



**GreeneDIH**  
Digital Innovation Hub



**SMART  
AGRI  
HUBS**

# **Supporting Agri food communities and networks in SEE through developing services on digital food quality and traceability using blockchain**



## **USER MANUAL**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 818182



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# 1. INTRODUCTION

This document User manual describes in detail how to use blockchain solution developed within the project “Supporting Agri food communities and networks in SEE through developing services on digital food quality and traceability using blockchain”.

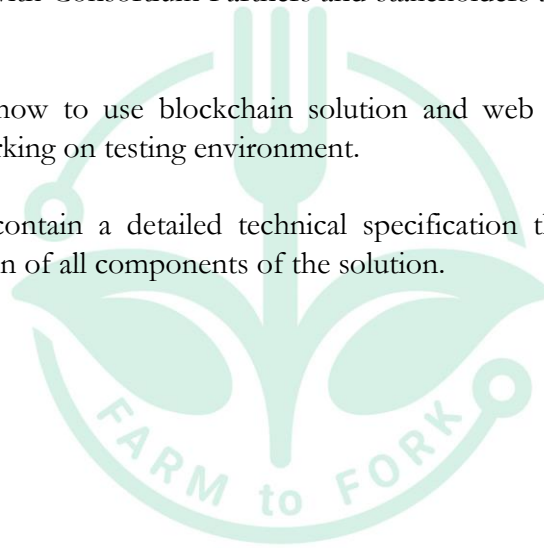
This document represents the contractual delivery of:

- Deliverable 3 Technology roadmap
- Deliverable 4 Lab pilot case
- Deliverable 5 Prepared documents for education of DIHs

This document was created by Partner Cuspis d.o.o., as a result of Cuspis d.o.o. domain knowledge, meetings held with Consortium Partners and stakeholders and collected information from producers.

This document describes how to use blockchain solution and web as part of this solution. Everything described is working on testing environment.

The document does not contain a detailed technical specification that would serve for the development and production of all components of the solution.



## 1.1. ABOUT CONSORTIUM

Consortium of four Digital Innovation Hubs in South East Europe partnering with one Competence Centre and one blockchain IT company, is geographically dispersed but reaches wider range of stakeholders throughout the Region.

Consortium Partners are:

[Green DIH](#), Digital Innovation Hub from Romania – Lead Partner

[DIH TERA](#), Digital Innovation Hub from Croatia

[DIH Hadas Bar](#), Digital Innovation Hub from Israel

[DIH Smart Village](#), Digital Innovation Hub from Bosnia and Herzegovina

[Centar Kompetencija](#), Competence Centre from Croatia

[Cuspis](#), Blockchain IT company from Croatia

## 1.2. ABOUT PROJECT

The Project “Supporting Agri food communities and networks in SEE through developing services on digital food quality and traceability using blockchain – DFTB” increased participation of DIHs in South East Europe Region in digital transformation of Agri-food sector with focus on food traceability using blockchain. Project focuses on supporting services that can significantly improve entrepreneurial business with the help of digitalization using blockchain technology creating transparent supply chain from farm to fork as well as enable customer to know history of the specific package or piece of food they are buying. Project focus is on food processors, customers, regulators, local government officials, and consumer protection association representatives. As a result of the Project, participating DIHs are able to offer range of new digital services: Scouting and ecosystem analysis, Technology Road Map, Proof of concept, Workshops and seminars, Lab facilities, Support for innovative business models.

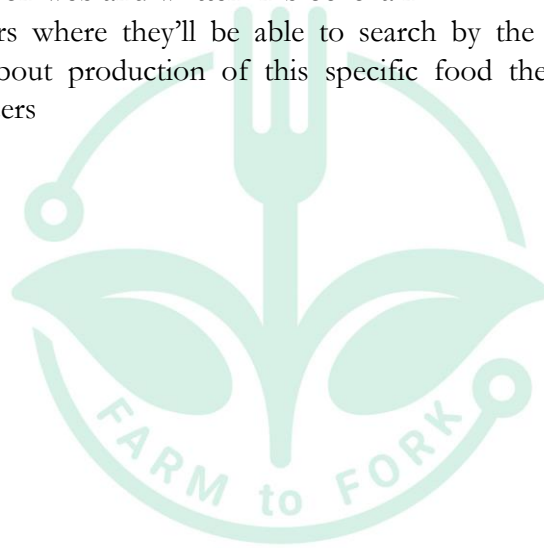
## 1.3. ABOUT SMARTAGRIHUBS

SmartAgriHubs is a project funded by the European Union through the Horizon 2020 funding instrument that brings together a consortium of over 164 partners in the European agri-food sector. SmartAgriHub aims to digitize European agriculture by promoting an agricultural innovation ecosystem dedicated to excellence, sustainability, and success. The SmartAgriHubs project serves as a catalyst for innovation in smart farming. By embracing and promoting European innovation in agriculture and IT, SmartAgriHubs is expanding digital solutions in the agri-food sector and helping farmers and their businesses achieve actual and achievable results.

## 2. BLOCKCHAIN SOLUTION

Blockchain solution consist of following elements in testing environment:

- Self-assessment tool for use by stakeholders to determine their current stage of digitalization. Output that will give directions how to use digital food quality and digitalization tools
- Communication hub for collecting data with automatic integration to web site and blockchain
- Web site tool for stakeholders to directly input data about their production lifecycle or supply chain that will be automatically written and sent to communication hub and written to blockchain and published on web
- API interface for stakeholders that have their own IT system in place where they'll send their production lifecycle or supply chain data through API to communication hub which will be automatically published on web and written in blockchain
- Web site for consumers where they'll be able to search by the lot number and find all relevant information about production of this specific food they are buying, search by products and by producers



### 3. PREREQUISITES FOR USE

The blockchain solution is accessed via link <https://www.foodqualitrace.com>

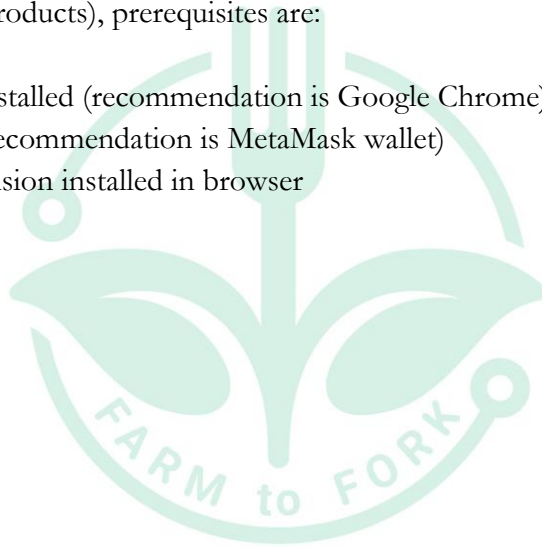
Certain prerequisites must be met to access the blockchain solution.

For users that will read information (check lot numbers, products and organizations, check different parts of the web), prerequisites are:

- Internet access
- Web browser installed (recommendation is Google Chrome)

For users that will add information (organizations that will add information about products and measuring parameters for products), prerequisites are:

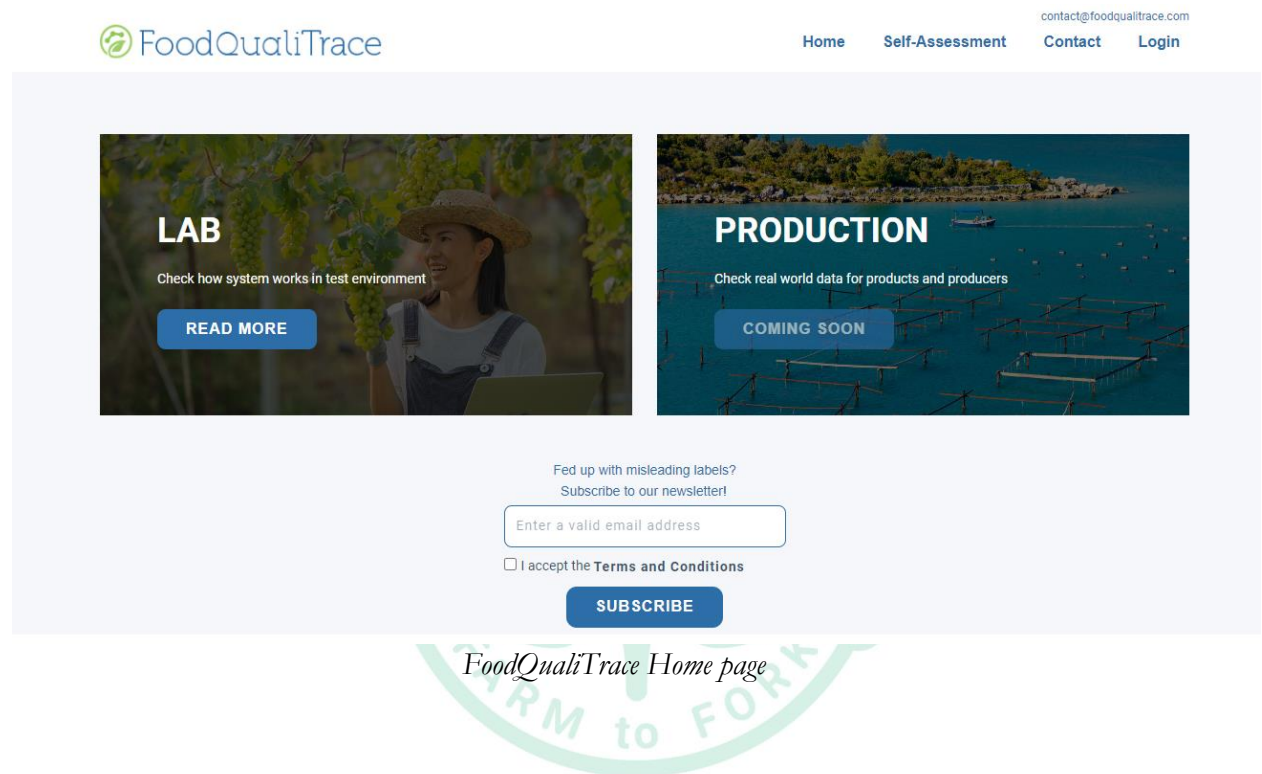
- Internet access
- Web browser installed (recommendation is Google Chrome)
- Crypto wallet (recommendation is MetaMask wallet)
- MetaMask extension installed in browser



## 4. SELF-ASSESSMENT TOOL

Self-assessment tool is used by organizations in supply chain to determine their current stage of digitalization. Output will give directions how to use digital food quality and digitalization tools.

