User Manual

iCheck
Carotene

iCheck **Carotene** is a testing device to measure **Carotenoids**, empowering you with instant results to make confident decisions.

BioAnalyt

Quality
Guarantee

Dear customer,
Congratulations on your acquisition of a new iCheck™ Carotene!

iCheck Carotene will be your reliable partner for total carotenoids analysis. iCheck is a high-tech portable photometer with precise and reliable results.

iCheck is produced following strict quality standards according to ISO 9001:2015. This is accomplished by the use of high-grade components and equipment as well as a streamlined production process. This process includes quality controls of each component and rigorous calibration of the device by trained technicians.

Your iCheck Carotene comes with a 2-year warranty.

Please note: If the device is used in a manner that does not comply with the operating instructions, the protection may be impaired.

If you have any questions, please contact us by calling **+49 (0)33 28 35 15 000** or sending an e-mail to **support@bioanalyt.com**.

www.bioanalyt.com
www.facebook.com/bioanalyt
www.linkedin.com/company/bioanalyt

CE   TÜV NORD TÜV NORD CERT GmbH ISO 9001   TOP 100 TOP 100

Development, manufacture and sales of all BioAnalyt test kits (devices, reagent vials) are carried out in accordance with ISO 9001:2015 and have been certified by TÜV NORD, Germany.

Contents

Check your
Case Content

Your iCheck **Carotene** is delivered in a portable case.
The items included in the case are listed below.
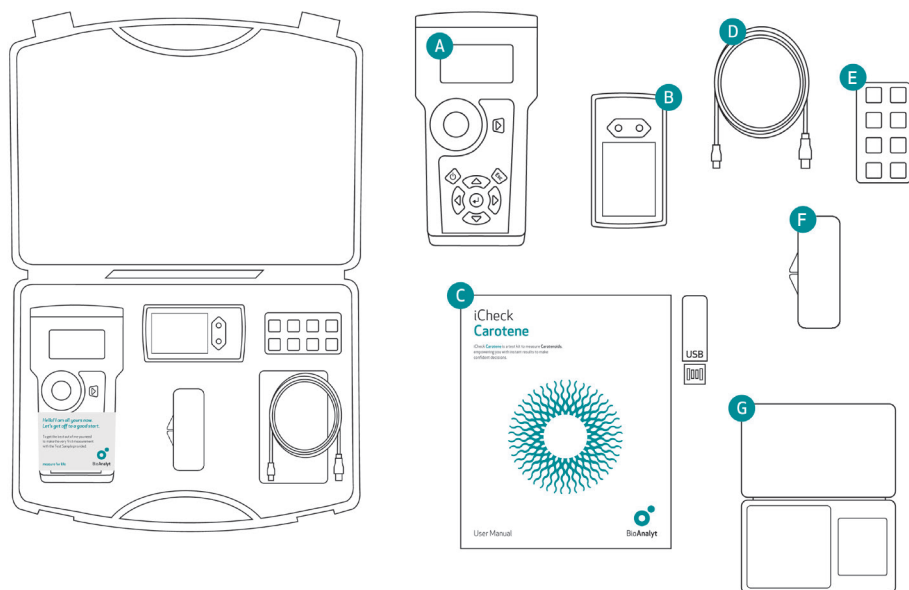
A	iCheck Carotene with metal cap	E	Stand for reagent vials
B	Battery charger and 4 rechargeable batteries	F	Carotene Standard
C	User Manual and software on USB stick	G	Digital balance and calibration weight
D	USB cable for data transfer to computer		

Device
Description
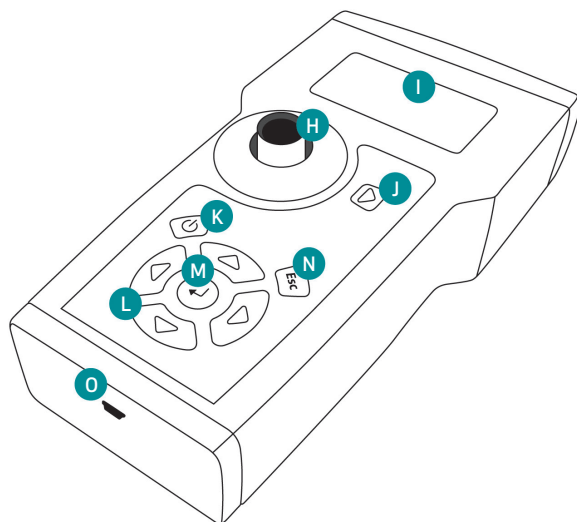
H Measurement chamber for iCheck
   Carotene reagent vials with removable
   metal cap (not shown)

