

Maltose[†] & Glucose

Product Nr. MK0125

Biosensor Assay Kit for
the determination of
glucose and maltose

Manual

Measuring Principle

The Maltose & Glucose Biosensor Assay Kit enables fast and accurate quantification of glucose and maltose in food samples with high selectivity against other sugars like sucrose, fructose, lactose and maltotriose. The glucose and maltose determination is carried out in three steps:

1. Stock solution

The sample is diluted 1 + 49 or 1 + 99 with deionized water.

2. Glucose measurement

100 µL stock solution is mixed with 100 µL Buffer 1 and then applied to a sensor strip.

3. Maltose measurement

Another 100 µL stock solution is mixed with 100 µL Buffer 2 and then incubated for **10 min at 53 °C** (127 °F). After incubation the solution is applied to a second sensor strip.

Note: Buffer 2 contains enzymes that specifically convert maltose to glucose, which is measured with a second glucose biosensor. From the two glucose measurements, the maltose concentration is calculated automatically by the MalgluSens software.

Specifications

- **Storage:** stable at 2 – 8 °C (36 – 46 °F) for 12 months
- **Analytical measuring range (AMR):**
 - Glucose: 2 - 120 g/L
 - Maltose: 6 - 120 g/L
- **Sample volume:** min. 100 µL
- **Total analysis time:** ≈ 12 minutes (after stock dilution)
- **In-assay precision (Repeatability, n=5):** ≤ 7 % RSD glucose; ≤ 10 % RSD maltose
- **Inter-assay precision (Reproducibility, n=15):** ≤ 10 % RSD glucose and maltose

Cross Sensitivities

In verification measurements, the following concentrations of possible sample constituents did not have a significant influence on the Maltose & Glucose measuring results:

- **Sucrose:** up to 60 g/L
- **Fructose:** up to 60 g/L
- **Maltotriose:** up to 60 g/L
- **Lactose:** up to 60 g/L
- **Raffinose:** up to 10 g/L
- **Calcium:** up to 1.25 g/L
- **Vitamin C:** up to 0.125 g/L
- **Vitamin D:** up to 50 mg/L

General Hints

- Always store the Maltose & Glucose kit in the fridge at 2 – 8 °C (36 – 46 °F).
- Preparations for measurement: Perform the measurements at room temperature 20 – 24 °C (68 – 75 °F).
30 min before starting with measurements, allow the kit components to equilibrate at room temperature and pre-heat the incubator.
- Make sure that starch processing enzymes from manufacturing, which potentially remain in the sample are inactivated prior to Maltose & Glucose measurement.
- Samples with **high-sugar content** (usually > 10 %) have a density that is typically higher than the density of water (> 1.03 g/cm³). If you want to measure these kinds of high-density samples and get the results in weight based units, please refer to the application note for high-density / high-viscosity samples.
- If you are measuring highly viscous samples, please refer to the application note for high-density / high-viscosity samples.
- If you want to measure solid samples, please follow the procedures described in the application note for solid samples.
- **Prevent microbial contamination** in the buffer solutions and the POC.
 - Always use fresh and clean pipette tips.
 - Close vials directly after taking out the liquid.
 - Open fresh vials only after using up opened ones.

1. What you need

Maltose & Glucose Biosensor Assay Kit

- 50 Maltose & Glucose Sensors
- 2 vials (each 1.8 mL) of Maltose & Glucose Buffer 1, ready-to-use
- 2 vials (each 1.4 mL) of Maltose & Glucose Buffer 2, ready-to-use
- 1 vial (1.8 mL) of Maltose & Glucose Positive Control (POC)
- Manual
- Quality Assurance Certificate

Additionally required materials

- DirectSens® Reader Kit
- Laptop or PC with the MalgluSens Software installed and with 2 free USB A sockets
- Vials, pipettes, tips for product dilution and sample application
- Incubator (53 °C / 127 °F) e.g. water bath, heat block

2. Measurement

2.1 Connect and turn on DirectSens® Reader

- Connect the reader with a free USB A socket on the PC or Laptop using the USB cable supplied with the Reader Kit.
- Connect the QR Code Scanner with another free USB A socket.
- Start up the PC or Laptop.
- Turn on the DirectSens® Reader by pressing the on/off button on top of the device. The white circular light around the button indicates the reader is on.

2.2 Start the MalgluSens Software



- Start up the MalgluSens software.

A green icon in the lower left corner of the Software window indicates that the reader is connected and operating.

Sample name:

- Insert sample name.
- Select one of the two present concentration ranges according to the expected glucose and maltose concentrations in the sample.

Select concentration range

	Glucose %	Maltose %	Dilution with water
1	0.2 - 6.0%	0.6 - 6.0%	1 + 49
2	0.4 - 12.0%	1.2 - 12.0%	1 + 99

You can also extend the concentration range by using higher or lower dilution factors than 1+49 and 1+99. Please refer to the respective application note for further information.