Self-assessment tool is available on main FoodQualiTrace page, in menu “Self-assessment”.



*FoodQualiTrace Home page*

Selecting Self-assessment from menu, user will be redirected to Self-assessment form.

Blockchain technology in Agrifood sector

## FoodQualiTrace - Self Assessment Tool

This Self-assessment tool is used to determine your organization current stage of digitalization. Final result will give you direction for possible improvements and examples of next steps.

Stage of digitalization with points (total points are 400, 100 for each role in supply chain):

1. Beginner - 0 - 25
2. Intermediate 26 - 50
3. Advanced - 51 - 75
4. Expert - 76 - 100

[Sign in to Google](#) to save your progress. [Learn more](#)

\* Required

Email \*

Your email

Add your First name and Last name \*

Your answer

*FoodQualiTrace Self-assessment Tool form*

User can answer questions to determine on which stage of digitalization its organization is. Final result will give direction for possible improvements and examples of next steps.

Questions are based on users roles in supply chain – Producer, Processor, Distributor and POS (Point of Sale). Depending on the role, categories of questions are:

- measuring parameters
- devices for measuring parameters
- products health checks
- measurement frequencies
- organization of production land



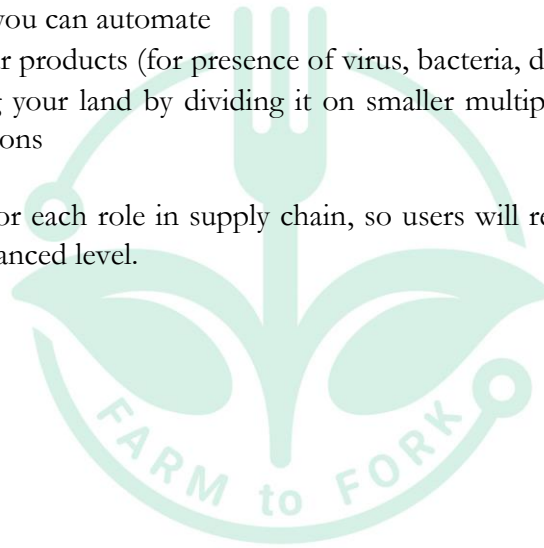
For each answer, user receives points. At the end, final score will be calculated and users will get result of their current stage of digitalization. Depending on final score, there are 4 stages of digitalization:

0-25 Beginner  
26-50 Intermediate  
51-75 Advanced  
76-100 Expert

At the end, user will also receive some recommendations for next steps:

- Think about measuring conditions
- Think about using devices for measuring parameters
- Think about collecting information from devices for measuring parameters
- Think about processes you can automate
- Think about testing your products (for presence of virus, bacteria, disease, parasite, etc...)
- Think about organizing your land by dividing it on smaller multiple lots for more accurate measurement of conditions

Total points are 400, 100 for each role in supply chain, so users will receive result e.g., 60/400, which is 60 points and Advanced level.



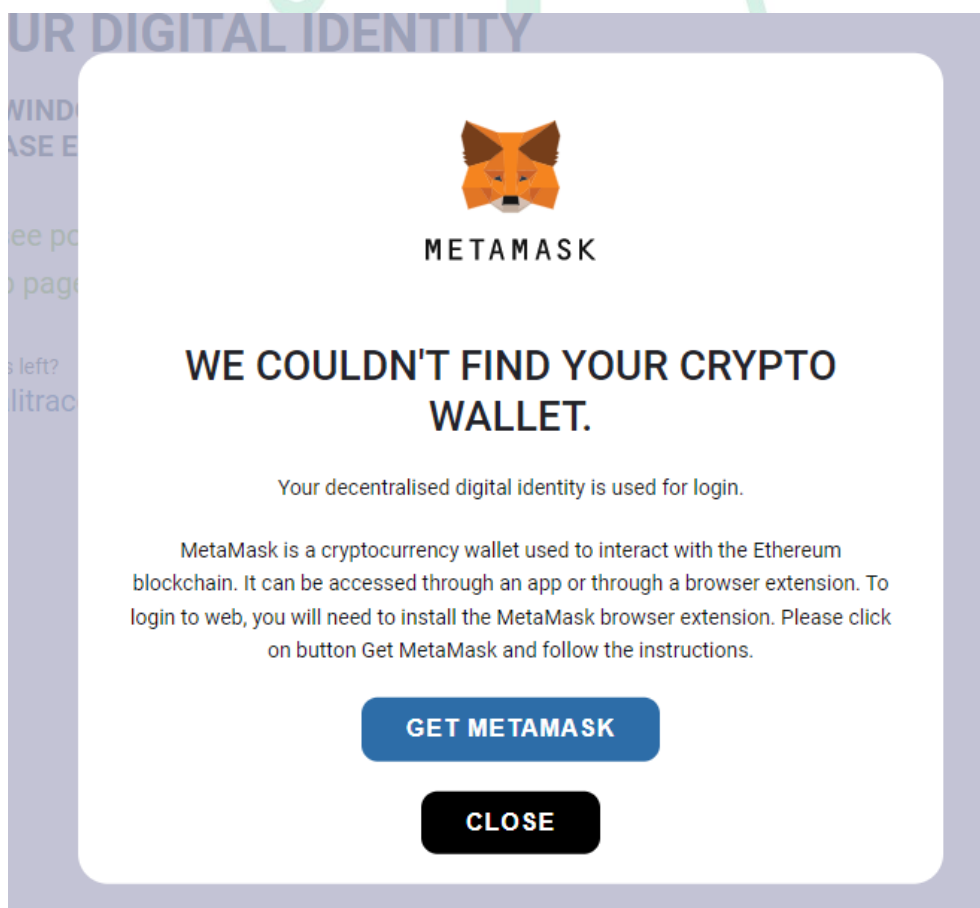
## 5. WEB SITE TOOL FOR STAKEHOLDERS

Web site tool for stakeholders gives producers, processors, distributors and POS (points of sale) tool to directly input data about parameters for product they produce/process/hold during its production lifecycle or supply chain. Inputted data is automatically written and sent to communication hub, written to blockchain and published on web. Stakeholders can use their digital identity to register and login to web site tool.

### 5.1. DIGITAL IDENTITY

Before filling data into web site tool for the first time, users (stakeholders) need to register to web. Registration is done using digital identity. Digital identity is represented by cryptocurrency wallet. User needs to have registered cryptocurrency wallet which will be used for paying transactions.

After user select Login menu on web site tool for the first time, message will appear and ask user to connect cryptocurrency wallet. It is suggested to use MetaMask extension for browser. MetaMask is a software cryptocurrency wallet used to interact with the Ethereum blockchain.



*Pop up window after selecting Login (user don't have MetaMask extension in browser)*

Selecting button “Get MetaMask”, user will be redirected to Chrome Web Store with MetaMask extension. Following the instructions in Chrome, user can install MetaMask extension and set up MetaMask wallet.

