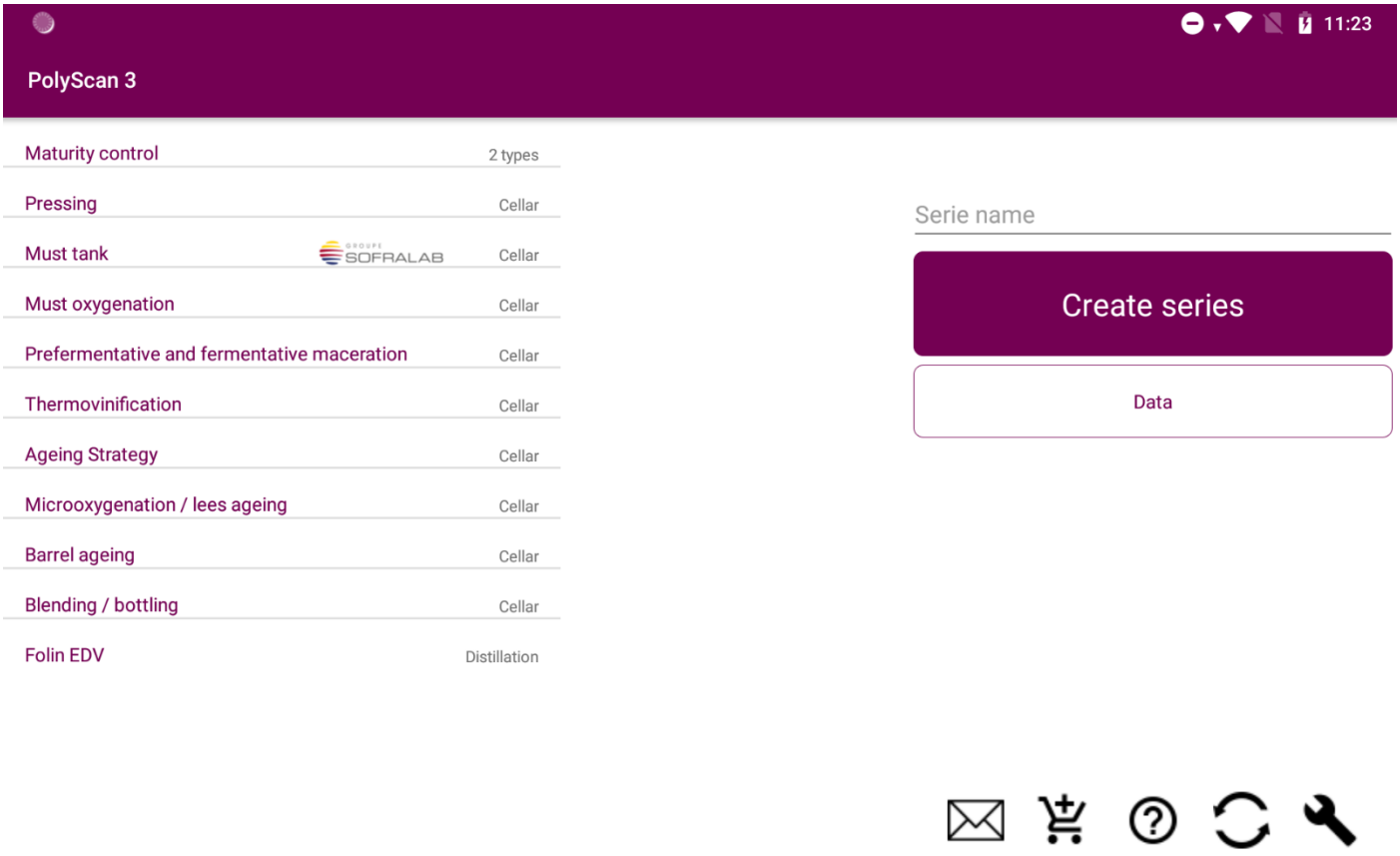
VINVENTIONS

WQS
Polyscan

User Guide



Version : V3 JUIN 2022

Only the C200 versions of the PolyScan are concerned by this manual, for the P200 refer to version V2 June 2021

Table of Contents

1. Starting 3
2. Measurement 3
2.1. Measurement launch 4
2.2. Results display 9
2.3. Reference values 9
2.4. Modify a sample or a series 10
2.5. Delete a measurement 13
2.6. Navigation buttons on the right of the screen 15
3. Type of analysis 15
3.1. Maturity Control 17
3.1.1. Maturity control on red and white grapes 18
3.1.2. Polyphenolic profile characterization on red grapes 21
3.2. Pressing 23
3.3. Must tanks 25
3.4. Must oxygenation 28
3.5. Thermovinification 29
3.6. Pre-fermentative and fermentative maceration 29
3.7. Microoxygenation / lees ageing 35
3.8. Ageing Strategy 36
3.9. Barrel Ageing 36
3.10. Blending/bottling 36
3.11. Tendency of evolution test 37
4. Data 41
5. Configuring the PolyScan 42
5.1. WI-FI setup 42
5.2. Account Setup 42
5.3. Application Update 43
6. Settings 43
6.1. Force local sample sync 43
6.2. Device Familiar name 46
6.3. Fining agent settings 47
6.4. Calibration 48
7. Troubleshooting : 49

1. Starting

Turn on the device by pressing the ON/OFF button on the side of the PolyScan.
.

Slide the locking screen up to unlock

The analyzer home screen is displayed automatically, otherwise click on the PolyScan logo.

After a series of measurements, to preserve the battery of the device, please turn off the analyzer.

2. Measurement

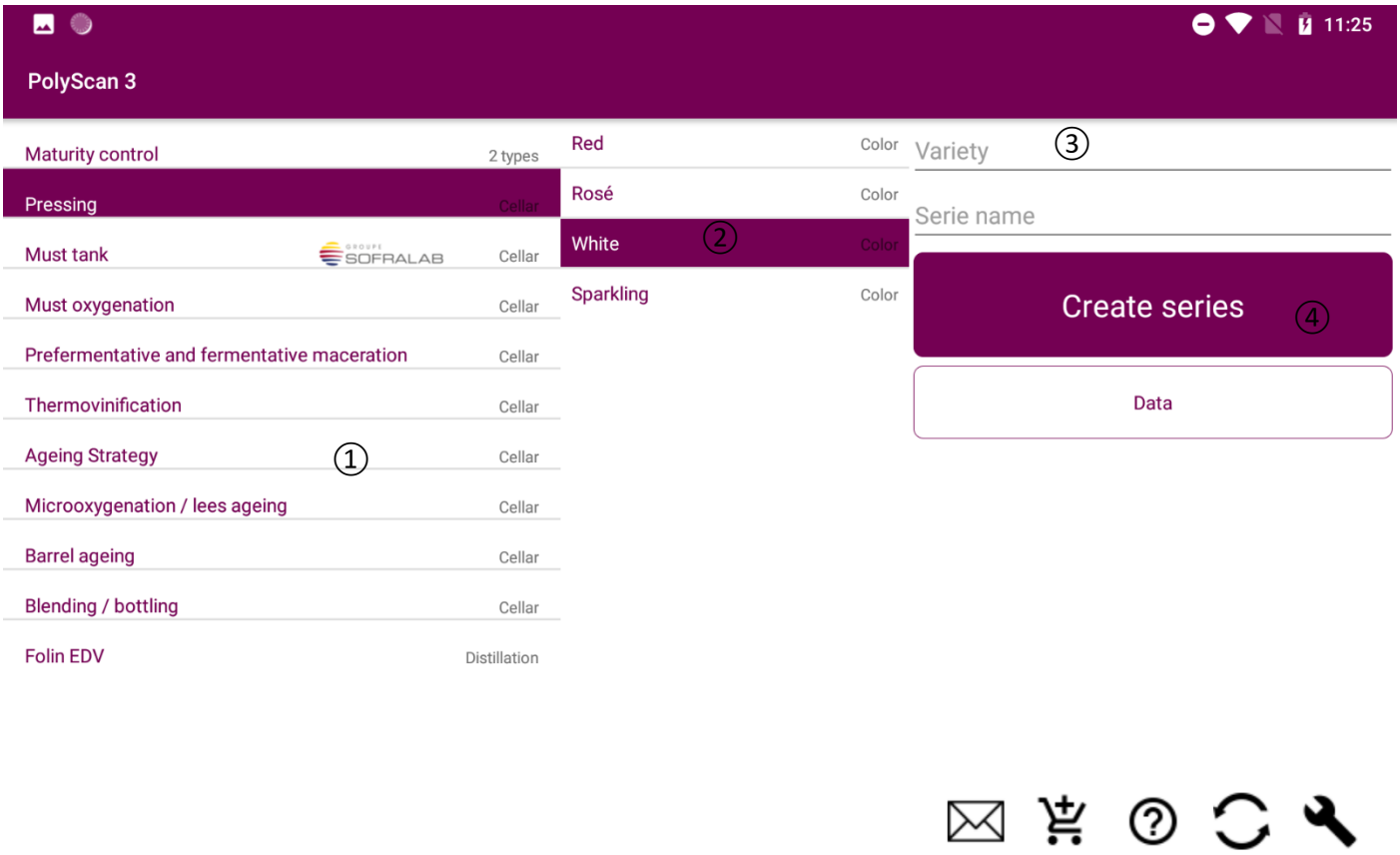
Precautions of use

- Do not sample juices that have been in contact with air for a long time (rapid oxidation => impacts the result).
- Do not compare juices or wines with low temperatures and high temperatures
- Do not compare sulfited and non-sulfited wines or musts

2.1. Measurement launch

DO NOT COLLECT AND DROP THE SAMPLE PRIOR to setting up the PolyScan

Take an electrode by the white part (without touching the gray part) to remove it from the box then, holding it on the blue part, insert it into the electrode connector as in the photo below.