I Display monitor

J Measurement key

K Power key (On / Off)

L Menu navigation keys: left, right, up, down

M Enter (OK) key

N Escape key

O USB cable mini-port for data transfer

Use the 4 keys marked with triangles to navigate the menu structure of the device. To select an option, press the enter key. To exit an operation or to navigate one directory up, press the escape key.
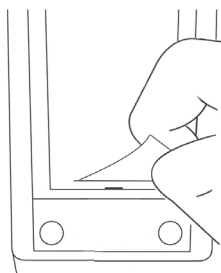
Not shown:
Battery compartment on the bottom side.

5

Instructions
Carotene

1 Insert the batteries

- The iCheck is equipped with 4 rechargeable batteries (AA). Please charge them fully before device use.
- Open the battery compartment at the back of the iCheck by lifting the tab.

- Insert the batteries as indicated.

Note:
The batteries can be recharged with the supplied charger. It takes about 2-3 hours to fully charge an empty battery. Charging is best performed within the temperature range of +5 °C to +45 °C.

2 Switch on the device

- Start by placing the iCheck on a flat and stable surface. Make sure the metal cap is covering the measurement chamber.
- Switch on your iCheck by pressing the power key.

Self-test
- The device will automatically perform a self-test of the photometric unit and software. This will take approximately 10 seconds.
- When the self-test is successful, the device will display "Self-test OK" and automatically bring you into the measurement mode.
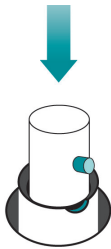

Self-test

Self-test OK!

- The iCheck has an energy-saving function. 10 minutes after the last keystroke the photometer will switch off automatically.

Important: iCheck must be used with charged batteries at all times even when connected to the computer via USB cable.

3 Control the device

- Using the left and right navigation keys enter "Device Control" mode. Carefully take out Carotene Standard from its casing, remove the cap covering the measurement chamber and place Carotene Standard inside.
- Make sure the metal edges of the Carotene Standard fit into the 2 ridges of the measurement chamber. Press the measurement key and wait for the device to display a value.
- Control that the value displayed by the device, for example, 55.67 AU, is within the range indicated on the casing of the Carotene Standard. For example: [20.66 - 100.66].

- When the value is within the range, return to the "Other Sample" or "Whole Blood Sample" mode to proceed with the measurement using left or right navigation keys.

- When the value displayed by the device is outside the indicated range, repeat the measurement. If the value remains outside the indicated range contact BioAnalyt Support at support@bioanalyt.com for assistance.

4 Select your sample type

- Choose your sample type by pressing left navigation key and choose one of the following options: "Other Sample", "Whole Blood Sample" and "Device Control".
- Now you are ready to proceed with measurement.

CAROTENE

OTHER SAMPLE
Batch 1
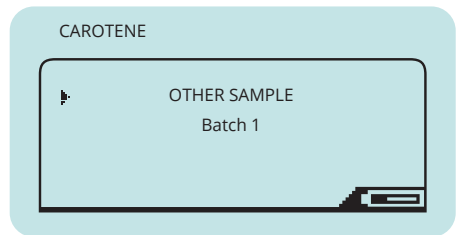
Instructions
Carotene

5 Prepare your sample

- iCheck Carotene quantitatively analyzes total carotenoids in food and biological fluids. iCheck Carotene measurement range is 0.15 – 15.0 mg/L.
- If the expected concentration of your sample is above iCheck Carotene measurement range, dilute your sample in distilled or bottled water to fit the middle of the measurement range (i.e. 10 mg/L).
- Record the weight of the sample, the total diluted sample volume and calculate the dilution factor (DF): DF = (mL total sample volume)/(g sample weight).
- Total sample volume is the final volume of the sample that you obtain after mixing your sample with the water.
- For support with dilution and calculation, please contact BioAnalyt Support at support@bioanalyt.com.