### **How to set up a MetaMask wallet**

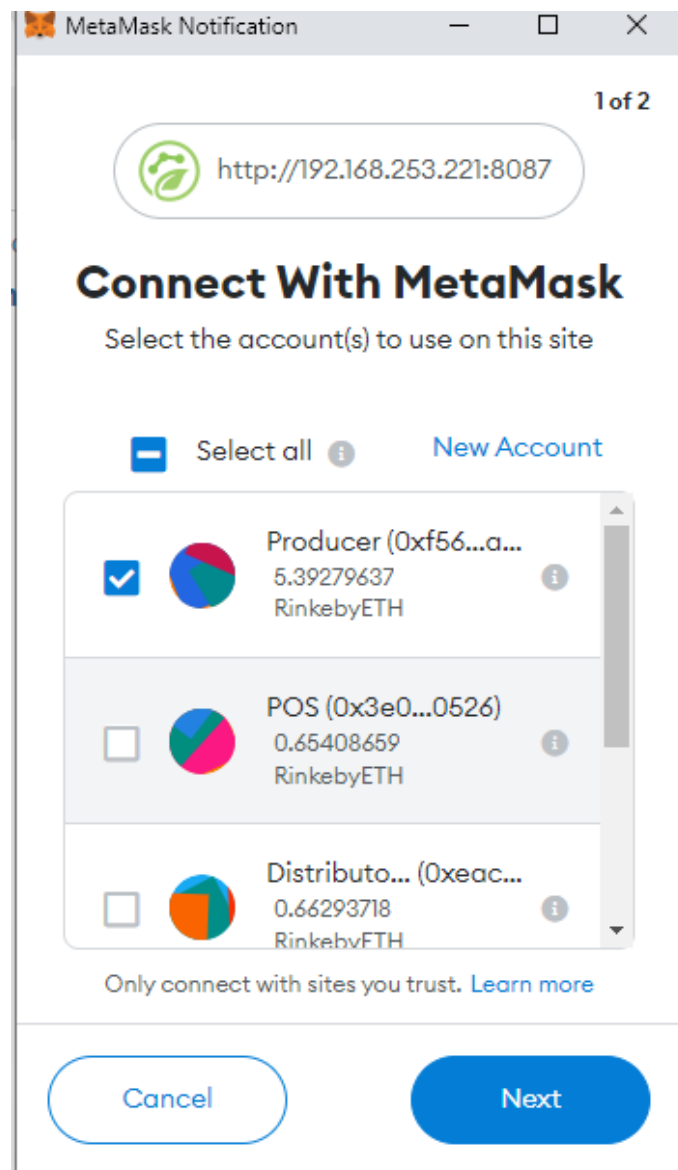
1. On MetaMask Chrome Web Store page user should select “Add to Chrome.”
2. A pop-up entitled “Add Metamask?” should appear. User should select “Add Extension.”
3. A new tab will appear. User should select “Get Started.”
4. If user already have wallet, user should select “No, I already have Secret Recovery Phrase”. If user is new to MetaMask, user should select “Create a New Wallet” under “Yes, let's get set up!”
5. After user selected “Create a New Wallet”, MetaMask will ask whether it can gather user usage data. If user accepts, user should select “I Agree.” If not, user should select “No Thanks.” Selecting the latter will not affect your ability to move forward in the set-up process.
6. User should create a password for MetaMask. Suggestion is to use a password that haven't be used for other accounts, and password that is long and complicated. Next, user should tick the “I have read and agree to the Terms of Use” box.
7. User will be guided to watch a short video on how to secure MetaMask wallet, which involves a writing down and storing a secret recovery phrase (a string of 12 words that gives user, or anyone else who has it, access to MetaMask wallet and its contents). User should select “Next.”
8. After that, user will be redirected to new page that has user 12-word recovery phrase. User should select greyed out area to reveal password. Once you've written it down, hit “Next.”

#### **Note:**

User should not, under any circumstances, give out recovery phrase to anyone. User should also keep a copy of recovery phrase, but put it somewhere safe. If user computer crashes, and user don't have recovery phrase, user won't be able to access MetaMask wallet.

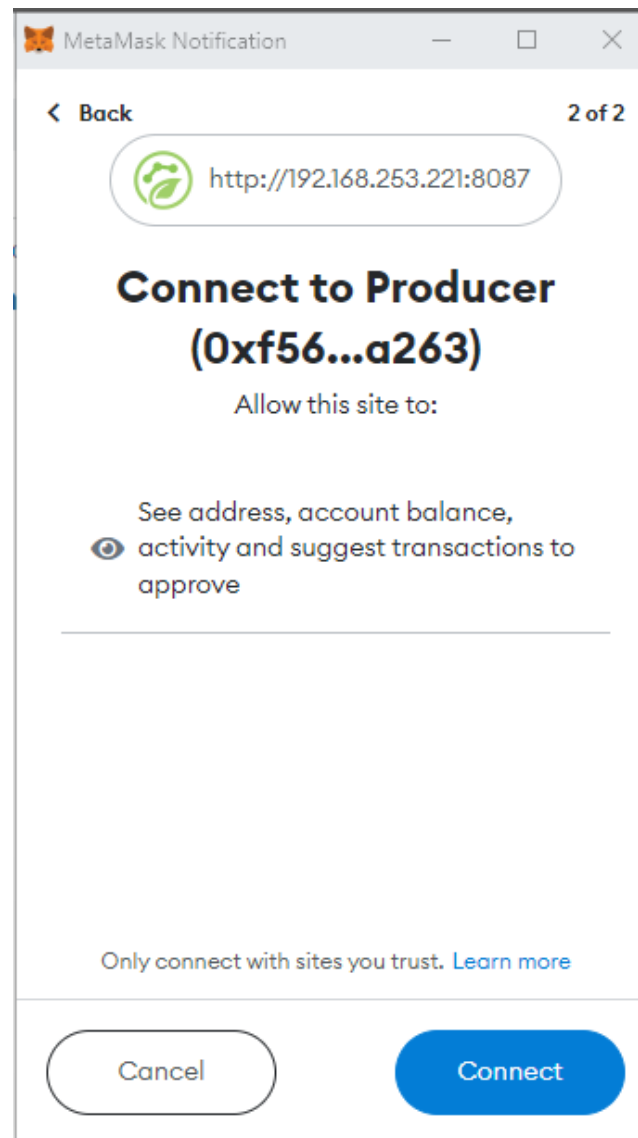
9. User should confirm secret recovery phrase by putting the 12 words in the right order. After that, user should select “Confirm”.
10. After that, user will be redirected to page that says, “Congratulations!” This is the final step on which user officially has a Metamask wallet that's ready to go. User should select “All done.”

Returning on FoodQualiTrace, and selecting MetaMask extension in browser, user will be directed to connect wallet to web site. User should select account and select button “Next”.



*MetaMask extension - Asking to connect to web FoodQualiTrace*

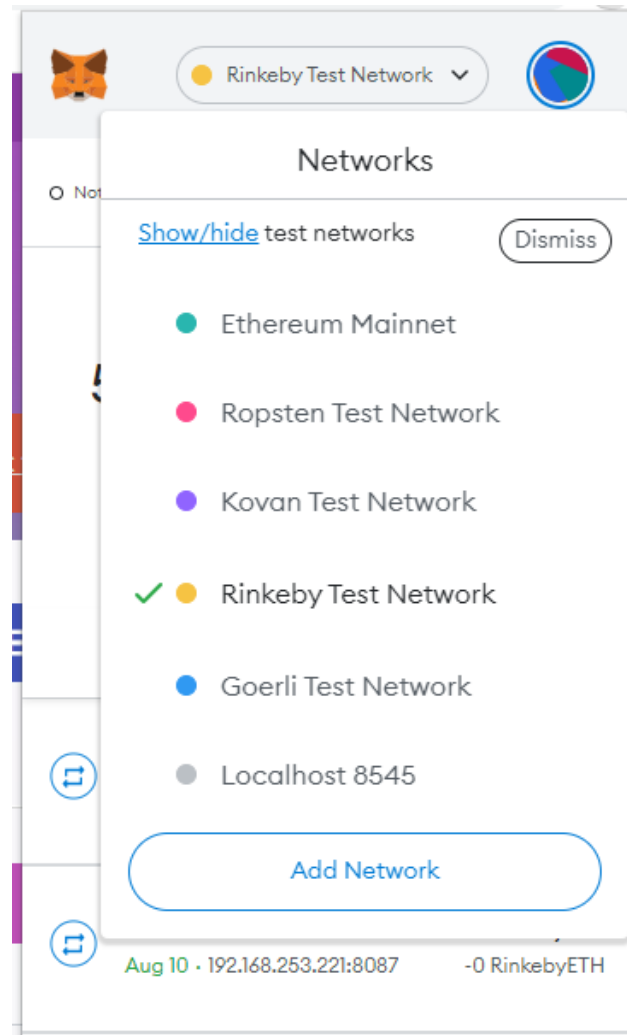
After that, user will get option to connect account to web page FoodQualiTrace. User should select button “Connect”.



*MetaMask extension - Showing what will FoodQualiTrace web see*

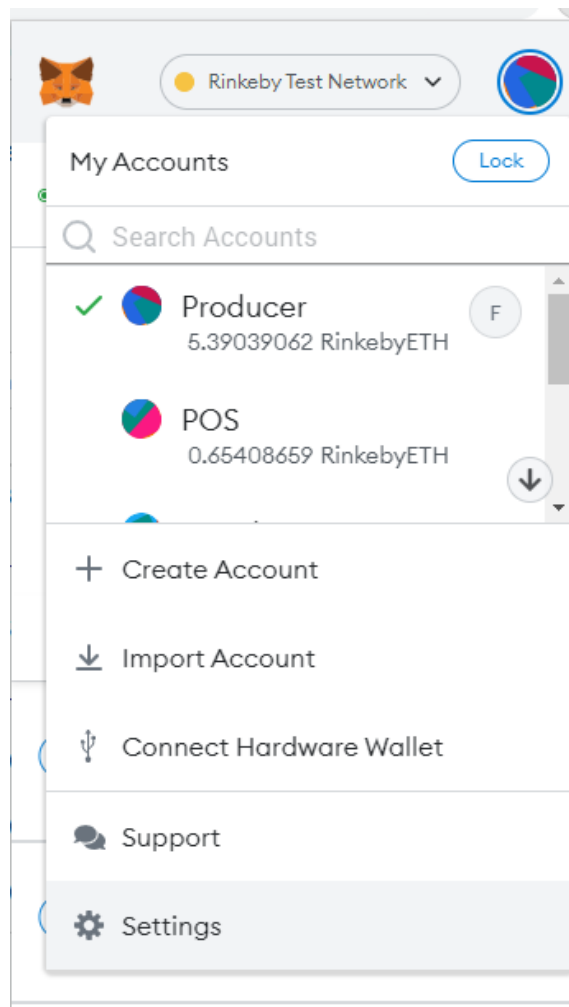
Since blockchain solution is available on testing environment, user should set up wallet account on Test Network.

Next to MetaMask logo, there is dropdown menu where user can select Networks. If Rinkeby Test Network is visible, then user should select it.