- Click on "Next" to continue

2.3 Sample preparation



Sample

Sample
1 + 49
or
1 + 99
water



Important: Inactivated enzymes in sample are crucial for an accurate measurement !

- Bring sample (or POC), buffers and sensor strips to room temperature: 20 – 24 °C (68 - 75°F).
- Prepare sample according to *Table 1*. (for POC 1 + 49 dilution with water is not required)
- For 1 + 1 dilutions with buffer 1 and 2 use 1.5 mL Eppendorf vials.
- Click "Next" to continue.

Vial 1

Diluted
sample
1+1
Buffer 1



Vial 2

Diluted
sample
1+1
Buffer 2

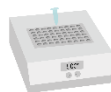


Table 1 Sample preparation.

Stock solution: Dilute sample 1 + 49 (e.g. 100 µL plus 4900 µL) or 1 + 99 with distilled water

Vial 1 (Glucose determination)

Dilute 100 µL stock solution with
100 µL **Buffer 1**

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- Use for first measurement with **Sensor**

Vial 2 (Maltose determination)

Dilute 100 µL stock solution with
100 µL **Buffer 2**

Incubate diluted sample at
53 ± 3 °C (127 ± 5 °F) for 10 min.

Use for second measurement with **Sensor**

Important: Make sure that all dilutions get sufficiently mixed by agitation.

For mixing the 1 + 1 dilutions with buffer take the diluted sample up and down 4 times with the pipette !

Do not vortex the Eppendorf vials for the final dilution step !

2.4 Glucose testing



- Point the red light of the QR Scanner directly on the QR code of one of the two sensor boxes (distance 10 – 20 cm / 4 – 8 inch).
- Acoustic signal if sensor is scanned correctly.

2.5 Insert sensor



- Take sensor out of the storage box.

Avoid touching the sensitive area on the sensor !

- Insert sensor into the Reader, the blue color facing upwards.
- Push the side with silver contacts into the sensor slot of the reader as far as it can go.
- Confirm by clicking "Next".

2.6 Sample application



- Apply 100 μ L from vial 1.
- Distribute sample equally on the sensitive area with the pipette tip.
- Make sure to cover the complete sensing area within the 15 seconds sample application step.



A correct sample application is crucial for an accurate measurement !

Avoid scratching the central black spot with the pipette tip !

Avoid spilling liquids into the reader in order to avoid damage on the instrument !

2.7 Analysis

The DirectSens® Reader will automatically detect the sample and start the measurement. The measurement will take approximately 30 seconds. Do not touch the sensor during this step!

2.8 Remove sensor

- After measurement, the Software will ask you to remove the sensor.
- Remove sensor and confirm by pressing "Next"
- Alternative: If you do not need a maltose result for the measured sample, you have the option to click on the button "Skip maltose measurement" instead of "Next". In this case the software will directly switch to the result screen and only show



Note: For each kit, enough Buffer 1 is supplied to measure 18 glucose only samples (plus remaining 16 glucose + maltose samples).
a result for glucose.

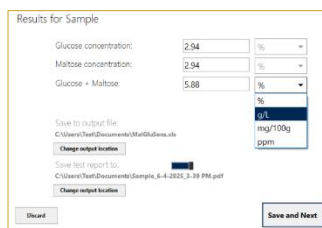
2.9 Maltose testing

Repeat steps 2.4 – 2.7, now using the sample from vial 2 after the incubation at 53 °C (127 °F)

Note: A correct sample preparation according to *Table 1* is crucial for an accurate measurement !
was completed.

2.10 Save results

- Select unit (% or g/L or mg/100g or ppm)
- Click "Save and Next" to return to the start screen



For detailed information please refer to the DirectSens® Reader & Software Guide or www.directsens.com.

3. Using a Positive Control

In order to verify correct handling, the positive control (POC), included in the Maltose & Glucose Biosensor Assay Kit, can be used. **The positive control imitates a 1 + 49 diluted sample, therefore, the first dilution with water is not required.** Before measurement bring the solution to room temperature (20 – 24 °C / 68 - 75°F) and follow the instructions from step 2 onwards. Select concentration range 1 for the POC. For specifications of the positive control see the Quality Assurance Certificate.

Note: When there is any doubt about the performance of a Maltose & Glucose kit, e. g. due to elevated temperatures during transport or storage, it is recommended to perform a positive control before moving on with the measurement of samples.

All specifications and procedures are subject to change without notice.



(www.directsens.com)

DirectSens GmbH
Am Rosenbüchel 38
3400 Klosterneuburg
Austria

office@directsens.com
+43 699 18355188