Weigh in your sample

- Place a weighing dish on the balance and press Z/T to 0 (tare) the weight of the dish. The display should show 0.0 g. Now you are ready to weigh your sample.
- Weigh in your sample and record the exact weight in your documentation.
- Next, measure and record the water volume in your documentation.
- Mix your sample with water until a homogenous suspension is formed. Record the final total volume of your sample solution for dilution factor calculation.


Important: The carotenoids concentration of the sample solution has to be in the measurement range of iCheck Carotene which is 0.15 - 15.0 mg/L.

6 Inject your sample

- Mix your sample well. Use a new syringe without a needle and take up approx. 0.6 mL of the sample.
- Clean the end of the syringe with a paper tissue. Place the needle in the syringe. Hold the syringe with the needle pointing up and gently tap the syringe with your fingers to get the air bubbles to move up.
- Adjust the volume of the sample to exactly 0.4 mL (400 µL) by ejecting excessive volume into the paper tissue. Make sure no air bubbles are left inside.
- Slowly inject 0.4 mL of the sample solution into a new iCheck Carotene reagent vial through the red septum.
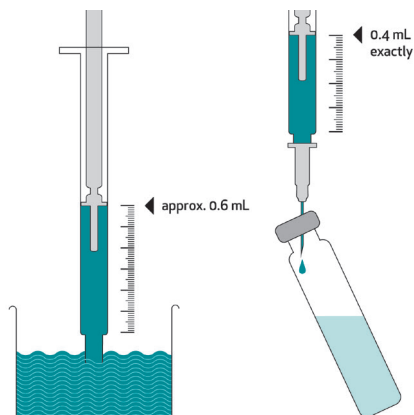
- Vigorously shake the vial for 10 seconds.

10 sec
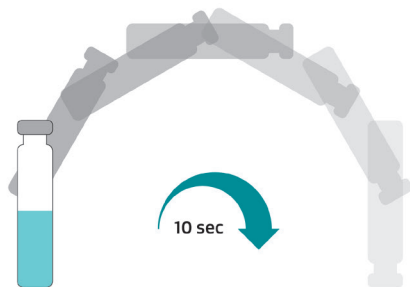
- After shaking the vial, the content should appear as a uniform solution.

0.4 mL exactly

approx. 0.6 mL

Instructions
Carotene

7 Reaction time

Wait 5 minutes
- Now let the vial stand still for 5 minutes for the extraction of the carotenoids from the sample into the upper phase. After waiting, the solution in the vial should appear in two distinct phases. If your sample contains carotenoids, the upper phase will turn yellow.

approx. 0.8 cm

5 min
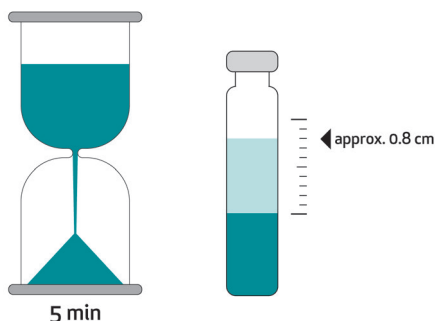
8 Check phase separation

- To proceed with the measurement you must observe a clear upper phase of approx. 0.8 cm.
- If you do not observe a clear upper phase then briefly centrifuge the vial at low speed (approx. 300 rpm) for 1 minute.
- Portable hand centrifuge can be purchased from BioAnalyt.
- When no centrifuge is available, let the vial stand for at least 1 hour until a distinct phase separation has occurred.
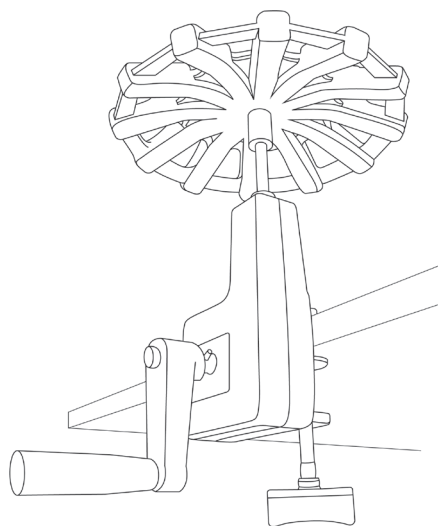
9 Insert the vial