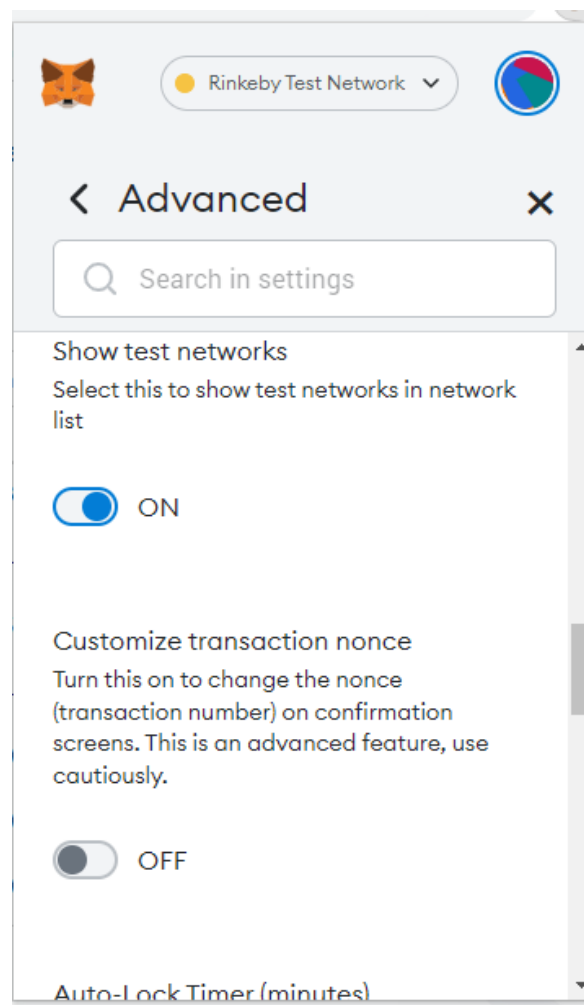
*MetaMask extension - Showing available Networks*

If user doesn't see Test Networks, user should set up it in Settings.



*MetaMask extension - Settings*

After that user should select Advanced, and then put Show test networks on “ON”.



*MetaMask extension - Settings/ Advanced*



After connecting wallet account to webpage, user will see pop up window with fields to fill in Profile info (name and info about organization). Wallet Address will be automatically filled with info from wallet account address connected to web page. Fields “Wallet Address”, “Your organization name” and “About your organization” are required. User will also need to check the box for agreeing with Terms and Conditions and Privacy Policy. Before checking the box, user can read both texts by selecting one of the titles of the text. By selecting one of the titles of the text, user will be redirected to new page. After reading the text, user can go back and continue with registration. User is registered after selecting button “Submit”.

Wallet Address

0x442e4d781f97731934d911d0f68e6d8c5b08e770

Your organization name (this is how other users will identify you)

Org. Name

Your email address (this is used to send you important updates)

Enter a valid email address

About your organization (this is your organization profile information other users will see)

Enter your info

☐ By signing up, I agree to [Terms and Conditions](#) and [Privacy Policy](#).

**SUBMIT** **CANCEL**

*Pop up window with data to be filled in order to register new account*

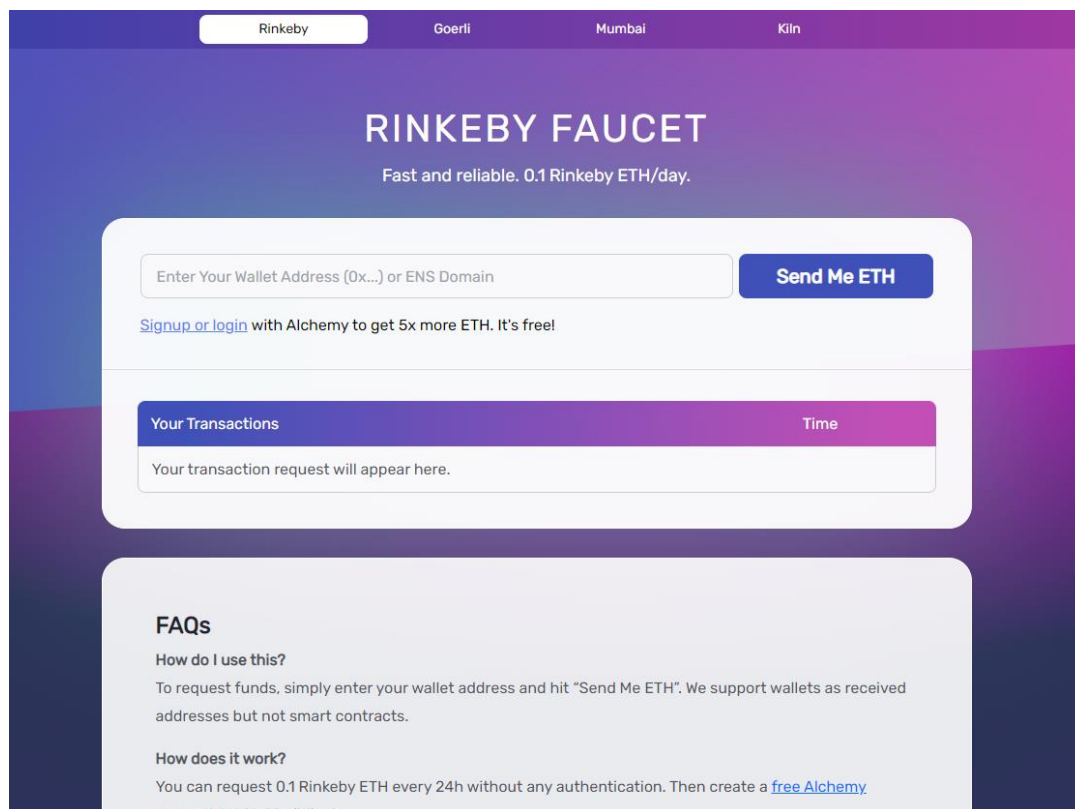
After user has registered profile, next time won't be necessary to register it again because user will only need to log in and everything will be ready to fill in data into web site tool.

User can change information on web later on by selecting Login/Organization name and then Profile info. Before user is logged in, Login will be shown in menu. After user log in, Organization name will be shown in menu.

## 5.2. OBTAINING CRYPTOCURRENCY FOR TESTING PURPOSE

Each time data is stored on blockchain, transaction is made which is paid as a small fee. In order to store data on blockchain, user needs to pay that transaction. Since blockchain is available on testing environment, user can obtain test Ethereum for testing purpose.

Visiting <https://rinkebyfaucet.com/>, user should choose Rinkeby on top of the page. After that user can enter wallet address and select button “Send Me ETH”. User will receive 0.1 Rinkeby ETH per day which can be used for paying transactions on testing environment. This way, user can request 0.1 Rinkeby ETH every 24h without any authentication.



*Rinkeby Home page*

## 5.3. TRANSACTIONS

User can write data to blockchain, and read data already written on blockchain. Each time user writes data on blockchain, small transaction fee needs to be paid. Each time user reads data from blockchain, no transaction fee needs to be paid.

Data is written on blockchain each time user:

- adds new lot number
- adds parameters for lot number

- transfer Lot number
- set end date to Lot number

Data has been read from blockchain each time user:

- checks products in Lab section
- checks Lot number data in Lab section
- checks organizations in Lab section

## 5.4. ROLES

Users will have roles according to their role in product lifecycle and product stages – production, processing, distribution, sale.

### 1 – Producer

Producer is organization which produces specific product and measures product parameters during growing/production stage.

### 2 – Processor

Processor is organization which buys product from producer, combine it with some other products from the same or other producers and make a new product. Processor measures all parameters for different products (that are combined) during processing stage.

### 3 – Distributor

Distributor is organization which transports specific product and measures product parameters during distribution stage. One specific product can have several distributors before going to the point of sale. Each distributor will measure product parameter during their distribution.

### 4 – POS

POS (Point of Sale) is organization which sales specific product and measures product parameters while the product is on POS. One specific product can have several POS before customer buys it. Each POS will measure product parameters while the product is on POS.

After user register profile, by default will have Producer role. Producers are first in supply chain, and they will first create data about product during production phase. One user can have more roles, depending on the role in supply chain. That means that one organization can be e.g., Producer and Distributor at the same time because it will transport its own products.

Roles are very important because user will only be able to add values for parameters connected to role (e.g., Producer won't be able to add values for parameters for other roles).

Example of measured parameters by roles:

Producer – parameters measured during production

- Temperature
- Humidity
- Light

Processor – parameters measured during processing

- Temperature

Distributor – parameters measured during transportation

- Transport temperature
- Transport humidity

POS – parameters measured during storage

- Store temperature
- Store humidity

After producer is finished with production, he/she will transfer Lot number to another organization in supply chain and choose role that this organization has in supply chain. That way new organization will be able to add parameters connected with role that producer selected during transferring Lot number.

If user has more roles in supply chain, it is possible to change role by transferring Lot number to the same address and selecting different role. That way Lot number will stay at the same address, but user will have different role and will be able to add parameters connected to this new role. That means that e.g., Producer will transfer Lot number to same address, but will choose role Distributor. After transferring Lot number, user won't be able to add parameters measured during production, but user will be able to add parameters measured during transportation.

More about transferring Lot numbers will be described in following sections.

## 5.5.WEB SITE INTERFACE

After user is logged in to web site, features are shown in dropdown menu. User can update profile info for organization, add new lot numbers for products, add parameters for added lot numbers, transfer lot number to another address or end lot number.

### **Note:**

User can only login using web browser, Login is not available on mobile version.

