СОЭКС

NO_3^-

NH_4NO_3

R-ONO$_2$

нитрат-тестер

CONTENTS

Nitrat-tester Soeks

Purpose

Nitrat-tester SOEKS is designed for express analysis of fresh fruit, vegetables and meat for nitrates.

Nitrate content analysis is based on conductivity of alternating high-frequency current the measured food items.

Base kit

Nitrat-tester SOEKS has the following items included in the base kit:

Nitrat-tester Soeks	1 pcs
Passport	1 pcs
2 batteries (AAA size)	2 pcs
Rigid paperboard box	1 pcs

Battery charger, power cord, rechargeable batteries and other accessories and supplies are purchased separately.

The manufacturer reserves the right to add new features to the device. Please follow new code modifications on the official website: **www.soeks.ru**. The device's code can be modified only in the manufacturer's service centers.

Principle of nitrat-tester operation

Nitrat-tester Soeks is intended for a primary express assessment of the nitrate ion content of fresh fruit and vegetables.

The principle of nitrat-tester Soeks operation is based on measuring the electric conductivity of fruit and vegetable medium. Each fruit and vegetable contains potassium, magnesium, iron, copper and chlorine ions required for their vital functions as well as many organic acids and other substances in certain concentrations required for their normal development. The content of each concrete substance (in the form of ions or molecules) is determined by biochemistry of the concrete plant (there exists a base level of ion content) and composition of water and soil, on which it grows. Fertilizer is very often used to secure an effective plant growth – for example, fertilizer in the form of salts (nitrate, phosphate, and other fertilizer). Nitrates or phosphates are dissolved in water, and reach the plant, which willingly absorbs them in the form of salt ions. The salt ions (nitrates, phosphates, etc.) spread across the plant, and are accumulated in various parts of the plant, including fruit, which increases electrolyte content and, accordingly, electric conductivity of the fruit/vegetable medium. Thus, we can use nitrat-tester Soeks to measure the electric conductivity of fruit and vegetables, to compare this value with electric conductivity due to the base level of ion content, and to say that that the product under test contains an increased amount of ions with a certain probability. Since nitrate fertilizer is widely spread in Russia and CIS countries, one may expect with a high degree of probability that excessive electric conductivity is due to the presence of nitrate ions.

Nitrat-tester Soeks is calibrated by nitrate ion content. Their concentration in fruit and vegetables is determined using an independent test method (potentiometric determination of nitrate ions per GOST 29270-95 (Fruit and Vegetable Processing Products. Nitrate Determination Methods). The results obtained have been used to download a number of dependences of the measured electric conductivity on nitrate ion concentration determined for various fruit and vegetables with due regard to their base electric conductivities in nitrat-tester Soeks.

Nitrat-tester Soeks delivers the result of express test in the form of nitrate ion concentration and compares is with the maximum permissible concentration for the measured product.

Remember that the result obtained is an estimate, and it cannot replace a quantitative chemical analysis in a specialist chemical laboratory, which is not free of charge and requires time. However, the presence of such laboratory and a qualified chemist/analyst at home or in the pocket during each purchase of fruit, vegetables or berries is impossible for the majority of people, while the presence of nitrat-tester Soeks allows one to refuse the purchase of suspicious foodstuff, and to significantly secure oneself and relatives, especially children. Such analysis made using nitrat-tester Soeks is performed in a few seconds, and the only thing the device needs for a long-term operation is that you do not to forget to change the batteries or to recharge accumulators as a usual cellular telephone.

Certainly, the question may always arise: what if excessive electric conductivity of a foodstuff is due not to nitrate ions? Such situation is possible, but will the buyer feel easier if he or she has bought a foodstuff with an increased phosphate (or other ion) content instead of nitrates or simply a foodstuff that started to spoil? Remember that base electric conductivity was determined for each individual type of fresh fruit and vegetables while the composition and concentration of organic acids vary during rotting.