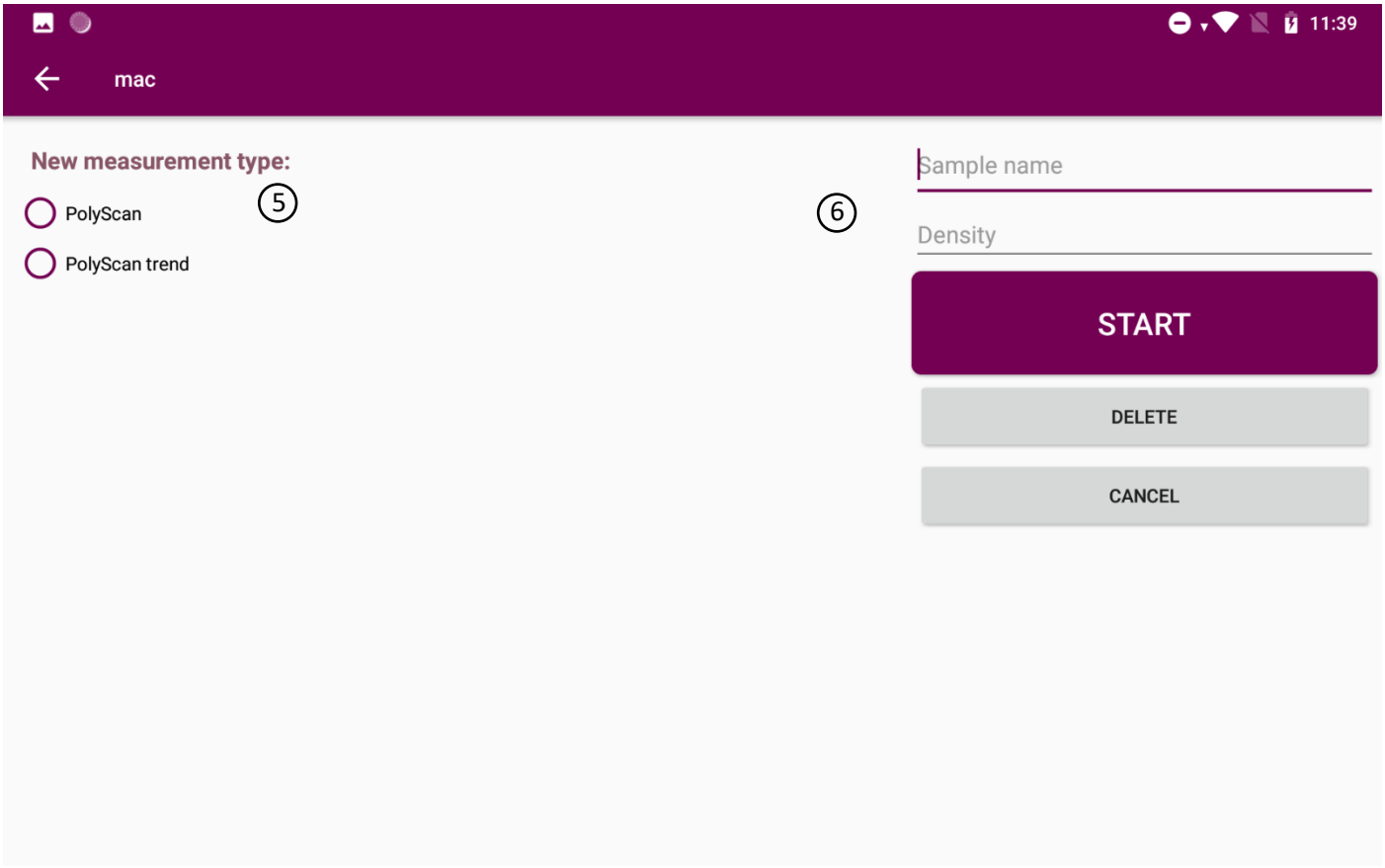


① Choose a type of analysis (compulsory) – see chapter 3. **The types of analyzes corresponding to an unsubscribed pack appear in gray and are not accessible.**

② Indicate the sample color (compulsory) / appears after choosing the analysis type

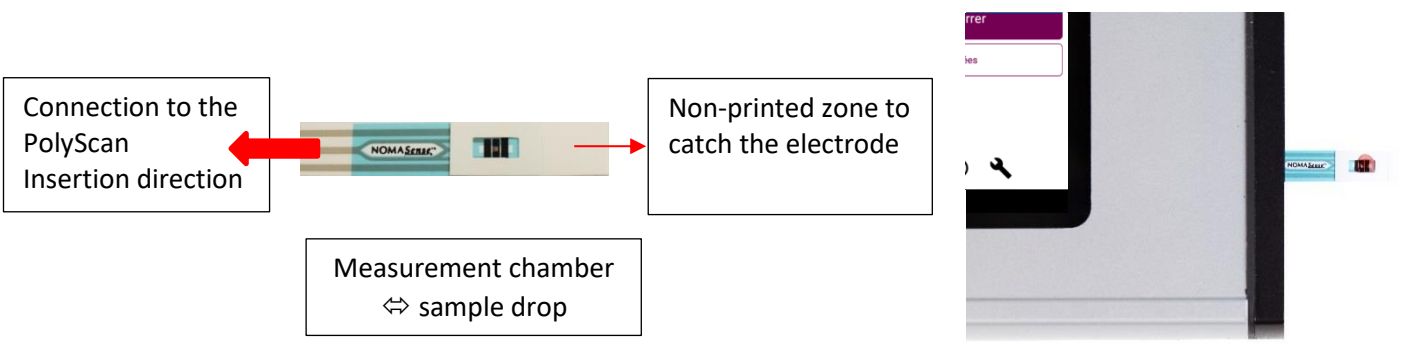
③ Indicate the grape variety, the series name and the sample name
If the grape variety is specified, the reference values will be adapted according to the grape variety and the type of measure chosen.

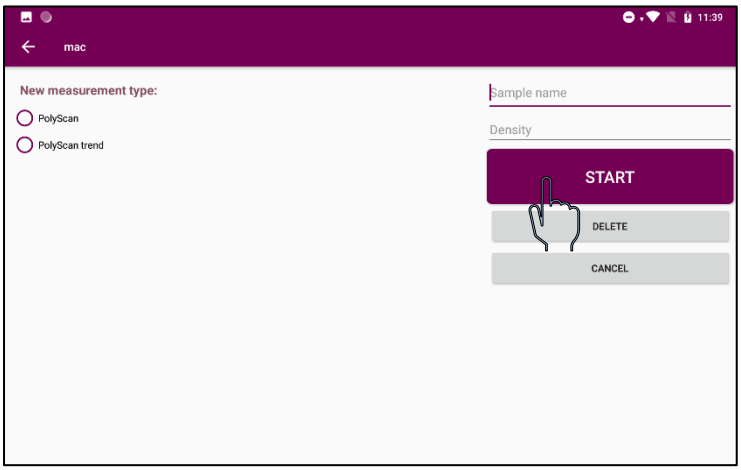
④ Press



5 Select the type of measurement: PolyScan (single measurement), evolution trend (sensitivity to oxidation). NB: in some menus only one type is available.

Information about the sample to be measured are optional. A time stamp of the measurement will identify it if they are not met. It is still strongly recommended to fill them in to facilitate the recognition of data. Take the sample and place a drop of juice or wine to be analyzed in the measurement chamber.



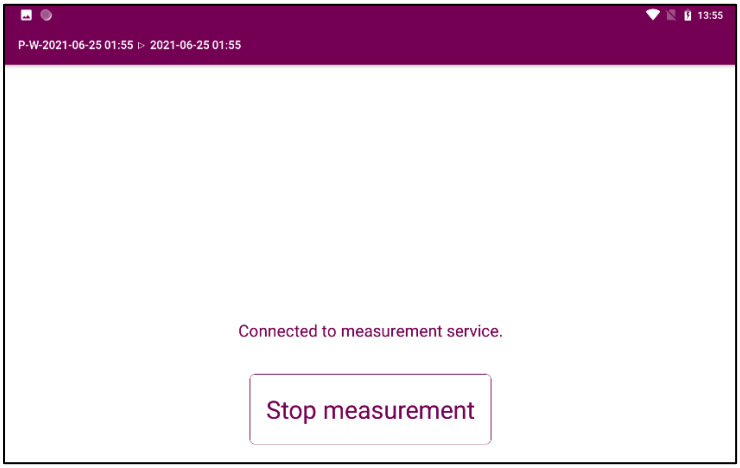


Once the settings have been made and the (new) electrode inserted.

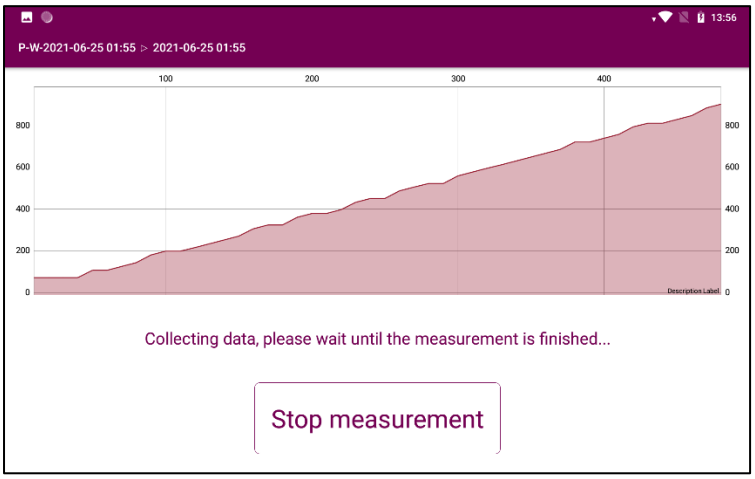
Take must from the tank.

