

FAQ „CITSens Bio“

1 Which is the advantage to measure Glucose with the „CITSens Bio“ Glucose-sensor?

- Results anytime available -> no time delay
- No additional sampling necessary
- reduced risk of contamination
- no reagents-costs compared to the off-line technology
- immediate recognition of contamination and other process changing
- no adulteration of the sample due to sampling

2 In which industrial sector and for which scope “CITSens Bio” is used?

“CITSens Bio” is the first and only system for online, in situ measurement of Glucose, Lactate and Glutamate in cell cultures.

3 Which cell cultures can be monitored with “CITSens Bio”?

You can monitor with the “CITSens Bio” the growth of all cell lines, which consume Glucose. (e.g.: CHO cells, yeast cells, bacteria cells, etc.)

4 Can the Glucose sensor be used without beamer and ZOMOFI?

No, the sensors are coated with a paste which generates in connection with the Glucose in the medium an electron-stream. This electron-stream will be evaluated by beamer and ZOMOFI on the PC and showed graphically.

5 Will the sensor be delivered sterile?

The sensor is gamma-sterilized and delivered twice packed.

6 Can the sensors be autoclaved?

No, the oxidase would be inactivated by the heat of the autoclave.

7 Which requirements has the PC to fulfill?

- Windows 2000, XP, VISTA, LINUX, MAC
- > 1,5 MHz Processor
- Min. 256 MB RAM

8 What is MySQL, Edgware and GUI needed for?

- MySQL: Data base, Long-term storage of the experiments. Other data bases such as Oracle can be also used
- Edgware: For control and communication with the ZOMOFI
- GUI: Graphical User Interface, for the representation of the data in a graph, calibrating and starting the experiments

9 How many parameters can be measured with one sensor?

For each parameter Glucose, Lactate and Glutamate you need a sensor.

10 How can the sensors be distinguished?

The sensors are marked with color points.

- Glucose black GOD
- Lactate red LOD
- Glutamate blue GluOD

11 How many sensors can be built in one cap (one disposable bioreactor)?

Per cup can be used up to three parameters: Glucose, Lactate, Glutamate

12 What is the required volume of medium to measure Glucose, Glutamate and / or Lactate at least?

It depends on the size of the bioreactor, however so much that the sensor is moistened anytime. Minimum bioreactor volume is 20 ml

13 How specific are the sensors measuring?

- The Glucose sensor is very specific and detects only the β -D-Glucose.
- The Lactate sensor is very specific and detects only L-Lactate.
- The Glutamate sensor is very specific and detects L-Glutamate.

14 Can the media be contaminated by the paste of the sensor?

No, because the paste on the sensor is covered and sealed with a membrane with a pore size of 6 kD which excludes all large molecules from diffusion. The paste never gets into direct contact with the medium and the cells.

15 Which Glucose concentration the most can be measured with the "CITSens Bio" sensor?

The ceiling concentration which can be measured with the "CITSens Bio" Glucose sensor amounts up to 10,8 g/l = 60 mmol/l

16 Are cells growing on the surface of the sensor, and does that have effect on the measuring result?

On the surface of the sensors there are no cells growing and thereby it doesn't have any influence on the measuring results.

17 How long can the sensors be used?

With the "CITSens Bio" sensor you can measure during 21 days the Glucose and Glutamate (Lactate 16 days) on-line, in situ.

18 For how long is the sensor stable?

The sensors are stable during 6 months in the fridge at 5 °C.

19 Must something be considered while connecting the sensors to the beamer?

When connecting the sensors to the beamer, it must be considered, that the smooth side (side with the sticker GoD, LoD or GluoD) of the electrode is laid upwards.

20 Can the same sensor be transferred from one bioreactor to the other?

This is possible, nevertheless, C-CIT AG does not take the responsibility for the sterility of the sensor.

21 Can the measurement be interrupted or stopped by the software?

A running experiment cannot be interrupted. If e.g., a new calibration is required, the experiment must be stopped, re-calibrated and then restarted.

22 How often should the sensor be calibrated?

The sensor should be calibrated after every feed or splitting.

23 How can I figure out whether my sensor is already calibrated?

The "CITSens Bio" software has a status announcement where you can see whether the sensor has already been calibrated.

24 How can I find out, if my sensors are certainly sterile?

Each delivered sensor "built in cup" is twice packed and gamma-sterilized. An indicator which sticks on the external packaging will change the color after sterilizing from brown to red.

25 Why have I to condition the sensor at least for 8 hours?

So the sensor can itself be adapted to the cultivation terms.

26 Why must the sensors always be connected to the beamer when using?

The sensor in the medium produces electrons which must be led away. If this is not the case, a production of peroxide, which is toxic for the sensors, will occur

27 Can the beamer be disconnected when feeding?

Yes, however, no longer than 30 minutes, because otherwise the sensors become overcrowded with electrons and this will damage the sensor.

28 Must the running experiment always be stopped before splitting?

Yes, because sensors which are already calibrated, cannot be calibrated again during a running experiment.

29 Must the sensors be re-calibrated after feeding?

We recommend after every feeding or splitting to re-calibrate.

30 Which concentration value must be put into the software, if I calibrate the sensor after feeding?

The concentration can be calculated by a simply mixing calculation.

31 How can I find out whether my beamer is operating?

The ID-tag of the beamer must appear in the software. The beamer is only running if a sensor is connected to the beamer.

32 How can I find out whether my ZOMOFI is operating?

A green light on the back of the ZOMOFI flashes approx. every 20 sec. if the ZOMOFI is connected and functioning.

33 How many beamers can be connected to the ZOMOFI?

It can be selected up to 1000 beamers with one ZOMOFI.

34 Do I need for each sensor a beamer?

Yes, because every sensor is calibrated together with the beamer and is identifiable.

35 How long should be the distance between beamer and ZOMOFI?

The distance within a room should not be greater than 20 meters.

36 Does the beamer also function through a closed incubator?

Yes, this is not a problem.

37 How often must the beamer's accumulator be charged?

On average approx. all 8 weeks once.

38 What is a drift and which value must be put in the software?

The drift is a signal change without concentration change. This value is required for the simplification of the calibration.

39 I get with CITSens Bio sensors other values than with BioProfile, is this regular?

No, the "CITSens Bio" values should not deviate more than 10 % from the off-line method. If you have different values you can adjust the calibration parameters „fixGValue“ and „fixNAValue“ in the file config.properties.

40 How can I convert nA into g/l?

It will be calculated automatically by the "CITSens Bio" software.

41 To which reference method are the "CITSens Bio" sensors compared?

The "CITSens Bio" sensors were compared to the reference method HPLC.

42 How do I convert mmol in to g/l?

- 1 mmol/l Glucose equates to 0.180 g/l
- 1 mmol/l Lactate equates to 0.090 g/l
- 1 mmol/l Glutamate equates to 0.147 g/l

43 Can the measured values also be processed?

The measured values can be processed with any program (e.g. Excel, Word, etc.).