Specification

Range of indicated nitrate content, mg/kg	from 20 to 5 000
Time of measurement, seconds	up to 20
Measurement mistake, less	30%
Power elements	AAA size batteries rechargeable or non-rechargeable (NiMH)
Power voltage range, V	2,3 - 3,5
Time of continuous work of the device, hours at least**	8
Overall dimensions height x width x thickness, max, mm	144x47x17
Weight (without power elements), max, grams	66
Battery charging current, max, mA	300
Current consumption from charger or USB not more than	500
Output charger voltage	from 4,5 to 5,5
Display	Color TFT, 128x160
Operating temperature range, °C	from -20 to +60

Comment:

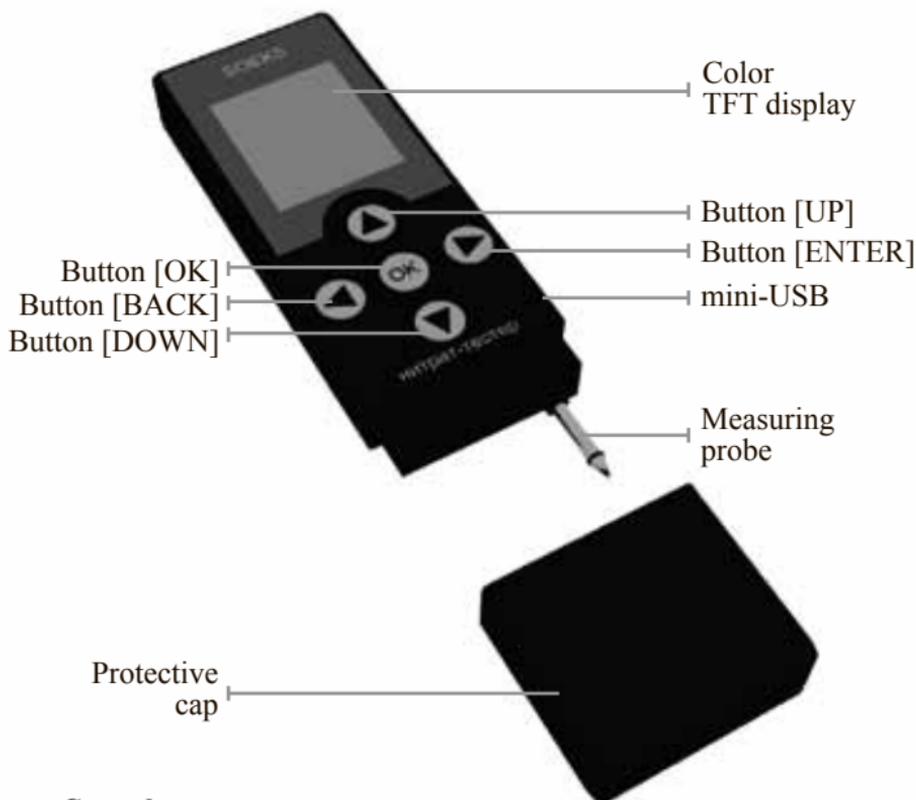* Increasing the number of measurements shall improve the reliability of readings.

** The time of continuous work of the device is up to 10 hours, with default settings and two batteries of capacity 1350mAh.

Precautions

Before using the product, please read carefully the safety measures below and strictly observe them when using the product. Violation of these rules may cause malfunction or cause total failure of the product. The manufacturer's guarantee shall be void if the safety measures stated below are violated.

• Protect the product from shock and other mechanical impacts that can damage it.
• Do not use the product in conditions of high humidity, under or in contact with water: the product is not waterproof.
• Do not leave the product in places with intensive sun light or high temperatures for a long time, this can cause electrolyte leakage from power elements, failure of the product, and injuries.
• Do not leave the product for a long time near devices that generate strong magnetic fields, such as magnets or electric motors, and where strong electrical magnetic signals are generated, such as transmitter towers.
• Do not perform measurements close to cell phones and microwaves, this may affect the instrument's readings.
• Do not disassemble and do not try to repair the device on your own.
• Do not connect the device to a PC or socket while it has regular batteries installed.
• Strictly observe polarity when you install power elements, otherwise the device may overheat and fail.