### **5.5.1. Profile info**

In Profile info, user can add/update/delete information about organization. Field names that can be filled and descriptions are as follows:

- **Wallet Address (required)**  
User can see own Address which is automatically added from wallet extension. Even if user deletes address, it will be automatically added from wallet extension.
- **Your organization name (required)**  
User can add organization name which will appear when searching lot number that is connected to organization, when searching products and when searching organizations

- **Your email address (optional)**

User can add email address which will be used to send important updates to user

- **About your organization (required)**

User can add short description of organization which will be shown when searching organizations. Maximum allowed characters are 1.000.

After data is added or changed, user needs to select button “Save” to save changes.

FoodQualiTrace

Home Self-Assessment Contact **Producer Ltd**

contact@foodqualitrace.com

**Profile Info**

Address

0xf5603a34b59485f7cb9385f465c93748bf52a263

Your organization name (this is how other users will identify you)

Producer Ltd

Your email address (this is used to send you important updates)

Enter a valid email address

About your organization (this is your organization profile information other users will see)

Producer Ltd is company ...

**SAVE**

Profile info

Products data

Lot Data

Logout

### 5.5.2. Products data

In Products data, user can add parameters to lot numbers that are connected to this user address, under certain conditions. That means that user can add parameters if:

- Lot number is registered by this user and visible in menu Lot data
- Lot number is register by another user, transferred from another user address to this user address and visible in menu Lot data
- Lot number is active, meaning that there is no End Date on lot number and visible in menu Lot data

Following these criteria, user can't add parameters if:

- User don't have lot number(s)
- Lot number is transferred to another user
- Lot number is ended (has End Date)

Field names that can be filled and descriptions are as follows:

#### 1. PRODUCT DATA

- **Lot number**

User selects Lot number from dropdown menu (all available lot numbers will be shown). Parameters for selected Lot number will be shown on right side under PRODUCT PARAMETER. Parameters will be added for selected Lot number.

– **Measurement Date**

User can add measurement date and time, or select it from dropdown menu which will show calendar with dates and clock with time. By default, field will show current date and time, but user can select its own date and time. Selected date and time can't be before lot number started and can't be date and time in future.

FoodQualiTrace

contact@foodqualitrace.com

Home Self-Assessment Contact Producer Ltd

**PRODUCT DATA**

Lot Number:

Select a value...

Measurement Date

12.08.2022 14:43

**PRODUCT PARAMETER**

*Product data - Before selecting lot number*

## 2. PRODUCT PARAMETER

After selecting Lot number, parameters connected to Lot number (and product register in Lot number) will be shown.

Each parameter will have name and unit in which is measured. User can add values for each parameter. User can also add test results for each testing, choosing between “Not Measured”, “Present” and “Absent”. If “Not Measured” is selected, data won't be shown for this test when checking Lot number. If “Present” or “Absent” is selected, this result will be shown for this test when checking Lot number.

To be able to save data, at least one parameter/test result must be added (meaning that user can save data if at least one parameter/test result is added, but user can add few or all parameters too).

### PRODUCT DATA

Lot Number:

2022-3-1001380655-20220812144413939

Measurement Date

01.08.2022 14:45

### PRODUCT PARAMETER

TEMPERATURE (°C)

Please add value between 6 - 38

HUMIDITY (%)

Please add value between 33 - 113

LIGHT (hours/day)

Please add value between 6 - 21

TEST FOR SALMONELLA BACTERIA

Not Measured

TEST FOR PEST CONTROL

Not Measured

SAVE

CANCEL

*Product data - After selecting lot number*

After adding values to parameters, user can save data selecting button “Save” or disregarding data selecting button “Cancel”:

- If user selects button Save, wallet extension will show pop up window with details about transaction and buttons to reject transaction (button “Reject”) or confirm transaction (button “Confirm”).
  - If user selects “Confirm” on pop up window, transaction will be processed if user have enough cryptocurrency in wallet. If user don’t have enough cryptocurrency in wallet, message will appear with information that transaction is rejected and to check users wallet. If user have enough cryptocurrency in wallet, transaction will be processed, and message will appear confirming that transaction was successful and data is saved on blockchain. Parameters for selected Lot number will be saved.
  - If user selects “Reject” on pop up window, message will appear with information that transaction is rejected and to check users wallet. Parameters for selected Lot number won’t be saved.
- If user selects button “Cancel”, all entered values will be deleted, Lot number field will show last selected lot number and Measurement Date will show current date and time. Parameters for selected Lot number won’t be saved.

*Product data - After entering data and selecting button Save*

### 5.5.3. Lot data

In Lot data, user can see all lot numbers connected to user account and relevant information about those lot numbers.

| <input type="checkbox"/> | Name                  | Lot Number                      | Start ...   | End D... | Station         | Location   | Year |                         |                         |                          |
|--------------------------|-----------------------|---------------------------------|-------------|----------|-----------------|------------|------|-------------------------|-------------------------|--------------------------|
| <input type="checkbox"/> | Eggs                  | 2022-3-1001380655-2022081214... | 01.08.20... |          | Hen farm 1      | 1001380655 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input type="checkbox"/> | Eggs                  | 2022-3-1001380655-2022081215... | 06.08.20... |          | Hen farm 2      | 1001380655 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input type="checkbox"/> | Pig (Black Slavonian) | 2022-4-1001315154-2022081215... | 06.07.20... |          | Pig farm 1      | 1001315154 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input type="checkbox"/> | Apples                | 2022-1-1001307175-2022081215... | 10.06.20... |          | Orchard Ap...   | 1001307175 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input type="checkbox"/> | Apples                | 2022-1-1001307175-2022081215... | 23.06.20... |          | Orchard Ap...   | 1001307175 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input type="checkbox"/> | Avocado (Hass)        | 2022-2-1001307165-2022081215... | 12.08.20... |          | Avocado pl...   | 1001307165 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input type="checkbox"/> | Wine (White)          | 2022-5-1001394024-2022081215... | 07.07.20... |          | Wine cellar ... | 1001394024 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |

*Lot data - Showing information about Lot numbers for this user address*

Column names and descriptions are as follows:

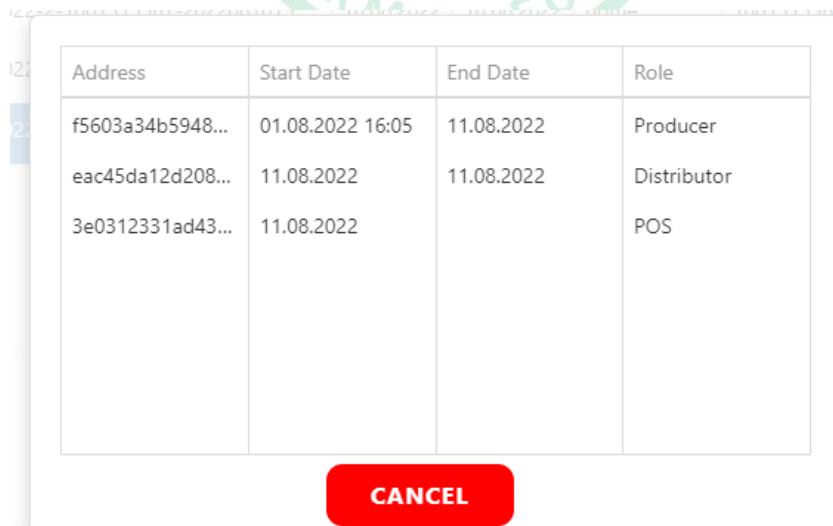
#### – Checkbox column

User can see which lot numbers are selected. Lot numbers can be selected/deselected individually by clicking on row with lot number, or can be selected/deselected all by clicking checkbox in top of the column. Lot numbers



that are selected will have tick in the checkbox on the beginning of the row, and those that are not selected, will have empty checkbox on the beginning of the row.

- **Name**  
User can see name of the product to which specific lot number belongs
- **Lot Number**  
User can see Lot number
- **Star Date**  
User can see starting date and time of specific Lot number
- **End Date**  
User can see ending date and time of specific Lot number
- **Station**  
User can see station where Lot number is located. Station is used for better organizing and defining exact location of the Lot number on specific location. Name of the station is individual for user, so user can create own Station names.
- **Location**  
User can see location code where specific Lot number is located.
- **Year**  
User can see year in which Lot number is created.
- **History**  
User can see history of handling specific Lot number – it shows wallet address of user, start date (date and time when this lot first come to this user address), end date (date and time when this lot was last time handled by this user address), role of this user



| Address          | Start Date       | End Date   | Role        |
|------------------|------------------|------------|-------------|
| f5603a34b5948... | 01.08.2022 16:05 | 11.08.2022 | Producer    |
| eac45da12d208... | 11.08.2022       | 11.08.2022 | Distributor |
| 3e0312331ad43... | 11.08.2022       |            | POS         |

*Button “History” - Showing history of handling selected Lot number*

- **Lot No.**  
User can see Lot number and URL address for searching data about this lot number parameters. It also allows user to generate QR code for this specific Lot number. QR code can be downloaded.