- Make sure your iCheck Carotene is in the right measurement mode.
- Press the measurement key. The device will instruct you to "Insert sample".
- Control the glass surface of the vial. If the glass is not clean, wipe it with a paper tissue before inserting into the iCheck.
- Be sure to hold the iCheck reagent vial only by its top. Insert the vial into the iCheck and cover the vial with the metal cap.
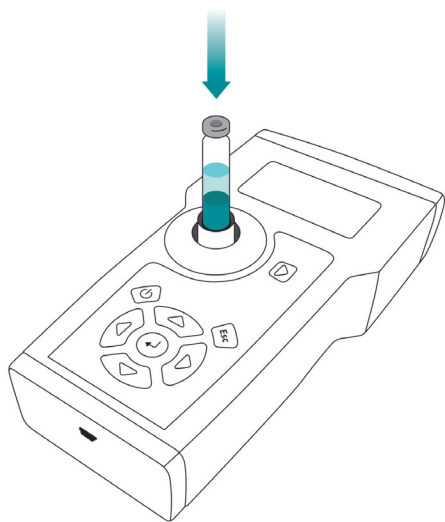

Important: Take care that no other objects, liquid or dust enters the measurement chamber. This would result in damaging the sensor and interfere with accurate measurement.

10 Start the measurement

- Press the measurement key again. This will initiate one of 6 measurements of your sample.

Reposition the vial
- When the display indicates "…next position", the position of the vial must be changed in order to take another measurement.
- To do this, lift the metal cap, turn the vial in the measurement chamber and cover the vial with the metal cap again.
- Press the measurement key.
- Repeat repositioning of the vial as many times as indicated by the display.
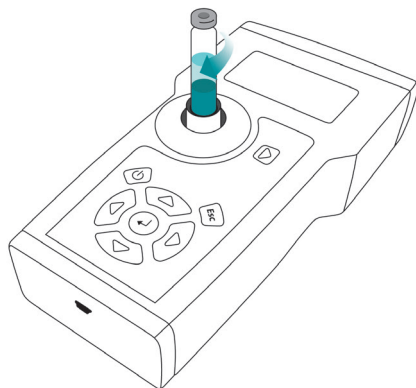
Note:
Turn the vial in ¼ of a turn. Repositioning and multiple measurements of the same vial increase the precision of your results.

Instructions
Carotene

11 Result display

- When the sample measurement has been completed, iCheck Carotene calculates the average over the 6 measurements. The result is displayed in mg/L and indicates the total carotenoids concentration in the sample.
- If you diluted your sample before measuring, then multiply the result by the dilution factor. For support contact BioAnalyt at support@bioanalyt.com.

<div style="border:1px solid;padding:1em;">

WHOLE BLOOD SAMPLE

Batch 1, Sample 1

1.10 mg/L

</div>
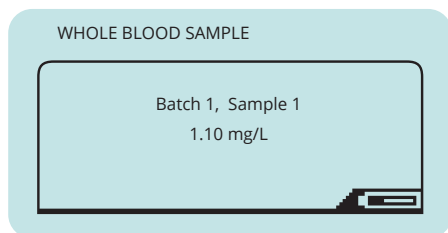
- When you measure your whole cattle blood sample under "Whole Blood Sample" mode the displayed result is corrected with the average hematocrit level in cattle blood of 32%. Therefore no further calculations are necessary.

12 Data storage

- For documentation purposes, iCheck Carotene has internal memory to store up to 400 individual measurements including such information as batch number, sample number, date, time, and result.
- For detailed description of the data transfer to a computer please refer to the "Data Transfer" section.

13 Disposal

- Reagent vials contain hazardous chemicals and are disposed of according to national regulations for hazardous materials. Collect the vials in a container and hand them over to a chemical waste company. Material safety data sheet (MSDS) of the reagent vials is provided with each shipment.
- Take extra care when disposing of the used needles to prevent injury: discard used needles into special container.