Place a drop on the electrode, **taking care to completely cover the black rectangles and avoiding bubbles.**

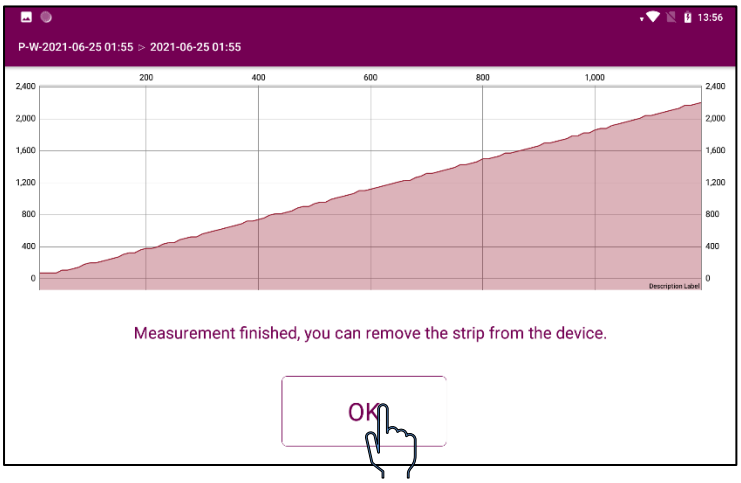
Then start the measurement by pressing Start.



The measurement starts by detecting the strips and calibrating the device.

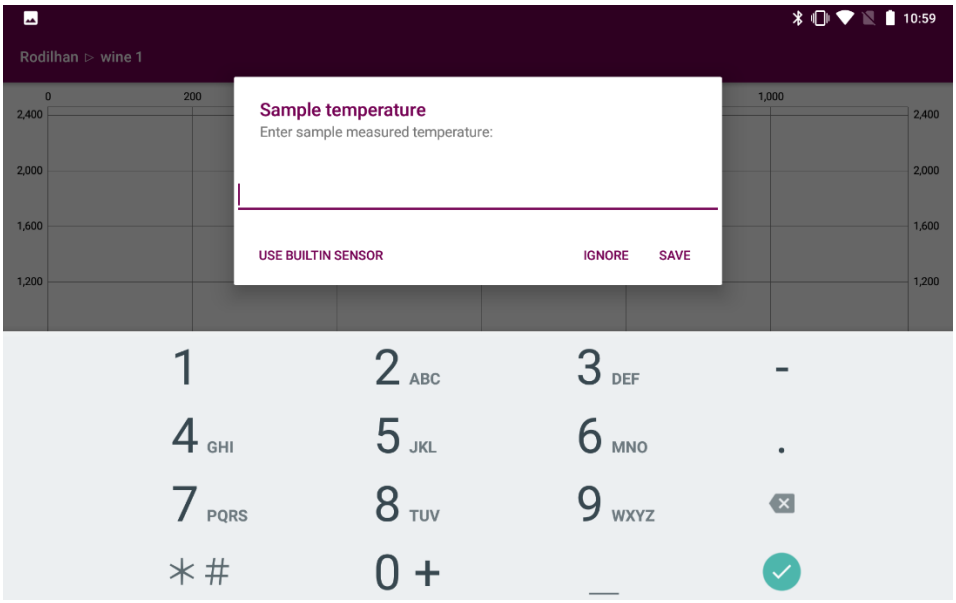


During the measurement the Intensity/Potential curve is plotted.



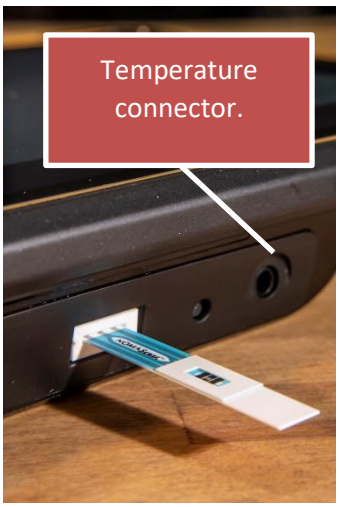
A the end of the measurement, remove the strip and press **OK.**

For certain types of analyzes (thermovinification, micro-oxygenation, etc.), at the end of measurement, before to switch to results page, a pop-up message allows saving temperature of the sample.



You can click on:

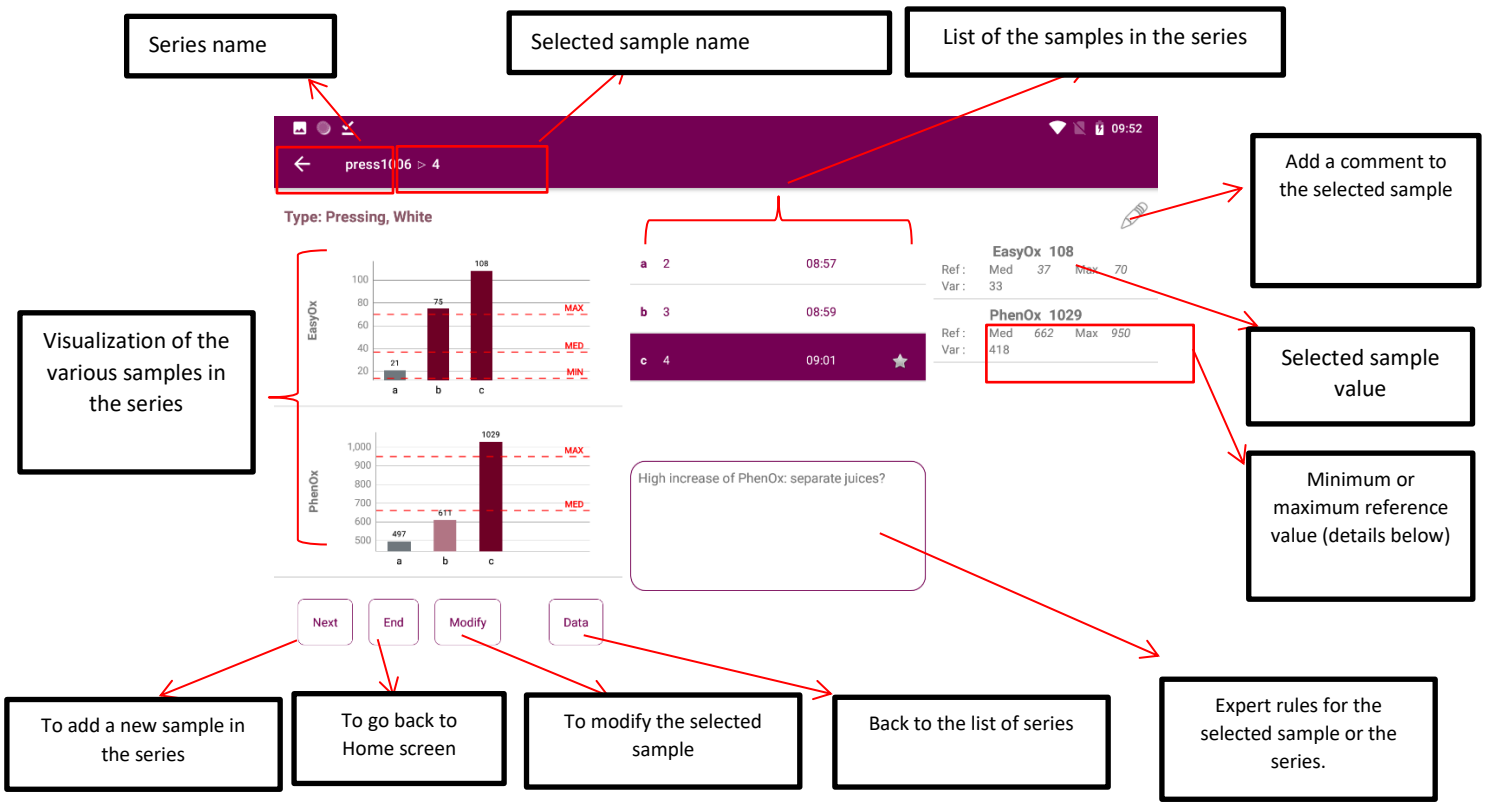
- Use built in sensor: for PolyScan with a temperature probe. Click to measure with the probe once it is plugged.
- Ignore: no temperature will be saved with measurement
- Save: to save temperature that was manually added.



Analysis results appear in the results screen
You can then click on:

Next to add a new measurement in the ongoing series,
End to come back to Home screen,
Modify to modify the selected sample, or series
Data to go back to the list of series.

2.2. Results display



★ **: there is an expert rule for the sample.**

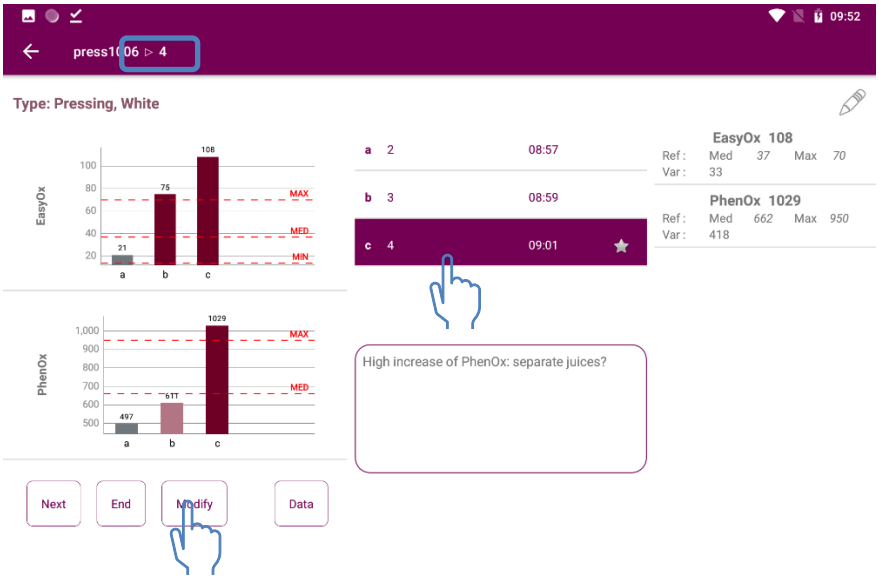
: there is a comment for the sample

2.3. Reference values

The reference values are displayed if they are available according to the grape variety. They correspond to the minimum, the maximum and the median values that were observed. If the database doesn't have enough data on this variety, values are indicated for the type of analysis and the color of the must or wine. They allow getting a reference regarding the values usually observed on the grape variety.

