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Cell Growth Quantifier (CGQ)

Product Presentation



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The CGQ is a sensor-based technology for non-invasive, online biomass monitoring in shake flasks.

Cell Growth Quantifier (CGQ)





A CGQ system consists of three components: The CGQ sensor, the base station and the DOTS Software.

Hardware & Software Components



The sensors are positioned under the shake flasks and measure the biomass non-invasively.

Base Station



The base station bundles the data from all monitored flasks and sends it to the DOTS Software.

DOTS Software



DOTS Software enables a simplified control of sensors and visualizes the received data from all monitored shake flasks in real-time.



The CGQ implements backscattered light measurement, allowing for optical, non-invasive biomass monitoring in shaken cultures.

Measurement Principle







Use the same sensor for various shake flask sizes with the CGQ – Sensor Adapters.

One Sensor for All Common Shake Flask Sizes



Advantages

- **Maximum flexibility**: The same sensor plate can be used for different shake flask sizes
- Cost savings: If you start using other flask sizes down the road, you only need to invest in adapters and not buy additional sensor plates

CGQ – Sticky Mat / non-INFORS Shakers Adapters and CGQ – Bottle Adapters allow maximum flexibility when choosing a shaker or flask type.

Adapters for Shakers and Flasks



CGQ – Sticky Mat / non-INFORS Shakers Adapter on shaker



CGQ – Sticky Mat / non-INFORS Shakers Adapter on Sticky Mat



Bottle – Adapter for serum bottles or Schott flasks



The CGQ is compatible with all common sizes and kinds of shake flasks (and other vessels) and every common type of shaker.



Compatible Laboratory Infrastructure



The DOTS Software enables easy sensor handling and experiment set up.

Exemplary Screenshots

Create an experiment with pre-defined application templates		Assign sensors to planned experiments via drag and drop		
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The DOTS Software provides a comprehensive overview of your experiments and visualizes your data in real-time.

DOTS Software Modules for Data Visualization



Various organisms like bacteria, archaea, filamentous fungi and yeast have been successfully monitored with the CGQ.

Example Organisms Successfully Monitored with the CGQ technology

Bacteria

- Escherichia coli
- Corynebacterium glutamicum
- Bacillus subtilis
- Pseudomonas putida
- Pseudomonas taiwanensis
- Gluconobacter oxydans
- Lactobacillus plantarum
- Vibrio natriegens
- Vibrio cholerae
- Staphylococcus aureus
- Klebsiella pneumoniae
- Actinobacillus pleuropneumoniae
- Chromobacterium violaceum
- Blautia producta
- Hungtatella hathewayi
- Prevotella copri

Yeast

- Saccharomyces cerevisiae
- Schizosaccharomyces pombe
- Pichia pastoris
- Yarrowia lipolytica
- Kluyveromyces lactis
- Hansenula polymorpha
- Ustilago maydis

Filamentous organisms

- Aspergillus fumigatus
- Aspergillus nidulans
- Aspergillus niger
- Streptomyces acidiscabies
- Streptomyces venezuelae
- Trichoderma reesei

Archaea

- Haloferax volcanii
- Sulfolobus acidocaldarius

Anaerobic organisms

- Acetobacterium woodii
- Clostridium aectobutylicum
- Clostridium ljungdahlii
- Clostridium difficile

Phototrophic organisms

- Chlorella vulgaris
- Scenedesmus obliquus
- Synechococcus elongatus
- Nicotiana tabacum BY-2 (plant cells)

The CGQ technology has already been used in over 30 publications in renowned journals.

Example Publications



1578–1585, https://doi.org/10.1093/jac/dkac078

Published: 10 March 2022 Article history -

metabolomic analysis

Birthe Halmschlag ¹ 🖾, Sastia Prama Putri ² 🖾, Eiichiro Fukusaki ² 🖾, Lars Mathias Blank ¹ 🐣 🖾

The online biomass data generated by the CGQ correlates nicely with offline OD data.

OD & CGQ Measurements (OD Calibrated): Saccharomyces cerevisiae



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The CGQ is ideal for screening experiments in shake flasks such as media optimizations.

CGQ Measurements: Saccharomyces cerevisiae CEN.PK2.-1C Growing on Mixed Carbon Sources



The CGQ is capable of precisely monitoring *Pichia pastoris* cultures in shake flasks.

CGQ Measurements: *Pichia pastoris*





The CGQ is ideal for growth rate comparisons of different organisms, for example *Vibrio natriegens* versus *Escherichia coli*.

CGQ Measurements: Vibrio natriegens and Escherichia coli



The CGQ is capable of precisely monitoring *Corynebacterium* glutamicum cultures in shake flasks.







The CGQ is ideal for quick and easy growth comparisons of different *Pseudomonas putida* cultures.

CGQ Measurements: *Pseudomonas putida* Transformed with Different Plasmids





The CGQ is capable of precisely monitoring *Bacillus subtilis* cultures in shake flasks.

CGQ Measurement: *Bacillus subtilis*





The CGQ is capable of precisely monitoring filamentous *Aspergillus niger* cultures in shake flasks.





The CGQ is the perfect tool for screening experiments with *Aspergillus niger* in shake flasks.

CGQ Measurements: Aspergillus niger N402



The CGQ is fully compatible with all typical anaerobic cultivation vessels such as serum bottles, Schott flasks or anaerobic shake flasks.

CGQ for Anaerobic Cultivation Vessels





The CGQ is capable of precisely monitoring *Acetobacterium woodii* cultures in serum bottles and shows good OD correlation.

CGQ & OD₆₀₀ Measurements: *Acetobacterium woodii* Triplicates





Acetobacterium woodii, 50 mL Acetobacterium Medium (+ Fructose), 100 mL Serum Bottle, 30 °C, 250 rpm



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