Menu
Functions

By pressing the enter key you enter the menu of iCheck Carotene. Using the arrow keys you can scroll through the different options on the menu and with the enter key you can choose a function.

```
CAROTENE

▶ View Data
  Delete Data
  Transfer Data
  Service                    ◼▭
```
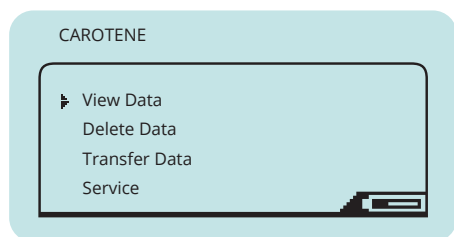
View data

 You can select the following options:
- View Samples
  To display individual measurement results.

Delete data
You can select the following options:
- Delete Sample
  To delete an individual result.
- Delete Batch
  To delete a batch with several measurements.
- Delete File
  To delete the file with all measurements performed on the device.
- Delete Memory
  To delete all measurements performed on the device.

Transfer data
Use this function to transfer the data from the iCheck to your computer. Refer to the section "Data transfer" in this manual.
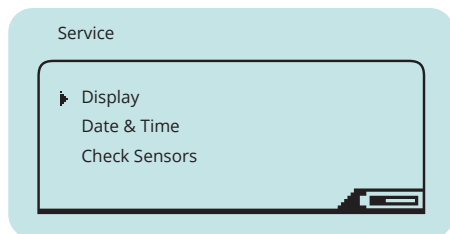
Note:
Data menu function is only displayed after a minimum of 1 measurement. Data Transfer menu function is only displayed after a minimum of 2 measurements.

Menu
Functions

Service

To configure your iCheck you can select the following options:

```
Service

▶ Display
  Date & Time
  Check Sensors
```

- Display
  Set the brightness and contrast of the display.

- Date & Time
  Set the correct time and date of your time zone.

- Check Sensors
  Use this function when instructed by BioAnalyt Support. To perform a check sensors, cover the measurement chamber with the metal cap. Select Check Sensors with the enter key.
- Record the values displayed by the device and send them to BioAnalyt Support.

```
Check Sensors

[1]      30.00 AU
[2]      27.00 AU
[3]      17.00 AU
[4]      15.00 AU
```
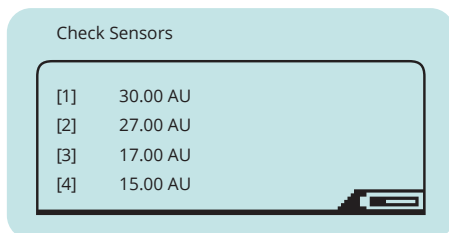
Note:
The Calibration Data of your iCheck can be provided on request. For this contact BioAnalyt Support at support@bioanalyt.com and provide the serial number indicated on the back of your device.

Software
Installation

Software installation

- The data stored on your iCheck can be transferred to a computer. To do so, install BioAnalyt Lab software which is provided on the USB stick ⬚ .
- Initiate BioAnalyt Lab software setup by double-clicking on the "Setup" icon on the USB stick. Follow the instructions on your computer and make sure that BioAnalyt Lab is installed in the "Programs" directory. Create a shortcut to your desktop if you wish. Finish installation by clicking "Finish". The driver will automatically be installed.
- Upon accepting the License Agreement, a window will pop up where you can enter your personal information. This information can be viewed and edited by clicking on the "Settings" window.

Note:
BioAnalyt Lab software only works with Windows operating system (XP and later versions).

Software update

- BioAnalyt Lab software can be updated by clicking on the "Update" window. For the program to detect whether there are new updates available from BioAnalyt computer must be connected to the internet.
- If your current version (e.g. 1.1.0) is different from the newest version, click on the "Update" key to proceed with the software update.

Data
Transfer

- Start *BioAnalyt Lab* program by double-clicking the link on your desktop or by going to the Start Menu >> Programs >> BioAnalyt GmbH >> *Bio-Analyt Lab*.
- Plug in your iCheck to your computer via USB cable. A configuration window will appear after you connect your device to the computer. Here you can enter the information about your device. The serial number of the device can be found on the back side of the iCheck.
- Now the information about iCheck is saved on your computer and will be displayed the next time you connect your iCheck to your computer. This way, information about multiple iCheck devices can be stored on your computer.