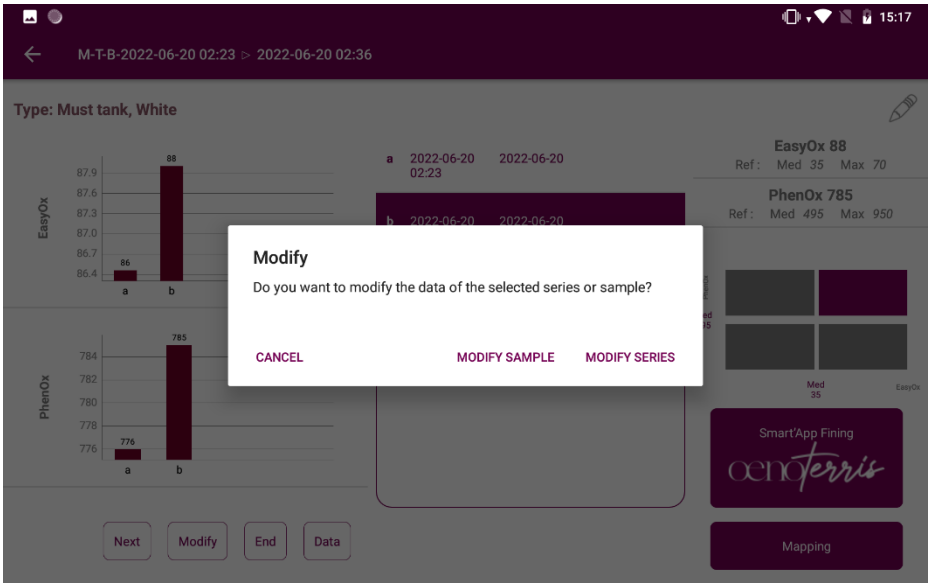
2.4. Modify a sample or a series

From the results screen of series



Select the sample to modify by clicking on the sample list (for instance sample 4). The selected sample name appears on the top of the screen.

Click on

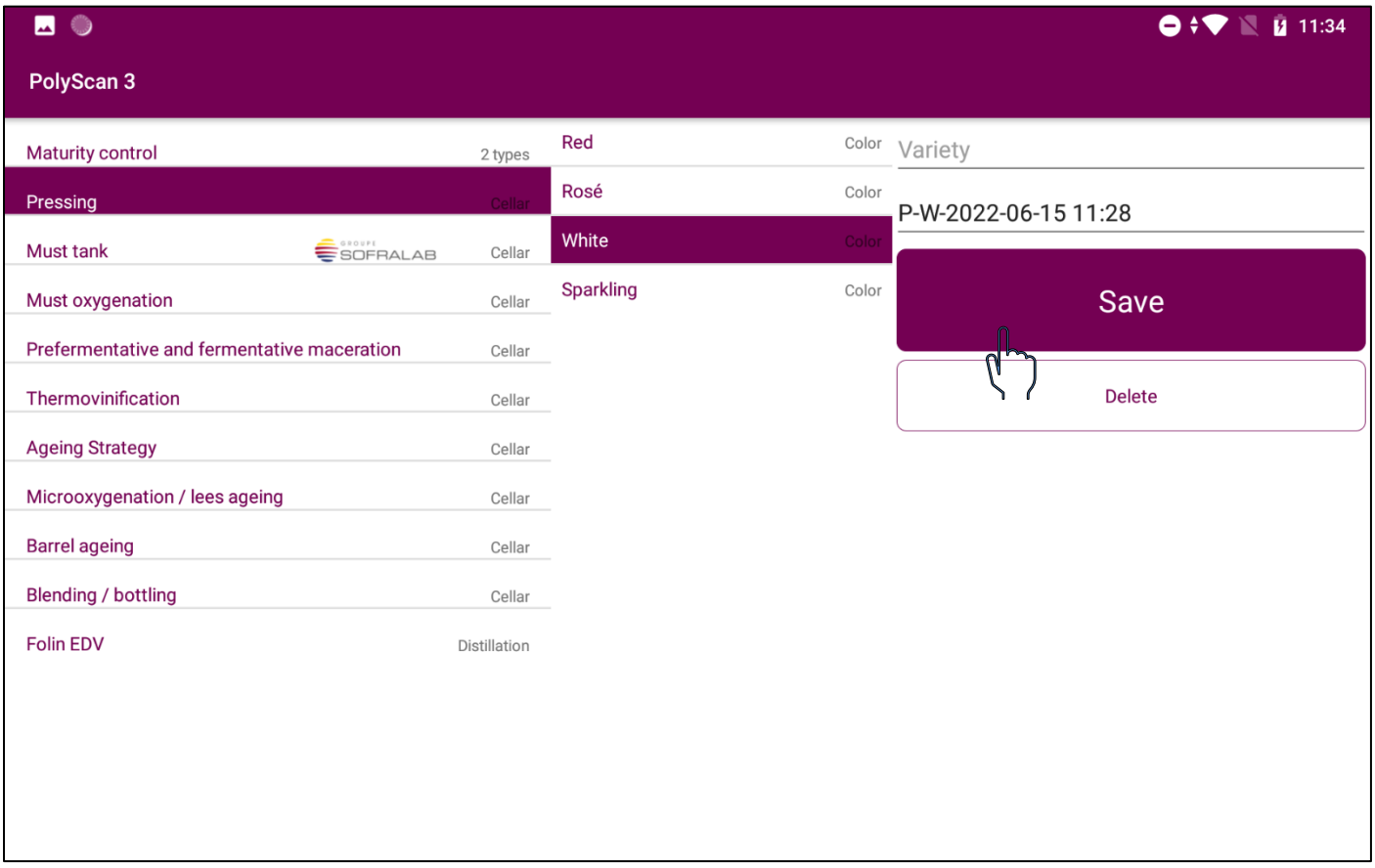


Modify a series

You can then choose to modify:
① The color which will modify all the samples in the series

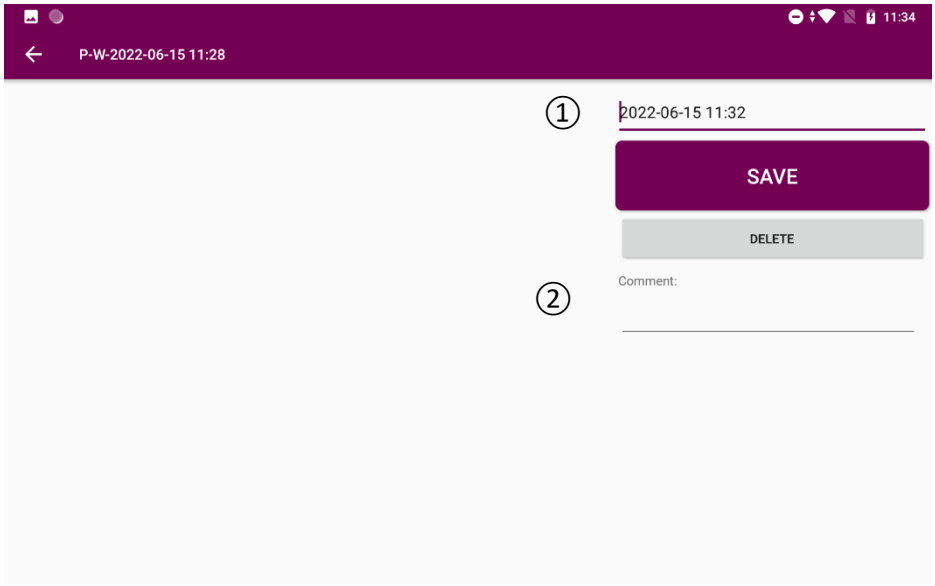
② The grape variety: what will modify all the samples in the series

③ The name of the series. Several series can have the same name



To save changes, click on “Save “. Click on “Delete” allows to suppress the series.

Modify a sample



① name of the sample

② comment

Density and temperature can be modified for types of analysis that take into account those parametres.

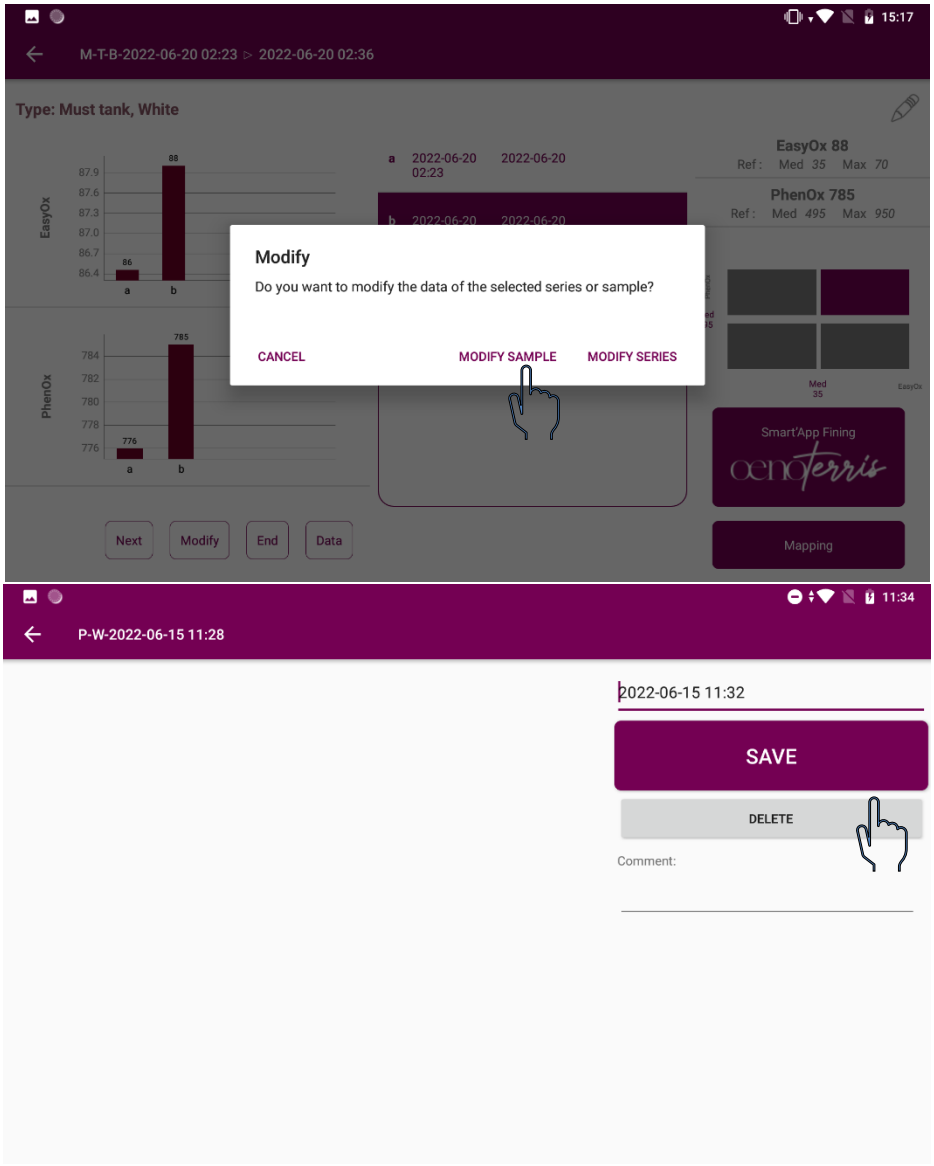
Click on « delete » allows to suppress a sample., be sure to have selected the correct sample.