Lot Number:

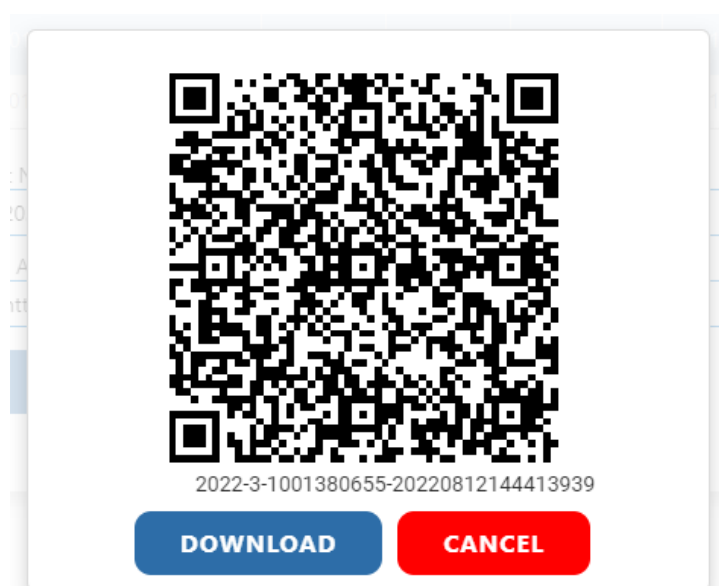
2022-3-1001380655-20220812144413939

Url Address:

<https://www.foodqualitrace.com/#/lotresult>

**GENERATE** **CANCEL**

*Button “Lot No” - Showing Lot number and URL address before selecting button “Generate”*



*Button “Generate” - Showing QR code and Lot number with option to download QR code*

## – Transfer

User can transfer individual Lot number to another address. User will see own address from which Lot number is transferred (Transfer from), and need to enter new address to which Lot number is being transferred (Transfer to). User also needs to choose from dropdown menu role of new address to which this Lot number is transferred. After selecting Save, user needs to pay transaction for writing data to blockchain. After Lot number is transferred to another address, user can't add new data to this Lot number (add new parameters, transfer it), but can read existing data (History, Lot No., search data about parameters).

Transfer from:

0xf5603a34b59485f7cb9385f465c93748bf52a263

Transfer to:

0xeAc45da12d20848816dd71135c821451722deC0e

Choose the role:

Distributor

SAVE CANCEL

*Button “Transfer” – Example for transferring Lot number*

**Note:**

There are two buttons for transferring Lot numbers:

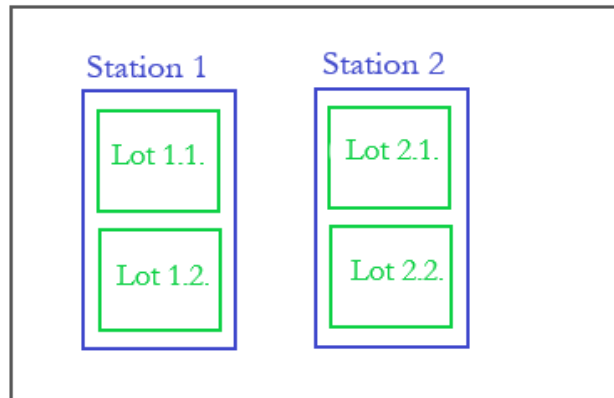
1. Button “Transfer” on the end of the Lot number row is used for transferring this specific Lot number to another address.
2. Button “TRANSFER” on the top of the page is used for transferring one or more Lot numbers to another (same) address.

User can also use buttons “NEW LOT”, “TRANSFER” and “END LOT”.

Button “**NEW LOT**” allows user to add new Lot number for specific product. Selecting button “NEW LOT”, new pop-up window will appear. Field names and descriptions in this window are as follows:

- **Product**  
User can choose from dropdown menu product for specific Lot number.
- **Location**  
User can choose country and then city from dropdown menu on which specific Lot number is located.
- **Station**  
User can add station (which is part of the location) on which specific Lot number is located. One location can have multiple stations, and one station can have multiple lot numbers. Brief explanation is presented on picture:

## Location



*Differences between Location, station and Lot number*

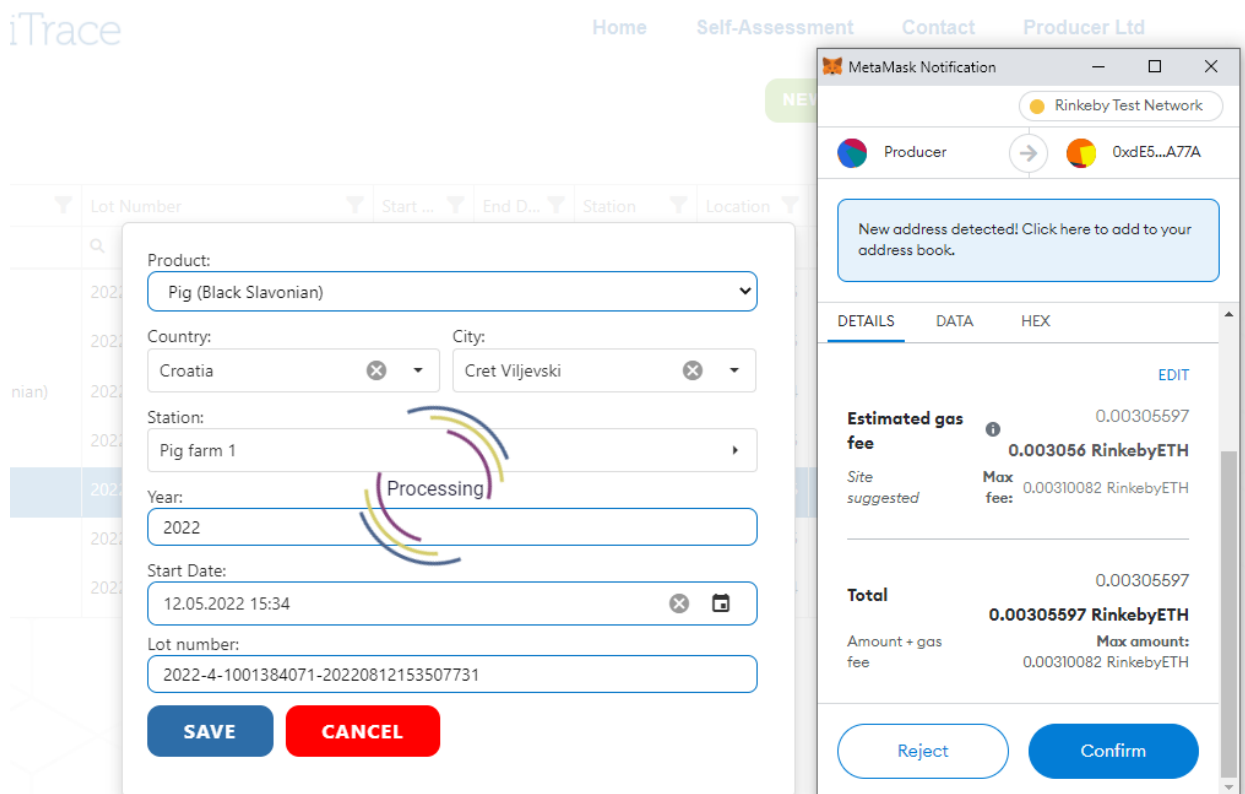
- **Year**  
Current year in which Lot number is created. This field is read only, can't be changed.
- **Start Date**  
User can add start date and time when Lot number is created. It can be current date and time, and date and time in past, but it cannot be date in future.
- **Lot number**  
User can choose to use default predefined Lot number (format YYYY-ProductID-LocationCode- yyyyMMddHHmmssfff) or can create own and enter it in the field.

*Button “NEW LOT” - Example of adding data for new Lot*

User can save data selecting button “Save” or disregarding data selecting button “Cancel”:

- If user selects button “Save”, wallet extension will show pop up window with details about transaction and buttons to reject transaction (button “Reject”) or confirm transaction (button “Confirm”).

- If user selects “Confirm” on pop up window, transaction will be processed if user have enough cryptocurrency in wallet. If user don’t have enough cryptocurrency in wallet, message will appear with information that transaction is rejected and to check users wallet. If user have enough cryptocurrency in wallet, transaction will be processed, and message will appear confirming that transaction was successful and data is saved on blockchain. Lot number will be created.
- If user selects “Reject” on pop up window, message will appear with information that transaction is rejected and to check users wallet. Lot number won’t be created.
- If user selects button “Cancel”, pop up window will close and all entered data will be deleted. Lot number won’t be created.

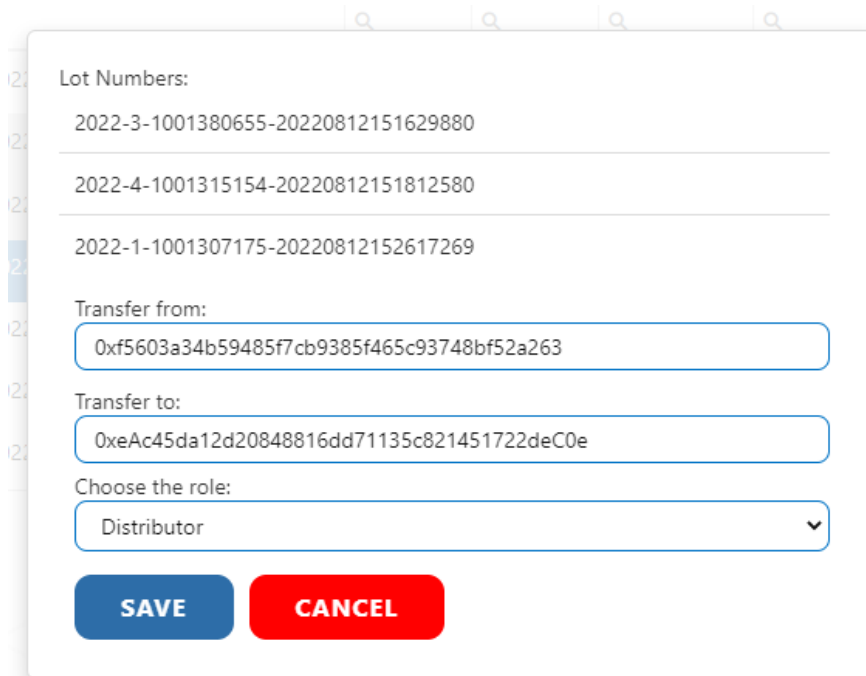


*Button “NEW LOT” - After entering data and selecting button Save*

Button “**TRANSFER**” allows user to transfer one or more Lot numbers to another address (the address must be the same). User selects Lot numbers which want to transfer by clicking on checkbox in front of the row of Lot number and then selects button “TRANSFER”. Selecting button “TRANSFER”, new pop-up window will appear. Field names and descriptions in this window are as follows:

- **Lot Numbers**  
User will see all selected Lot numbers that will be transferred.
- **Transfer from**  
User will see own address from which Lot number will be transferred
- **Transfer to**  
User will need to enter address to which Lot numbers will be transferred
- **Choose the role**

User needs to choose from dropdown menu role of new address to which Lot numbers will be transferred. User can choose between Producer, Processor, Distributor and POS (Point of sale). It is important to choose right role, because new user will only be able to add values for parameters connected to his role (e.g., Producer won't be able to add values for parameters for other roles).