- To initiate data transfer click on "Start Transfer". Wait for data transfer to proceed and the sign "Data Transfer in Progress" to disappear.
- Now, all your data is saved and listed under "Documents". You can view, save and edit this data by clicking on the "Documents" window.
- To save your data in CSV or EXCEL format select the file in the "Documents", select the format and save the files to the desired location.

Note:
Power supply units and laptops/PCs must comply with appliance class III.
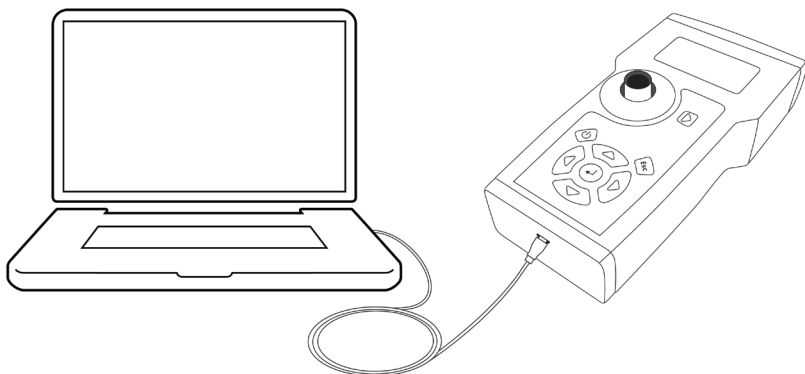
Technical
Data

Quality assurance

iCheck and iCheck Carotene Test Kit are produced according to quality management system (DIN EN ISO 9001:2015) certified by TÜV Nord in Germany.

TECHNICAL DATA	
Sample	
Analyte:	Total carotenoids
Sample:	Food: Premix, roots (i.e. cassava), beverages, eggs, salmon; Biological fluids: colostrum, cattle whole blood & serum
Sample preparation:	For solid or highly concentrated samples: dilution in distilled or bottled water
Sample volume per analysis:	0.4 mL (400 μL)
Concentration range:	>0.15 ppm (mg/kg), samples above 15.0 ppm must be diluted in water
Device	
Analytical method:	Photometric determination of total carotenoid concentration using absorption at 450 and 525nm.
Units displayed:	mg/L
Linear range:	0.15 - 15.00 mg/L
Calibration:	Factory set (standards included for control)
Time per analysis:	< 10 min
Environment:	20 –30°C, no direct sunlight
Accuracy at 95% confidence interval at 25°C:	±5-20% (depends on the sample type and concentration)
Method comparison:	High-performance liquid chromatography (HPLC)
User training:	1 day training
Use:	Laboratory and field
Data output:	Sample #, Batch #, Result, Date, Time (in transferred data)
Connectivity and data:	Results are stored in the device and transferred to a PC via USB
Power source:	NiMH rechargeable batteries included; AA 1.2 or 1.5V
Warranty:	2 years
Device weight:	0.45 kg
Device dimensions:	11 x 4 x 20 cm (W x H x L)
Voltage (Recommended)	5V ±10%
Voltage (Max.)	5.5V
Test Kit	
Content:	100 reagent vials; 100 syringes - 1.0 mL; 100 needles - 1.6mm x 25mm.
Chemical composition:	n-Hexan and alcohols
Volume per reagent vial:	2.0 mL
Shelf life:	12 months at 20 –30°C, no direct sunlight, upright
Dimension of test kit:	26 x 14.5 x 16.5 cm
Disposal instructions:	Hazardous waste
Optional equipment:	Manual centrifuge, 50 mL falcons, weighing dishes, reference samples

Frequently Asked
Questions

Power supply

iCheck does not turn on.

Make sure that the batteries are fully charged. In the lower right corner of the display, a battery symbol is shown, indicating the remaining battery charge. To recharge the batteries, place them in the charger provided in the case, connect it to a power supply, and wait until the light turns green, indicating that power is at 100%. Place the batteries back in the device, and switch it on. If iCheck is still not turning on, please contact BioAnalyt Support.

May I use other batteries?

You may use other AA/2100mAh/1.2V or 1.5V batteries. However you cannot recharge those with the supplied charger.

What is the overvoltage category?

The overvoltage category is I .

Measurement

The self-test failed when I switched on the device. What should I do?

If the self-test fails, switch the device off and on again. If, after restarting, the self-test it still fails, contact BioAnalyt Support.