2.5. Delete a measurement

Suppress a sample

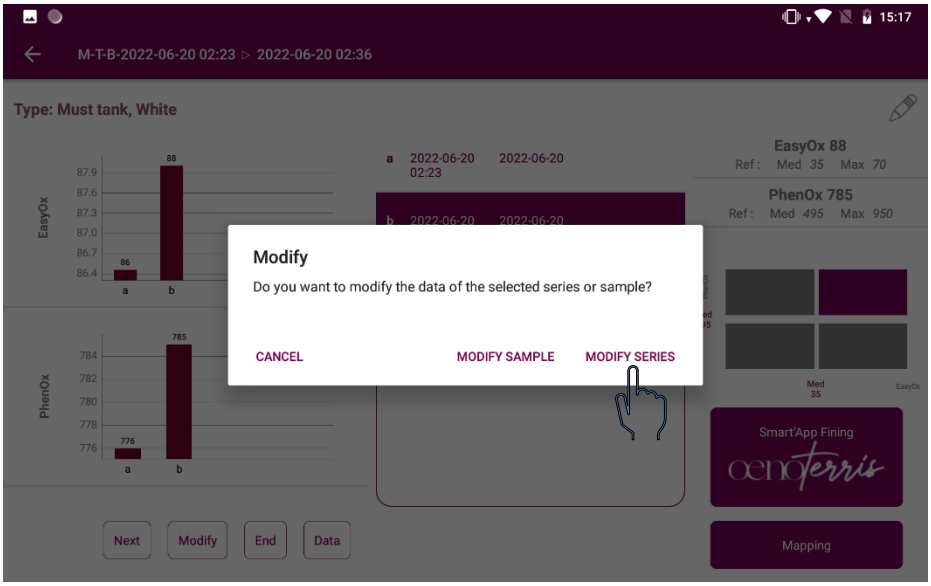
Select the sample to delete

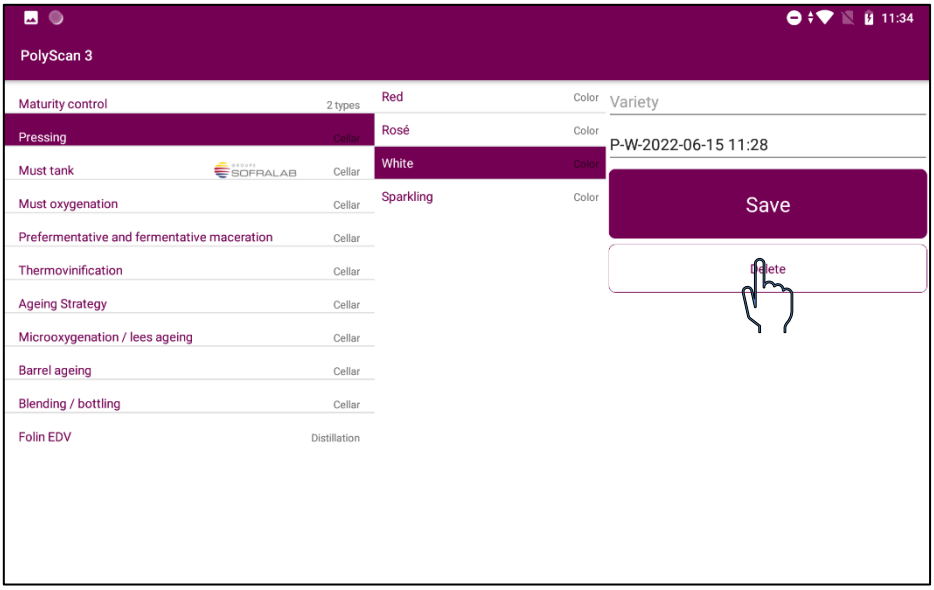
Click on Modify



Delete a series

Click on Modify





2.6. Navigation buttons on the right of the screen

Back to home page

To close applications in use

Previous screen

3. Type of analysis

For each type of analysis, the indexes calculation is specific. For a series of measurements, ensure that each measurement is performed in the same type of analysis. The analyzes are accessible according to the subscribed packs.

Maturity Pack : maturity control

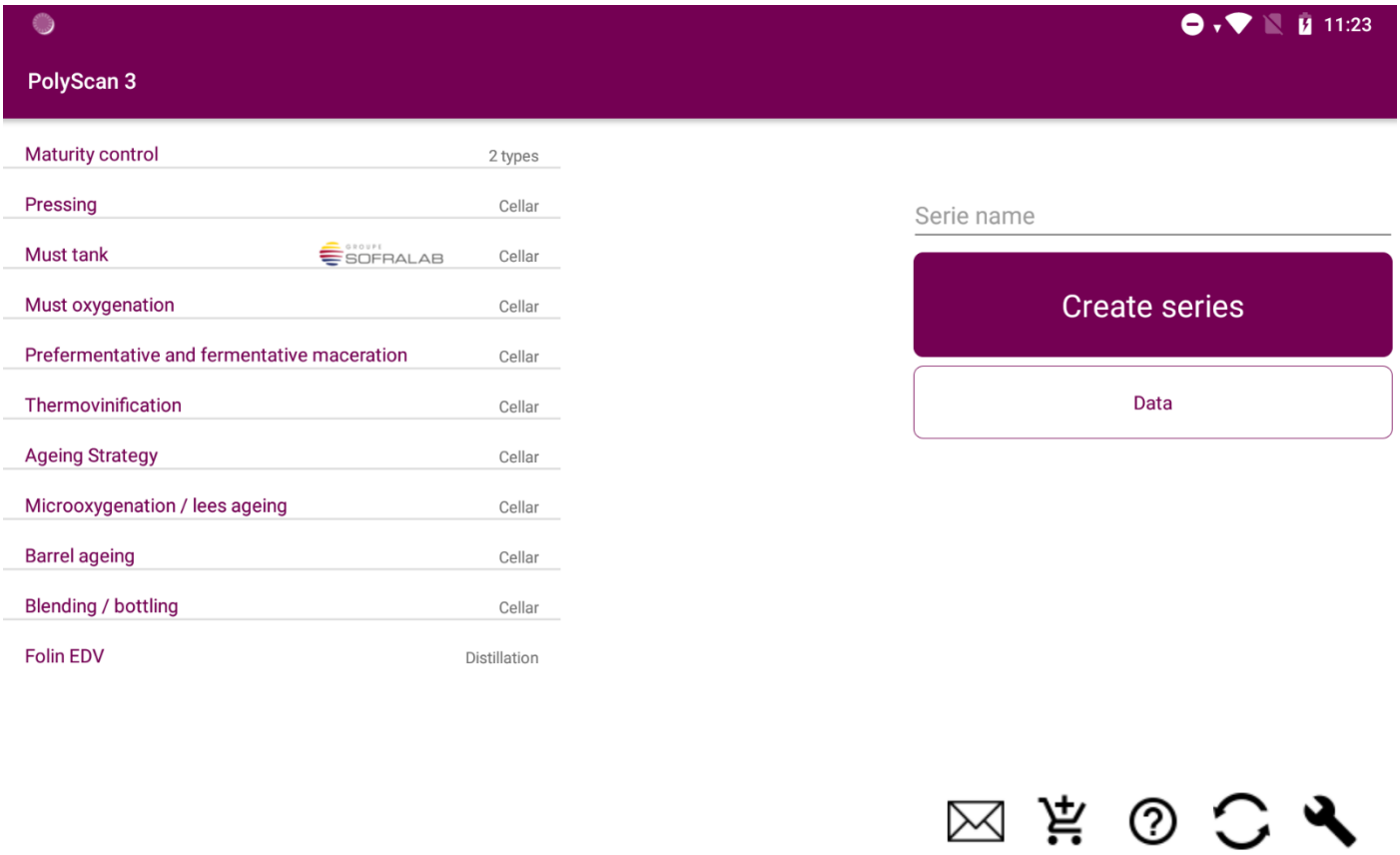
Vinification Pack: pressing, settling tank, must oxygenation, Thermovinification, fermentative maceration, ageing strategy, micro-oxygenation, barrel aging, blending/bottling.

Pack Smart App Fining : Developed in partnershiph with Sofralab, for a reasoned fining on musts.

On the home screen of the application, the icon ⓘ provides access to essential information on each type of measurement.

From the voltammograms (intensity/potential curve) PolyScan calculates different indices according to the types of analysis selected.

