lactobacillus*, *Pediococcus*, *Pectinatus*, and *Megasphaera*, can generate off-flavors, turbidity and acidity. Related bacterial beer spoilage can generate high economic losses and impact brand image.

Furthermore, labor intensive and lengthy investigations after spoilage detection can increase these risks as spoilage can originate from a wide variety of sources throughout the brewing process. These investigations can generate increased losses as higher volume of spoiled product could be produced or production could be interrupted for a long period.

Pall GeneDisc Technologies help industries to reduce these risks by enabling the following:

- Implementation of decision making tests at key control points of the process
- Fast investigations after spoilage detection

GeneDisc System Benefits

Rapid — Pall's GeneDisc method allows a simultaneous detection and identification of beer spoilage bacteria in a few days and direct monitoring or colony identification in 2 hours.

Flexible — Analysis with enrichment ensures high sensitivity (as low as 1 cell/sample) when precise information is the priority. With direct monitoring, contamination assessment is sped up when quick results are required (reduced to 2 hours).

Easy to use — GeneDisc solutions are designed for routine use. Implementing PCR (Polymerase Chain Reaction) has never been this easy.

Modular — Scalable PCR system with 1 to 8 units adapts to evolving testing needs.

A Solution Designed for Breweries

Accelerated decision-making — GeneDisc technology allows for early preventive controls to reduce risk of product spoilage.

Fast corrective actions implementation — Reduce negative financial impact of spoilage with rapid root cause analysis in case of contamination.

Cost-effective and informative method — Lower analytical cost as one single run allows the simultaneous detection and identification of 22 major beer spoilage microorganisms:

- *Lactobacillus brevis*
- *Lactobacillus lindneri*
- *Lactobacillus backii*
- *Lactobacillus acetotolerans*
- *Lactobacillus collinoides* and *L. paracollinoides*
- *Lactobacillus* group: *L. casei*, *L. paracasei*, *L. coryniformis*, *L. rossiae*, *L. parabuchneri* (= *frigidus*), *L. perolens* and *L. plantarum*

GeneDisc® Technologies

For the Rapid Detection and Identification of Beer Spoilage Bacteria



- *Pediococcus* (*P. damnosus*, *P. inopinatus*, *P. clausenii*)
- *Pectinatus* (*P. cerevisiophilus*, *P. frisingensis*, *P. haikarae*, *P. portalensis*)
- *Megasphaera* spp. (*M. cerevisiae*, *M. elsdenii*)

Reliable approach — Our approach is based on the detection of stable genes. GeneDisc method overcomes limitations of resistance genes based methods and can be used for all product types (e.g. radler style beers), with reliable results not influenced by resistance gene variability or by detection of genes not necessarily related to bacteria spoilage ability.

Reliable results — To ensure result accuracy, each sample analysis includes an internal positive control. In addition, results from internal and external studies demonstrated the method was able to accurately detect the presence of beer spoilage bacteria even at low contamination levels in beer samples.

Easy to use — GeneDisc method allows clear beer spoilage bacteria detection and identification from various sample types including in-process and final product samples.

Beer Spoilage Bacteria ID

Bacteria Genus	Description	Can Generate Turbidity	Main Associated Off-flavors
<i>Lactobacillus</i>	Gram + bacilli	Yes	Lactic acids
<i>Pediococcus</i>	Gram + cocci	Yes	Diacetyl
<i>Pectinatus</i>	Firmicutes	Yes	Sulphur compounds (e.g. H ₂ S)
<i>Megasphaera</i>	Firmicutes	Yes	Valeric and isovaleric acids

How the System Works



Technical Information

Enrichment Time	With common broths (<i>e.g.</i> MRS or NBB) – Optional
Sample Preparation Time	< 1 hour for 48 samples with Extraction Pack Food 1
Hands-on Time	About 45 minutes for 48 samples (<1 min/sample)
PCR Cycle Time	< 1 hour
Limit of Detection (with enrichment)	Down to 1 cell/sample before enrichment
Limit of Detection (direct monitoring)	Down to 1 cell/mL
Compatible with	<ul style="list-style-type: none"> Filterable samples (<i>e.g.</i> filled product, water) Unfilterable samples (<i>e.g.</i> green beer, wort, yeast propagation)
Internal Positive Control	Ensure PCR reaction is not affected by the presence of inhibitors for each sample DNA extract

Ordering Information

Part Number	Description	Samples/pack
Equipment		
EGDUL1A230 (EU)	GeneDisc Ultra-Lyser	-
EGDUL1A120 (US)		
EGDCV3A	GeneDisc Cyclor Base Unit	-
EGDSV3A	GeneDisc Cyclor Sub Unit	-
Consumables		
PFOOD1100	Extraction Pack Food 1	100
GBSPOBC306006	GeneDisc Beer Spoilage Bacteria – 6 sample plates	36
GBSPOBC303012	GeneDisc Beer Spoilage Bacteria – 3 sample plates	36

We also offer a full product range for pathogen detection in food and water as well as detection and identification of *Alicyclobacillus* in beverages.

Quantitative tests for pathogens in water (*Legionella*, *E. coli*, *Enterococcus*...) are also available.

For more information including part numbers please contact us.

Further Readings

- Application Bulletin: FBABGDBEEREN, Implement High Value-added Quality Control in Breweries with the GeneDisc System.
- Application Bulletin: FBABGDFILEN, Craft Brewery Preserves Image and Limits Losses with Pall's GeneDisc System and Microbial Filtration
- Poster: Fast and Reliable Detection of Beer Spoilage Bacteria for Routine Analysis – Field Results, Ziehl J. *et al.*, Pall Corporation and BITBURGER BRAUGRUPPE GmbH.
- Poster: Practical Application of qPCR for Monitoring and Improving Brewery Sanitation, Fyfe L. *et al.*, Craft Brew Alliance and Pall Corporation.
- Poster: Performance Evaluation of the GeneDisc Method for Detection of Beer Spoilage Bacteria, Bonilla S. *et al.*, Pall Corporation.
- Poster: Implementation of Real-time PCR to Ensure Bacteria Free Yeast Propagations in a Mid-sized Craft Brewery, Bailey B., Tröegs Brewing Co.



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