Lot Numbers:

2022-3-1001380655-20220812151629880

2022-4-1001315154-20220812151812580

2022-1-1001307175-20220812152617269

Transfer from:

0xf5603a34b59485f7cb9385f465c93748bf52a263

Transfer to:

0xeAc45da12d20848816dd71135c821451722deC0e

Choose the role:

Distributor

**SAVE** **CANCEL**

*Button “TRANSFER” - Example of adding data for transferring lot numbers*

User can save data selecting button “Save” or disregarding data selecting button “Cancel”:

- If user selects button “Save”, wallet extension will show pop up window with details about transaction and buttons to reject transaction (button Reject) or confirm transaction (button Confirm).
  - If user selects “Confirm” on pop up window, transaction will be processed if user have enough cryptocurrency in wallet. If user don't have enough cryptocurrency in wallet, message will appear with information that transaction is rejected and to check users wallet. If user have enough cryptocurrency in wallet, transaction will be processed, and message will appear confirming that transaction was successful and data is saved on blockchain. Lot numbers will be transferred.
  - If user selects “Reject” on pop up window, message will appear with information that transaction is rejected and to check users wallet. Lot numbers won't be transferred.
- If user selects button “Cancel”, pop up window will close and all entered data will be deleted. Lot numbers won't be transferred.

The screenshot shows the 'ace' application interface. In the background, there is a table with columns: Lot Number, Start, End D..., Station, and Location. Overlaid on this is a 'Transfer' modal. The modal contains the following fields:

- Lot Numbers:** A text area containing "2022-3-1001380655-20220812151629880", "2022-4-1001315154-20220812151812580", and "2022-1-1001307175-20220812152617269".
- Transfer from:** A text field containing "0xf5603a34b59485f7cb9385f465c93748b52a263".
- Transfer to:** A text field containing "0xeAc45da12d20848816dd71135c821451722deC0e".
- Choose the role:** A dropdown menu with "Distributor" selected.
- Buttons:** "SAVE" (blue) and "CANCEL" (red).

Overlaid on the right is a 'MetaMask Notification' window for the 'Rinkeby Test Network'. It shows a transaction for 'Estimated gas fee' of 0.00168267 RinkebyETH. The 'Total' is 0.00168267 RinkebyETH. At the bottom, there are 'Reject' and 'Confirm' buttons.

Button "TRANSFER" - After entering data and selecting button Save

If two or more Lot numbers are transferred at the same time via button "TRANSFER", user will need to "Confirm" or "Reject" transaction for each Lot number selected.

Button "END LOT" allows user to put end date to selected Lot number(s). Even though End date is automatically added to Lot numbers during transfer to another address, sometimes it will be necessary to manually add End date (e.g., product is sold; something happened to product during production, transport; product expired...).

contact@foodqualitrace.com

Home Self-Assessment Contact Producer Ltd

NEW LOT TRANSFER END LOT

Search...

| <input type="checkbox"/>            | Name                  | Lot Number                      | Start ...   | End D... | Station         | Location   | Year |                         |                         |                          |
|-------------------------------------|-----------------------|---------------------------------|-------------|----------|-----------------|------------|------|-------------------------|-------------------------|--------------------------|
| <input type="checkbox"/>            | Eggs                  | 2022-3-1001380655-2022081214... | 01.08.20... |          | Hen farm 1      | 1001380655 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input type="checkbox"/>            | Eggs                  | 2022-3-1001380655-2022081215... | 06.08.20... |          | Hen farm 2      | 1001380655 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input checked="" type="checkbox"/> | Pig (Black Slavonian) | 2022-4-1001315154-2022081215... | 06.07.20... |          | Pig farm 1      | 1001315154 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input checked="" type="checkbox"/> | Apples                | 2022-1-1001307175-2022081215... | 10.06.20... |          | Orchard Ap...   | 1001307175 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input type="checkbox"/>            | Apples                | 2022-1-1001307175-2022081215... | 23.06.20... |          | Orchard Ap...   | 1001307175 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input type="checkbox"/>            | Avocado (Hass)        | 2022-2-1001307165-2022081215... | 12.08.20... |          | Avocado pl...   | 1001307165 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |
| <input type="checkbox"/>            | Wine (White)          | 2022-5-1001394024-2022081215... | 07.07.20... |          | Wine cellar ... | 1001394024 | 2022 | <a href="#">History</a> | <a href="#">Lot No.</a> | <a href="#">Transfer</a> |

Button "END LOT" - Selecting Lot number before selecting button "END LOT"

User selects Lot numbers which wants to end by clicking on checkbox in front of the row of Lot number and then selects button “END LOT”. Selecting button “END LOT”, wallet extension will show pop up window with details about transaction and buttons to reject transaction (button “Reject”) or confirm transaction (button “Confirm”).

- If user selects “Confirm” on pop up window, transaction will be processed if user have enough cryptocurrency in wallet. If user don’t have enough cryptocurrency in wallet, message will appear with information that transaction is rejected and to check users wallet. If user have enough cryptocurrency in wallet, transaction will be processed, and message will appear confirming that transaction was successful and data is saved on blockchain. Lot numbers will be ended.
- If user selects “Reject” on pop up window, message will appear with information that transaction is rejected and to check users wallet. Lot numbers won’t be ended.

The screenshot displays the FoodQualiTrace web application. At the top, there is a navigation bar with links: Home, Self-Assessment, Contact, and Producer Ltd. Below the navigation bar, there are three buttons: NEW LOT (green), TRANSFER (blue), and END LOT (red). A search bar is located below these buttons. The main content area features a table with columns: Name, Lot Number, Start, End D., Station, Location, Year, History, Lot No., and Transfer. The table lists various products like Eggs, Pig (Black Slavonian), Apples, Avocado (Hass), and Wine (White). The 'Apples' row is highlighted in blue, and a red circle is drawn around the 'END LOT' button in the table's action column. To the right of the table, a MetaMask notification window is open, showing a transaction confirmation for 'CONTRACT INTERACTION' with an estimated gas fee of 0.000221 RinkebyETH. The notification also displays the site's suggested fee and a max fee of 0.00022316 RinkebyETH.

Button “END LOT” - After selecting Lot number and selecting button “END LOT”

If two or more Lot numbers are ended at the same time via button “END LOT”, user will need to “Confirm” or “Reject” transaction for each Lot number selected.



## 6. WEB SITE FOR CONSUMERS

Web site for consumers gives consumer tool to search by the lot number and find all relevant information about production and supply chain of specific food they are buying. They can also search the web by products and by producers and check which products or producers are on web.

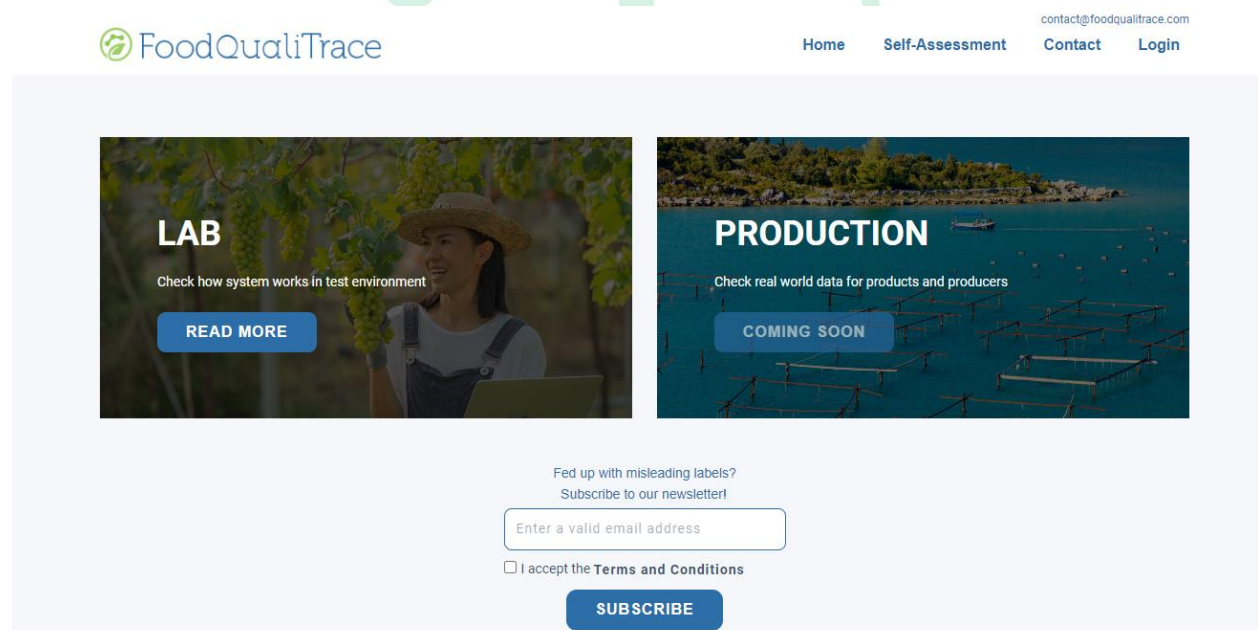
### Note:

User doesn't have to be logged in on page in order to read information.