- **EasyOx :** easily oxidizable compounds (caftaric acid, anthocyanins…)
- **PhenOx :** total polyphenols (correlated to Folin index)
- **Tan/Acn :** Tannins/ Anthocyanins ratio ➔ balance beetwen tannins and anthocyanins
- **IPT_volta :** estimation of total polyphenols index
- **MaturOx :** index used to determine the level of aromatic maturity
- **Ageing State :** opening state index
- **TE index :** sensitivity to oxidation index



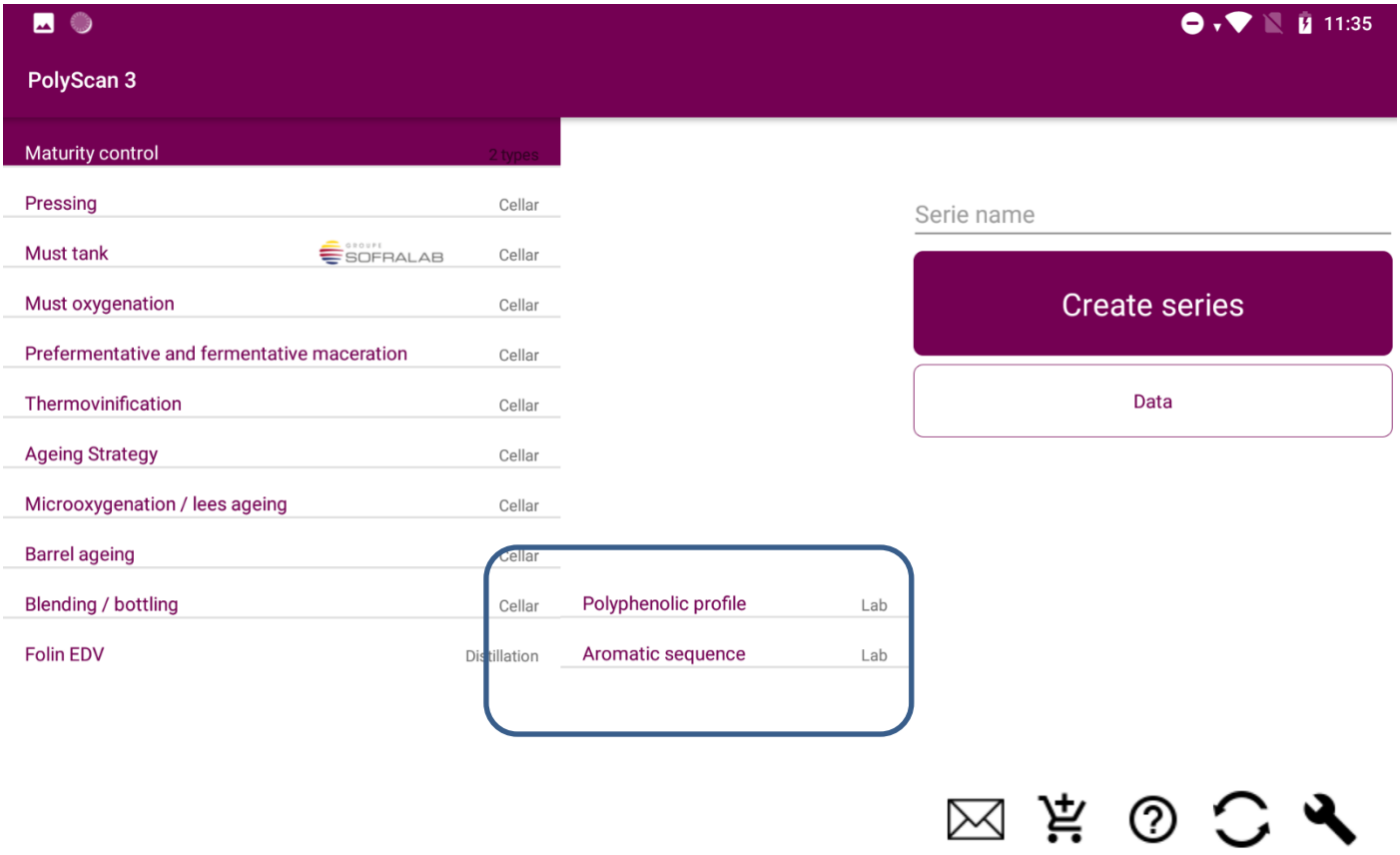
3.1. Maturity Control

This analysis is adequate in the following cases:

- Maturity control on grapes
- Parcel polyphenolic profile characterization

Two types of analysis are available:

- Polyphenolic potential: to evaluate the amount of polyphenols, sample preparation is necessary. One series for one plot or several plots with the same variety.
- Aromatic sequence : to determine when to harvest according a targeted aromatic profile. One series for one plot. First measurement at the end of veraison.



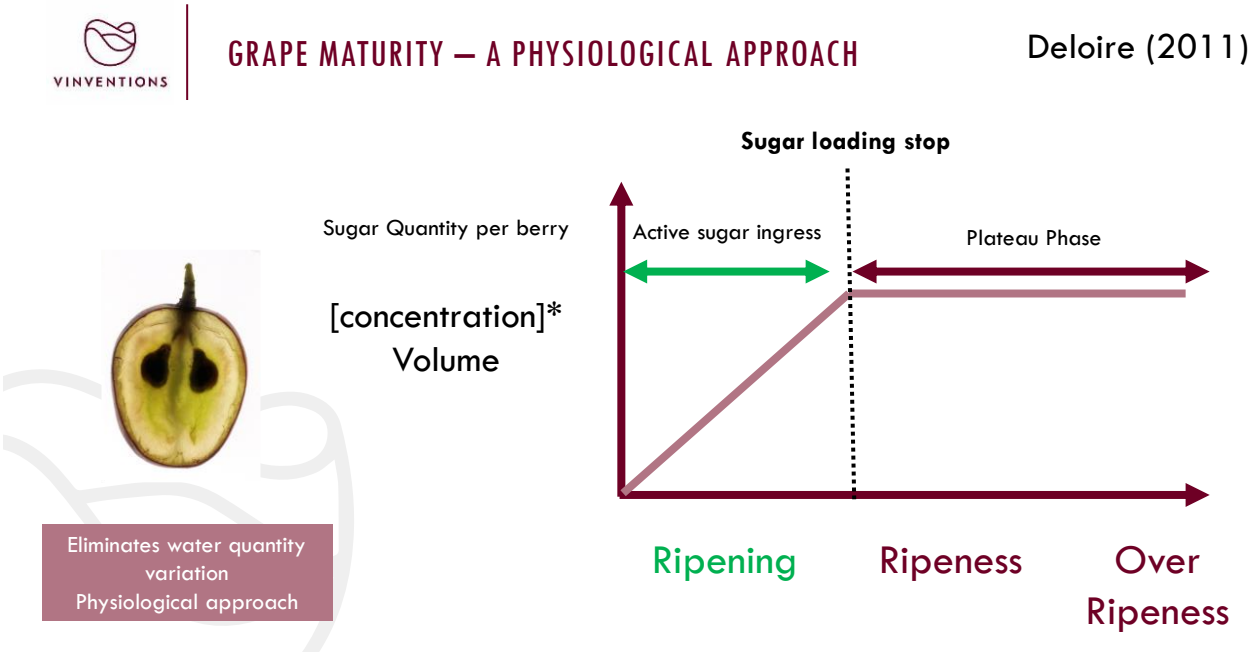
3.1.1. Maturity control on red and white grapes

Measurement is done directly on juice during a usual maturity control.
Warning: as soon as the juice is pressed, **perform PolyScan analysis immediately** before proceeding to others usual maturity measurement (e.g. sugar content).

Attention : lorsque le jus est pressé, réaliser immédiatement l'analyse PolyScan avant de procéder aux analyses de maturité classique.

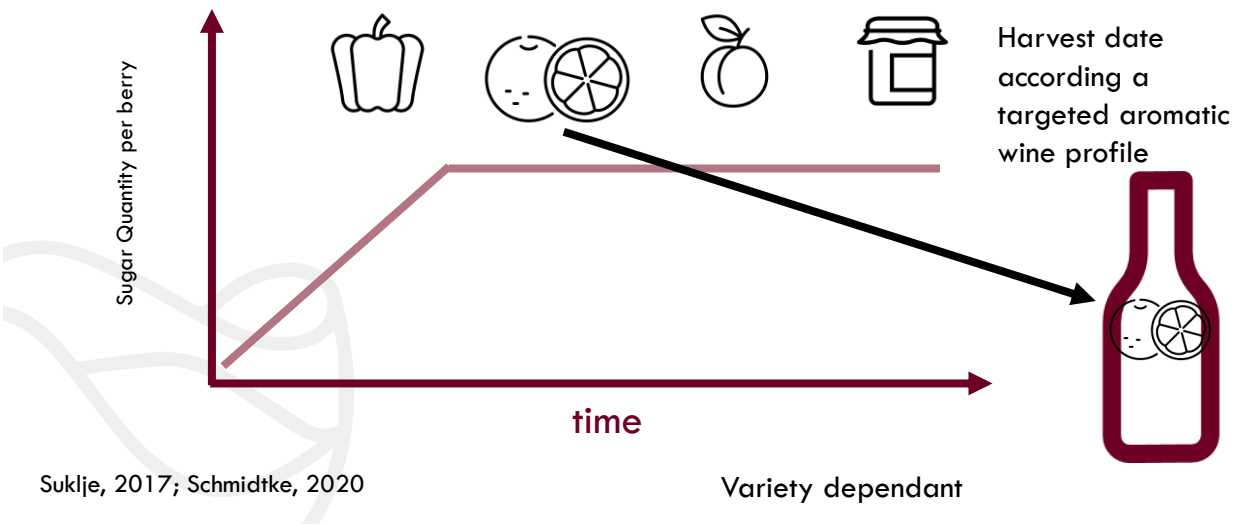
4.1.1.1- Concepts

The works of Pf Alain Deloire has shown the interest of sugar loading monitoring to characterize berry ripening. Indeed, this indicator by making it possible to overcome variations in the water content of the berry allows an accurate reading of the ripening of the grape and the determination of different phases during ripening.



These works have highlighted the phenomena of "Berry Aromatic Sequence" during ripening. The sugar loading through the determination of sugar loading stop allows to determine a time indicator for the beginning of aromatic sequence.