Appearance of the Device

Color TFT display

Button [UP]

Button [ENTER]

mini-USB

Button [OK]

Button [BACK]

Button [DOWN]

Measuring probe

Protective cap

Controls

Button [OK] – turn the device on/off,
        confirmation in nitrat-tester mode.
Button [ENTER] – confirm selection.
Button [BACK] – back to previous menu.
Button [UP] – moving up in the menu.
Button [DOWN] – moving up in the menu.

Power

      At the back side of the device there is the cover of the battery section. AAA type batteries or accumulators NiMH can be used to power the device.

The bottom of the battery section shows the manufacturer's trademark - SOEKS - and board model.

      The front side of the device has a mini-USB port that can be used to recharge batteries from a computer via a USB-mini-USB cable or from the power mains. If connected to a PC or electric mains, the device can work without power elements.

How to install power elements

• Strictly observe polarity when you install power elements, otherwise the device may fail.

• The type of power elements installed must match the parameters preset in the 'Power' menu item (page 36).

• When the device is turned off, you can leave the power elements installed – the batteries and accumulators are not spent if the device is in standby mode.

• If you expect not to use the device for a long time, it is recommended to remove the power elements after the device is turned off.

Screen Indicators

1. List indicators – appear if the list exceeds the screen.

- the list exceeds the bottom limit of the screen

- the list exceeds the top limit of the screen

- the list exceeds both the top and bottom limits of the screen

2. USB indicator

- USB cable connected

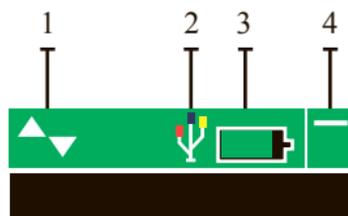- batteries are charging

- charging completed

3. Battery charge status indicator:

- normal power level

- running down

- low power level. Attention! In this case measurement result can be not exact.

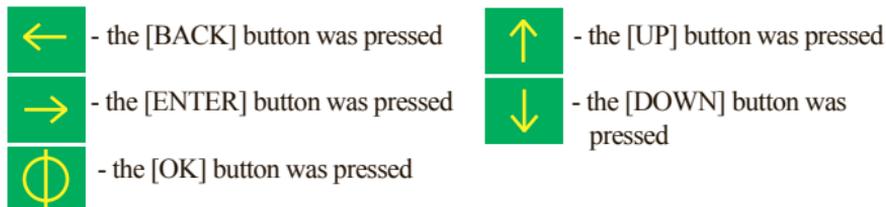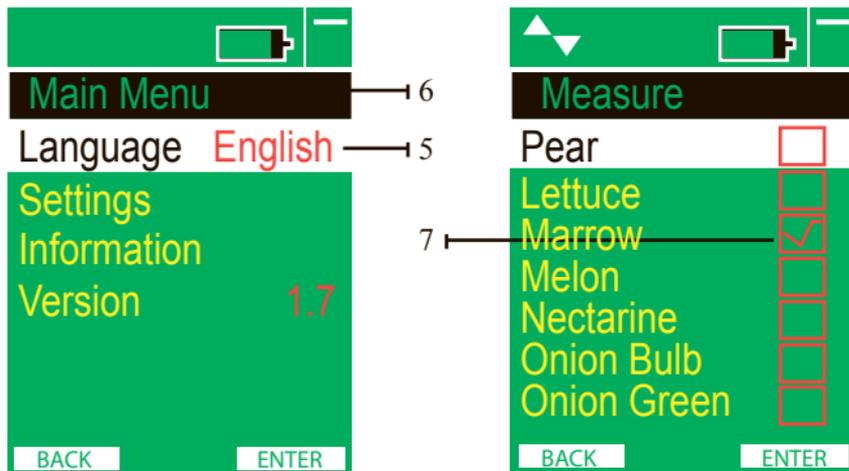- replace or recharge the batteries. Attention! In this case measurement result can be not exact.