During Device Control the value displayed is outside the range. What should I do?

If during Device Control the value is outside the range indicated on the back of your device, measure again. If the value is out of range again, please contact BioAnalyt Support.

Do I need to calibrate iCheck Carotene?

No, there is no need to calibrate iCheck Carotene, because the device is calibrated during the manufacturing process and calibration is programmed into the software.

The result I received for a sample is higher/lower than expected. What might be the reason for this?

1. iCheck Carotene variation for repeated measurements of the same sample is 5-20%. Therefore ±5-20% deviation from expected value is acceptable.

2. Incorrect volume:
Make sure that exactly 400 µL (0.4 mL) of the homogenized sample is injected into iCheck Carotene reagent vial.

Frequently asked
Questions

Measurement

3. The accuracy also depends on how the sample is mixed When measuring solid samples make sure that you do not wait for the particles to settle down in the water. Mix the sample and immediately take up the suspension in the syringe.
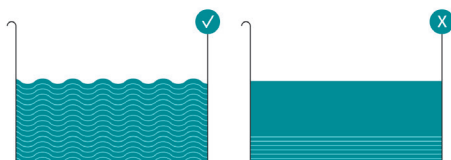
4. The result can be additionally influenced by environment, sample preparation and skills of the operator.

5. The operator was not well trained. Contact BioAnalyt to obtain training.

What might interfere with the measurement procedure?

1. Incorrect sample extraction:
It is very important, that the extraction and phase separation has occurred. Wait for at least 5 minutes.

2. Unclean vial surface:
Make sure the reagent vial you are measuring is absolutely clean and does not have any fingerprints on it. If not, wipe the vial with a paper tissue (optional: wet the tissue with alcohol to improve the cleaning).

3. Sunlight:
Do not measure in direct sunlight.

How should I store the reagent vials?

iCheck reagent vials must be stored upright at room temperature and protected from direct sunlight.

Do temperature or humidity influence the iCheck measurements?

Please follow these conditions to operate iCheck safely:
1. Altitude up to 2 000 m;

2. It is recommended to measure at an ambient temperature between 20 - 30 °C (68 - 86 Fahrenheit). Do not use iCheck at temperatures above 40 °C.

3. It is further recommended to store the iCheck and the iCheck reagent vials at least two hours before starting the measurement in the room in which the measurement will be performed. This procedure ensures that both the vials and the device have the same temperature.

4. The device can be used indoors or outdoors, as long as there is no direct sunlight.

5. Maximum relative humidity of 80 % at 30 °C.

Can I use iCheck in wet conditions?

No, the device is not intended to be used in wet conditions. Condensation must be avoided.

Frequently asked
Questions

May I measure haemolysed whole blood with iCheck Carotene?

Yes. Our method selectively extracts solely fat-soluble components prior to measurement. Therefore, components resulting from hemolysis such as hemoglobin will not disturb the measurement.

What is a batch and how can I select a new batch?

To select a new batch, press the right arrow key. The batch function is used to group samples, e.g. samples from 1 day or 1 region can be measured in batch 1. When you proceed to measure samples from a different day or region, select a new batch (i.e. 2).

General

Which form of carotenoids can be measured?

iCheck Carotene works like a lab photometer and measures all carotenoids such as beta-carotene, astaxanthin, lutein, and canthaxanthin. The software quantifies the concentration based on beta-carotene calibration.

Does the Data Transfer work with other operating systems like Apple OSX etc.?

No, BioAnalyt Lab may only be used with Windows Operating System.

What is the pollution degree for this equipment?

The expected level of pollution around iCheck has been set to degree 2: only nonconductive pollution typically occurs. Occasionally, however, temporary conductivity caused by condensation may be expected.

How can iCheck Carotene test kits be ordered?

An order can be placed by visiting the BioAnalyt website www.bioanalyt.com/shop or by sending e-mail to contact@bioanalyt.com.

Where do I get help with other questions that are not mentioned here?

*We would love to hear from you! Please send us an e-mail at **support@bioanalyt.com**.*

You can also join the discussion by following us on Facebook or LinkedIn.

www.facebook.com/bioanalyt
www.linkedin.com/company/bioanalyt

USB Stick

Find the *BioAnalyt Lab* Software and further product information on the USB stick.