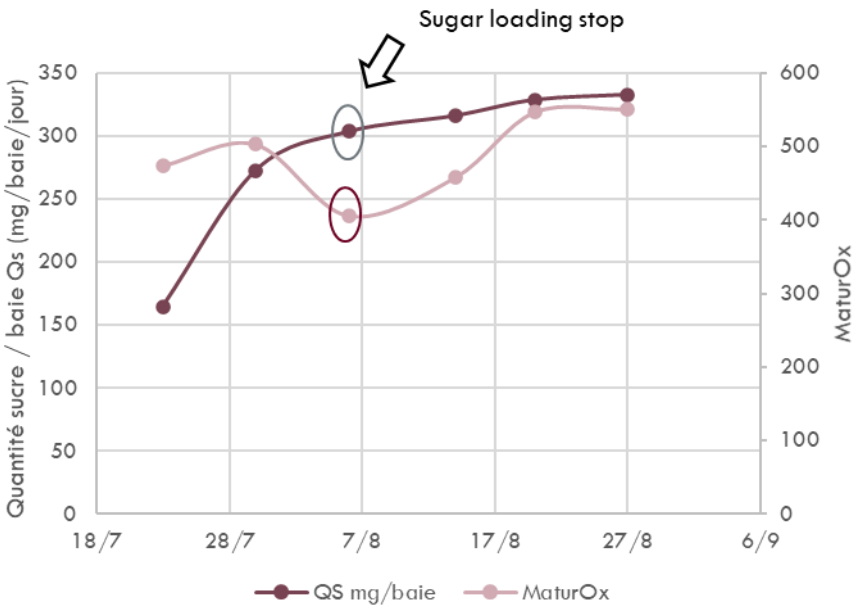
GRAPE « MATURITIES »: THE BERRY AROMATIC SEQUENCE



Suklje, 2017; Schmidtke, 2020

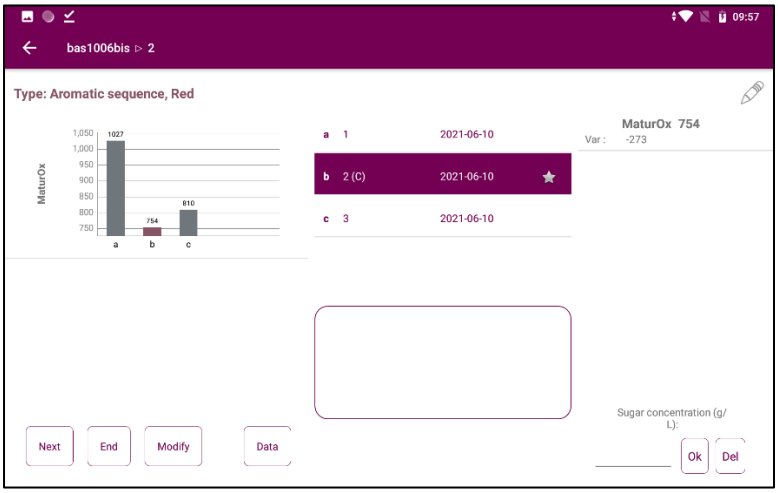
Variety dependant

During the monitoring performed on various varieties and numerous plots, it has been shown that a minimum of voltametry signal occurs at sugar loading stop.

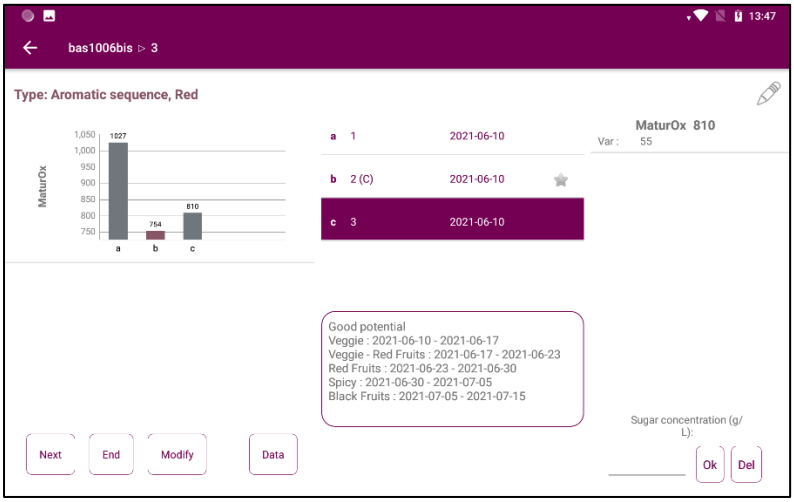


4.1.1.2- Aromatic sequence

The index dedicated to Aromatic sequence is the « MaturOx ».



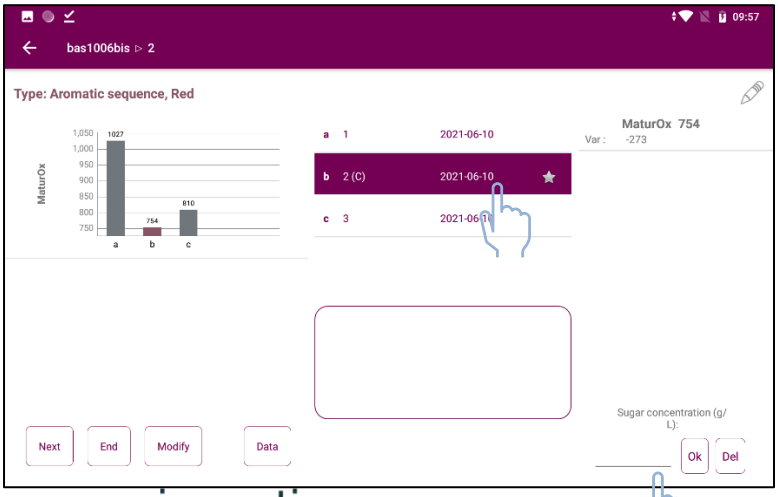
Minimum is colored in pink in the graph. A star symbol is also displayed next to the sample name in the sample list



When the sugar concentration of the samples have been typed in and a minimum has been determined, windows are displayed for the different aromatic profiles.

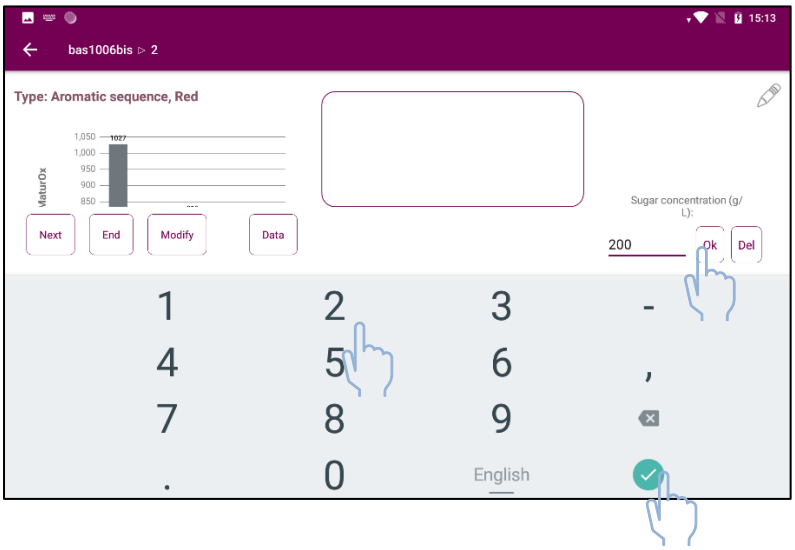
These profiles are variety dependents.

Entering the sugar concentration



Select the sample.

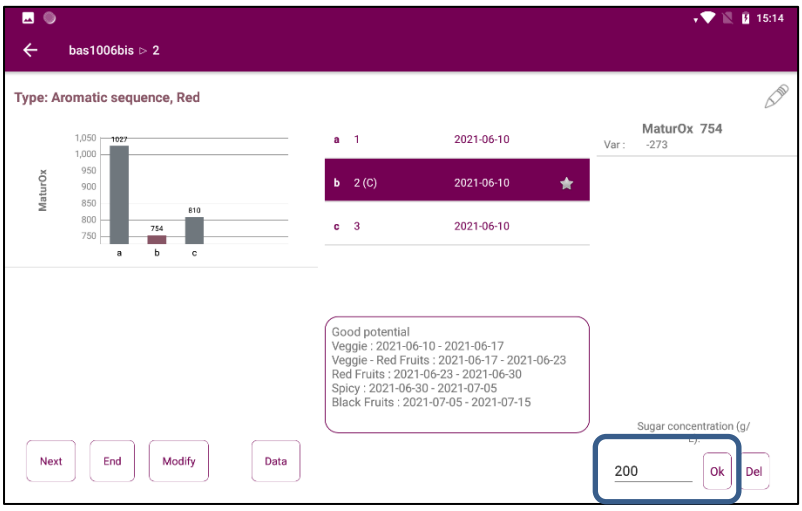
Click on the sugar concentration input area.



Type in sugar concentration value in g/L

Press the green validatation symbol.

Press OK to validate.



The sugar concentration (g/L) value is displayed when the sample is selected.

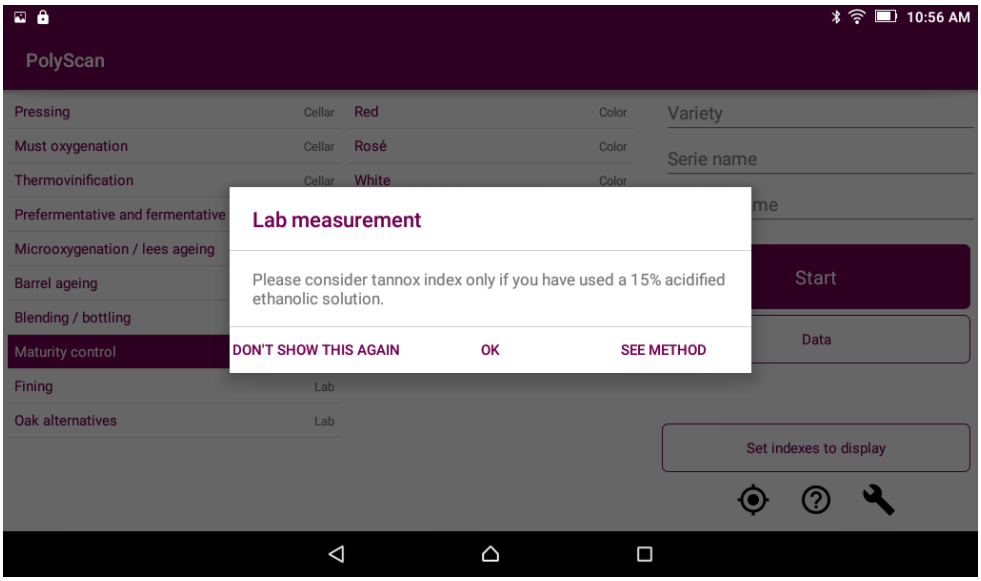
3.1.2. Polyphenolic profile characterization on red grapes

- Pick 200 berries form the parcel to analyze
- Crush them for 2 minutes in a blender
- Sample exactly 50 g from the crushed obtained and add 100 mL of extraction solvent

Extraction solvent can be prepared as follow:

For 10 L: add to 8.5 liters of distilled water 1.5 liter of ethanol 96% and adjust pH to 3 with hydrochloric acid 12N.