4. Active status indicator

The continuously moving element in the upper right corner of the screen indicates the device's active status.

When buttons are pressed, icons in this area show which button has been pressed.

 - the [BACK] button was pressed   - the [UP] button was pressed

 - the [ENTER] button was pressed   - the [DOWN] button was pressed

 - the [OK] button was pressed

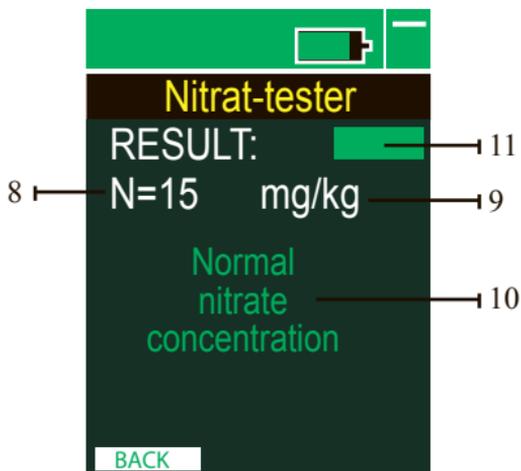**Menu indication and navigation**

5. The current (selected) line is highlighted with color.

6. Inside a selected menu item, the upper line on the list indicates the parent menu item.

7. As the device is being set up, the current parameter value is flagged with a tick mark.

Indicators in the «Measure» mode

A screen with the following elements appears in the measure mode:

8. Measuring result.

9. Unit of measure: mg/kg.

10. Result message showing nitrate concentration based on maximum daily rates of nitrate consumption with food.

- if the measured result of nitrate concentration does not exceed the medium norm of nitrate consumtion - you will see the following message marked green «Normal nitrate concentration».

- if the measured result of nitrate concentration exceeds the medium norm of nitrate consumption not more than 20% - you will see the following message marked yellow «Insignificant excess of standart!»

- if the measured result of nitrate concentration exceeds the medium norm of nitrate consumption not more than 50% - you will see the following message marked red «Significant excess of standart!»

- if the measured result of nitrate concentration exceeds the medium norm of nitrate consumption more than 50% - you will see the following message marked red «Dangerous concentration of nitrates!»

11. Coloured indicator.

Main menu

● Language

In this item you can select the interface language. This device has only two options: English and Russian.

Attention! After the [BACK] button is pressed the screen will display the root menu in the selected language. If you made an error and selected the unfamiliar language, press the following sequence of buttons to return to the language selection menu: **DOWN-ENTER-ENTER.** Then select the language you need.

Settings

In this section you can preset the parameters for the device and the interface.

● Vision

In this item you can adjust screen settings: brightness, display time, and color pattern.

   ● Brightness

Select low, medium or high brightness level of the screen.

To save power and help the batteries last longer it is recommended to use the low or medium brightness level of the screen.

   ● MinutesOn.

Set the time of display backlight in standby mode. You can select from 1 to 15 minutes in the options list.

   ● AlwaysOn

yes – cancels the MinutesOn parameter. Backlight is always on while the device is in use.

no –the screen's backlight works as preset in the MinutesOn function.

   ● Theme

Select from 4 possible combinations of background and font color: green, gray, blue and white.

●Power

In this item you can adjust parameters of the power elements used in the device.

● Accumulators

Select 'yes' if the device has rechargeable accumulators installed and 'no' if regular batteries are used. Incorrectly selected parameter of the installed power supply type may cause incorrect indication of power charge.

If 'yes' parameter is selected the accumulators will recharge while connected to a PC or charger via a mini-USB slot.

Attention! Never connect the device to a charger or a PC if it has batteries installed. This can overheat the power elements, cause their failure and electrolyte leakage, damage the case and break the device.

● Sleep

Set the time in minutes after which the device shall automatically shut down.

● AlwaysOn

yes – cancels the value of the Sleep parameter. The device will work until turned off with the [OK] button.

no – the device automatically shuts down according to the set Sleep parameter.