### 6.1. WEB SITE INTERFACE

Consumer can check parameters for specific Lot number, check which products are traced and check which producers are tracing their products.

To be able to do any of that, user needs to visit <https://www.foodqualitrace.com> first. On Home page, user needs to select button "Read more" under Lab section



*FoodQualiTrace Home page*

After that, user will be redirected to Lab section, with options to check Lot number, or search products and organizations.

The screenshot shows the FoodQualiTrace website interface. At the top, there is a navigation bar with the logo on the left and links for Home, Self-Assessment, Contact, and Login on the right. Below the navigation bar, a section titled "ENTER THE LOT NUMBER FROM YOUR PRODUCT TO GET QUALITY AND TRACEABILITY INFORMATION." contains a text input field labeled "Enter lot number" and a blue "SEARCH" button. Below this, there are two main sections: "PRODUCTS" and "ORGANIZATIONS". The "PRODUCTS" section features a background image of a person in a field and text explaining the importance of knowing where food comes from, with a blue "SEARCH" button. The "ORGANIZATIONS" section features a background image of a coastal area with aquaculture and text explaining the need for transparency from producers, also with a blue "SEARCH" button.

*Lab section of FoodQualiTrace web*

### 6.1.1. Check Lot number

User can check specific Lot number in two ways:

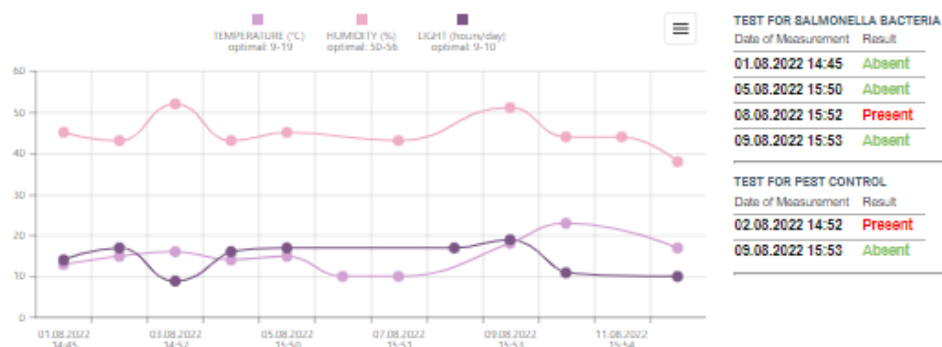
- By visiting <https://www.foodqualitrace.com/> (Lab section), entering Lot number from product and selecting Search.
- By scanning QR code from product.

In both ways, user will be redirected on page with representation of product parameters for this specific Lot number during different stages of production and supply chain. User will see information about organizations that handled product, what parameters were measured and when, values of those parameters, testing results (if there are health check tests), start date/end date for each phase. User will also see information about optimal values for each measured parameter.

Lot Number:2022-3-1001380655-20220812144413939 Product:Eggs Station:Hen farm 1 Location:Zagreb Country:Croatia

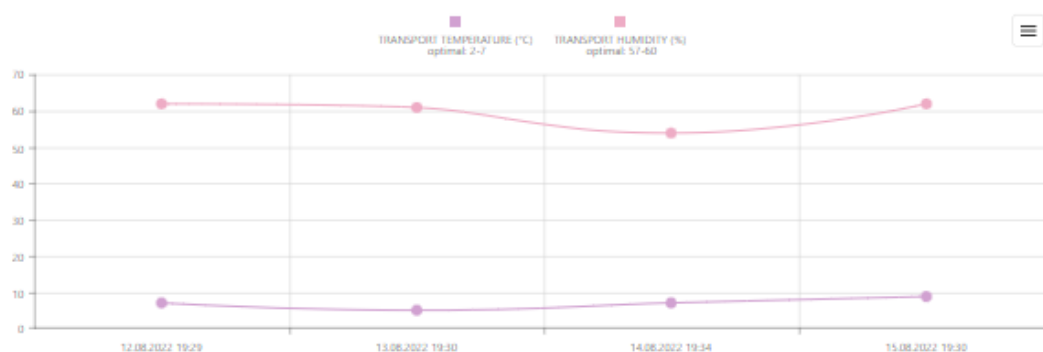
Producer: Open Fields Ltd

Address:f5603a34b59485f7cb9385f465c93748bf52a263 Start Date:01.08.2022 14:43 End Date:12.08.2022 15:57



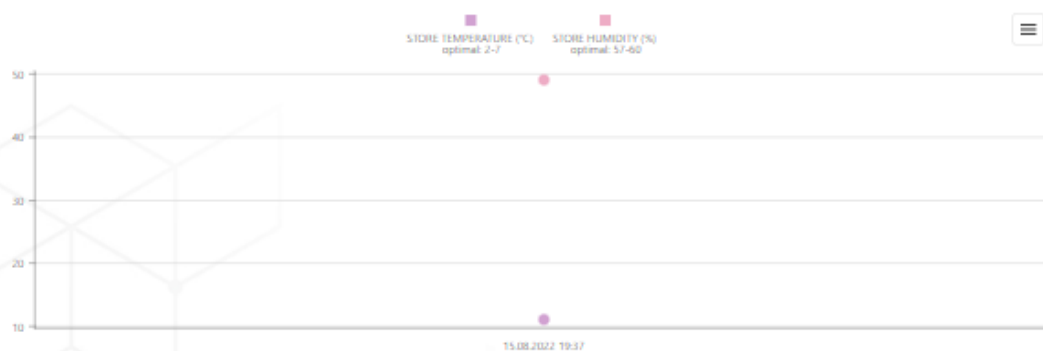
Distributor: Good Food On The Move Ltd

Address:ee045de12d20848816dd71135c821451722dec0e Start Date:12.08.2022 15:57 End Date:15.08.2022 19:35



POS: Food Corner Market

Address:3e0312331ad4340a79fe013d21f0715b6bfb0526 Start Date:15.08.2022 19:35 End Date:



Check Lot number - Example of results after entering Lot number

## 6.1.2. Check Products

User can check which products are traced. By visiting <https://www.foodqualitrace.com/> (Lab section), user needs to select button “Search” bellow Products.

ENTER THE LOT NUMBER FROM YOUR PRODUCT TO GET QUALITY AND TRACEABILITY INFORMATION.



## PRODUCTS

Consumers are not sure what they are buying. Is food really organic all the way from farm to fork? Was food really grown and distributed in optimal environment? Consumers want to be able to see history of specific piece of food they are buying.

## ORGANIZATIONS

Food farmers or food processors that are producing quality food want to give customers as much information as possible about their products and differentiating themselves from other producers, proving that their food is what they are claiming it to be.

*Lab section of FoodQualiTrace web*

All products that are traced will be shown. Selecting one of the products, user will see information where this product is produced and who is producing it.

Select the first letter from product you want to see:

A

E

P

Pig (Black Slavonian)

W

Croatia

City

Producer

Suhopolje

Producer Ltd

*Check Products – View of products by product name*

### 6.1.3. Check Organizations

User can check which organization are tracing their products. By visiting <https://www.foodqualitrace.com/> (Lab section), user needs to select button “Search” bellow Organizations.

ENTER THE LOT NUMBER FROM YOUR PRODUCT TO GET QUALITY AND TRACEABILITY INFORMATION.



## PRODUCTS

Consumers are not sure what they are buying. Is food really organic all the way from farm to fork? Was food really grown and distributed in optimal environment? Consumers want to be able to see history of specific piece of food they are buying.

## ORGANIZATIONS

Food farmers or food processors that are producing quality food want to give customers as much information as possible about their products and differentiating themselves from other producers, proving that their food is what they are claiming it to be.

Lab section of FoodQualiTrace web

All organizations that are tracing products will be shown. Selecting one of the organizations, user will see information about this organization – organization role in supply chain and which products they are handling, organization name, email address (if available), short description of organization.

Select the first letter from organization name you want to see:

- F
- G
- O
- Open Fields Ltd**
- T

|                       |                       |         |          |
|-----------------------|-----------------------|---------|----------|
| Eggs                  |                       |         |          |
| City                  | State                 | Country | Role     |
| Zagreb                | City of Zagreb        | Croatia | Producer |
| Pig (Black Slavonian) |                       |         |          |
| City                  | State                 | Country | Role     |
| Suhopolje             | Virovitick-Podravaska | Croatia | Producer |
| Apples                |                       |         |          |
| City                  | State                 | Country | Role     |
| Vinkovci              | Vukovar-Sirmium       | Croatia | Producer |
| Avocado (Hass)        |                       |         |          |
| City                  | State                 | Country | Role     |
| Vis                   | Split-Dalmatia        | Croatia | Producer |
| Wine (White)          |                       |         |          |
| City                  | State                 | Country | Role     |
| Ilok                  | Vukovar-Sirmium       | Croatia | Producer |

Organization: Open Fields Ltd

Email:

Products: Eggs, Pig (Black Slavonian), Apples, Avocado (Hass), Wine (White)

Open Fields is company that produces high quality food on farms all around Croatia. We grow fruits and vegetables on fields, breed animals on farms and make a good white wine from our own grapes.

Check Organizations – View of all organizations from supply chain by organization name