Power control of the device

1. To turn the device on, press and hold the [OK] button until the display turns on (the screen backlight is on) then release the [OK] button.
- When the device is on, an animated screen with the company's logo appears. To skip this screen press the [ENTER] button.
 - After the splash screen the display will indicate the model of the device for 3 seconds.

2. To turn the device off press and hold the [OK] button until the display shows an animated screen with falling autumn leaves. Then release the [MENU] button.
Pressing and holding the [OK] button will turn the device off in any mode.

3. While connected to a USB, the device will be on, even without power elements installed. If the device automatically turned on while connected to USB; disconnecting the device from the USB slot will shut down the device.

When the device is off, you can leave the power elements installed – batteries and accumulators are not spent if the device is in standby mode. If you expect not to use the device for a long time, it is recommended to remove power elements after the device is turned off.

Beginning to Use the Device

1. Install the power source (page 31,36)
2. Turn the device on (page 37)
3. Before you begin measurements, we recommend that you tune up the device (page 35)
4. Select the 'Measure' menu item.

Measuring nitrate concentration of fruit and vegetables.

1. The measured foodstuff should be clean without any mud on the surface. You should clean the measured foodstuff without any cleaning agent, with clear water only, it should not be rotten or damaged. Foodstuff should be fresh. You can use cut pieces of the foodstuff that were made not later than 15 min.

2. Choose the foodstuff from the menu list. Norms of maximum nitrate concentration limit are mentioned in table on page 40.
3. After foodstuff selection you will see the following text in the menu: «Make sure that probe is not stuck in testing product and press OK»

4. Clean the probe with alcohol and then with paper napkin. The probe should be dry.

5. Press [OK] button. You will see that preparation process has begun(self calibration). The following text message will appear "Wait please. Preparation to analysis in process". Do not touch the probe until you`ll see new text instructions.

6. Please wait until you`ll see the following text message "Stick probe into product. Press OK" Besides harmless recommended norm of nitrates for selected foodstuff will be shown.

7. Stick the probe info the tested foodstuff hold the device perpendicularly to it in direction to the center of it. Do not move or the press probe.

The depth of sticking the probe should be at least 10 mm. The pointed cone of the probe should not go out of the foodstuff, be in the seed zone or hollow spaces. It should be sticked to the most juicy part of the foodstaff.

Notice that you should not use holes that were made by probe or other device iteratively

        8. Press [OK] button. The measurement process will begin.

        9. Wait for the results will be displayed. During the measurement you will see the following message «Wait please! Measurement in process». Please do not move the probe during the measurement.

        10. Chek the results.

        11. Pull the probe out of the foodstuff.

        12. Push the [BACK] button to go back to the menu.

        Device measures nitrate concentration per 1 kilogram of the product.

        Harmless day dose of nitrates is 200-300 mg per one grownup person. Therefore if you eat 2 kiligrams of a watermelon with 350 mg/kg nitrate concentration you risk to pick up a nitrate poisoning. Remember that normal concentration for a watermelon is 60 mg/kg. Some food stuffs as beet, radish, dill, cabbage lettuce have high norm of nitrates. Normal concentration for beet is 1400 mg/kg. If you eat such foodstuffs in large amounts please keep in mind maximum harmless doses that were pointed earlier.

Example: You measured beet and nitrat-tester measured 1000 mg/kg nitrates per kilo. This concentration is normal for this foodstuff and you can eat not more than 200 grams of such beet.

Notice that there are special norms for children, because child's organism undergoes by nitrate poisoning much more than grownups. Harmful doses for little children are 10-50 mg/kg.

Product	Norms	Designation in menu
Apple	60	Apple
Apricot	60	Apricot
Banana	200	Banana
Beet	1400	Beet
Cabbage early	900	Cabbage E
Cabbage late	500	Cabbage L
Carrot early	400	Carrot E
Carrot late	250	Carrot L
Cucumber soil	150	Cucumber S
Cucumber gr.	400	Cucumber G
Eggplant	300	Eggplant
Grapes	60	Grapes
Greengrocery	2000	Greengrocery
Pear	60	Pear
Lettuce	2000	Lettuce
Marrow	400	Marrow
Melon	90	Melon
Nectarine	60	Nectarine
Onion Bulb	80	Onion Bulb
Onin Green	600	Onion Green
Peach	60	Peach
Peper Sweet	200	Peper Sweet
Persimmon	60	Persimmon
Potatoes	250	Potatoes
Radish Black	1000	Radish Black
Radish Garden	1500	Radish Garden
Strawberry	100	Strawberry
Tomato soil	150	Tomato S
Tomato gr.	300	Tomato G
Watermelon	60	Watermelon
Baby Norm	50	Baby Norm
Fresh Meat	200	Fresh Meat

Marking and sealing

The name of the device is written on the case. The serial number and date of manufacturing are written in the battery section under the accumulator. The manufacturer does not seal the device.

Package

The package ensures safety of the device during transportation and storage, provided normal climatic conditions.

Transportation and storage

The packed device can by shipped by any type of transport over any distance.

During shipment, the device must be protected against humidity.

Shipping conditions of the packed device must meet the following requirements:
 - environment temperatures from -40° to +60°C.
 - relative humidity max 90% at +25°C.

Until operation, the device must be stored in the factory package, in a warehouse with air temperatures from -5° to +40° C and maximum relative air humidity 80% (at temperature +25°C). The device may not be stored without the package. If the device remained at below-zero temperatures for a long time, it must be left indoors for 2 hours before use.

Maintenance

Maintenance includes:
 - removal of dust from the outer surface of the device;
 - timely changing or charging the power elements;
 - if the device is not used for a long time (more than 2 weeks), power elements must be uninstalled;
 - clean the display with soft cloth only.
Prevent foreign objects from getting inside the device through the accumulator section or perforation on the back side of the device.

Маркировка и пломбирование

На корпусе изделия нанесено наименование изделия. Заводской номер и дата выпуска находятся в батарейном отсеке под аккумулятором. Изделие предприятием-изготовителем не пломбируется.

Упаковка

Упаковка обеспечивает сохранность изделия при транспортировке и хранении при нормальных климатических условиях.

Транспортирование и хранение

Транспортирование изделия в упаковке может производиться любым видом транспорта на любое расстояние.

При транспортировании изделия необходимо обеспечить защиту его от атмосферных осадков.

Условия транспортирования изделия в упаковке должны соответствовать:

- температура окружающей среды от –40° до +60°С.
- относительная влажность при температуре +25°С не более 90%.

Изделие до введения в эксплуатацию следует хранить на складе в упаковке предприятия-изготовителя при температуре окружающей среды от –5° до +40° С и относительной влажности воздуха не более 80% при температуре +25°С. Хранение изделия без упаковки не допускается.

Изделие, в течение длительного времени находящееся при температуре ниже 0°С, должно быть выдержано при комнатной температуре в течение 2 часов перед вводом прибора в эксплуатацию.

Техническое обслуживание

Техническое обслуживание предусматривает:

- удаление пыли с наружной поверхности изделия;
- своевременная замена или подзарядка элементов питания;
- при длительном перерыве в эксплуатации изделия (более 2-х недель) элементы питания должны быть извлечены;
- протирать дисплей только мягкой тканью.

Не допускается попадание посторонних предметов внутрь изделия

Талон на гарантийный ремонт/
Warranty coupon

НИТРАТ-ТЕСТЕР SOEKS/
NITRAT-TESTER SOEKS

заводской номер/ serial number

Продан магазином/ Sold by

_____
наименование предприятия торговли/ name of the retailing organization

Дата продажи/ Date of sale_____/_____201___г.

Выполнены работы/ Works performed_____
_____
_____
_____
_____
_____

Исполнитель/ By_____

_____

Владелец/ Owner_____
_____
_____
_____
фамилия, имя, отчество/ full name   подпись/ signature

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