- The diluted crushed must be stirred few second every 15 minutes for 1 hour at room temperature. The obtained homogenate can thus be settle for 30 minutes
- After this step, juice can be dropped on the electrode
- Launch measurement

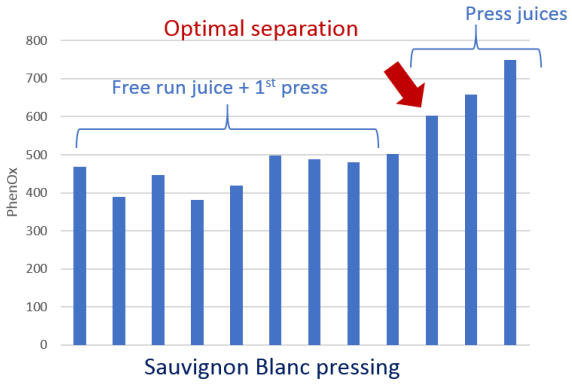

10:56 AM
PolyScan
Pressing
Cellar
Must oxygenation
Cellar
Thermovinification
Cellar
Prefermentative and fermentative
Microoxygenation / lees ageing
Barrel ageing
Blending / bottling
Maturity control
Fining
Lab
Oak alternatives
Lab
Red
Color
Rosé
Color
White
Color
Variety
Serie name
Start
Data
Set indexes to display
Lab measurement
Please consider tannox index only if you have used a 15% acidified ethanolic solution.
DON'T SHOW THIS AGAIN
OK
SEE METHOD

3.2. Pressing

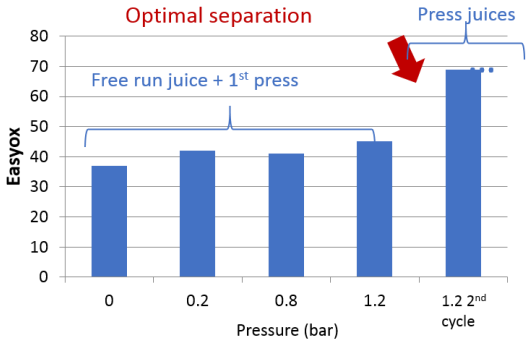
The pressing analysis allows defining when juices separation is optimal depending on the polyphenol content.
Method:

- Sample juice as soon as it runs form the press, at the beginning of each pressure cycle
- Avoid sampling at the end of a pressure cycle when the juice flow is low or when juices stayed too long in contact with air (fast oxidation => impact on results)
- Measurement must be done right after sampling to avoid oxidation impact.

Example of pressing monitoring on White et Rosé:
Progressive extraction => allows separating juices depending on their polyphenol concentration



Sauvignon Blanc pressing



Grenache Noir pressing

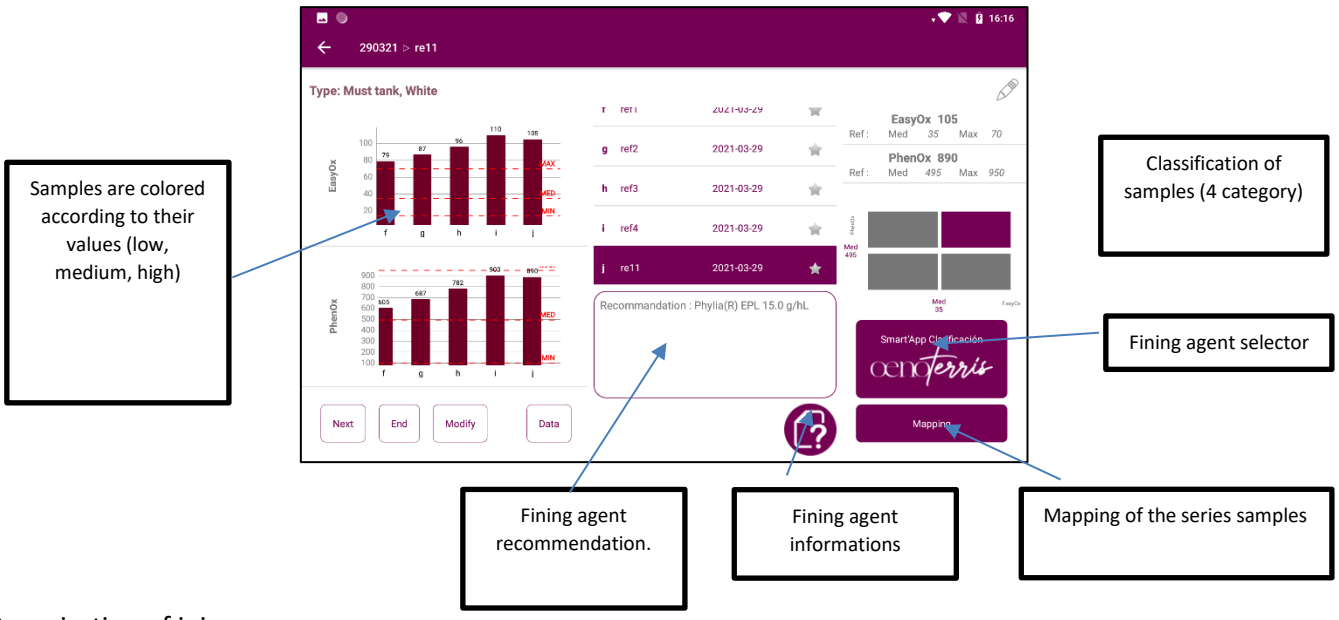
When a significant increase in the indexes is observed, a pop-up message appears on the screen recommending the separation of the juices based on their polyphenol concentration.

09:52
press1006 ▷ 4
Type: Pressing, White
EasyOx
100
80
60
40
20
108
75
21
MAX
MED
MIN
a
b
c
PhenOx
1,000
900
800
700
600
500
1029
MAX
MED
497
a 2 08:57
b 3 08:59
c 4 09:01
EasyOx 108
Ref : Med 37 Max 70
Var : 33
PhenOx 1029
Ref : Med 662 Max 950
Var : 418
High increase of PhenOx: separate juices?
Next
End
Modify
Data

3.3. Must tanks

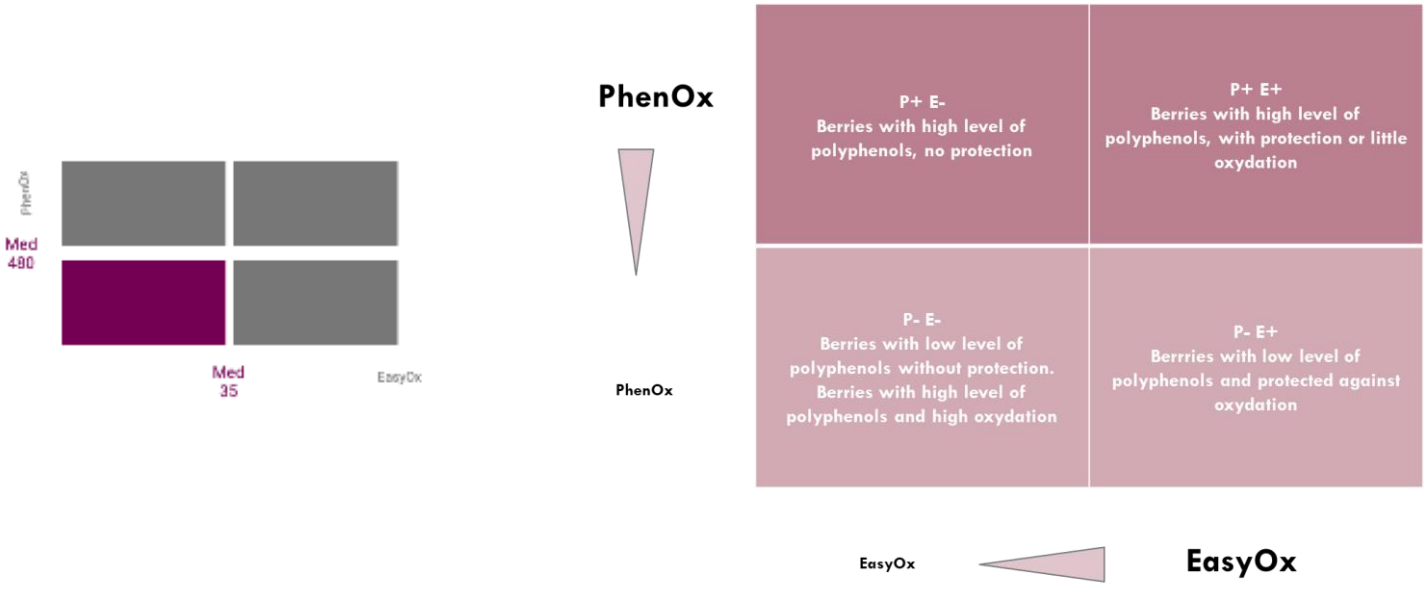
Must tanks analysis makes it possible to characterize the musts in vats after pressing in order to adapt the preferential treatments to be applied to optimize the management of polyphenols.

4.2.1- Main screen



Categorization of juices:

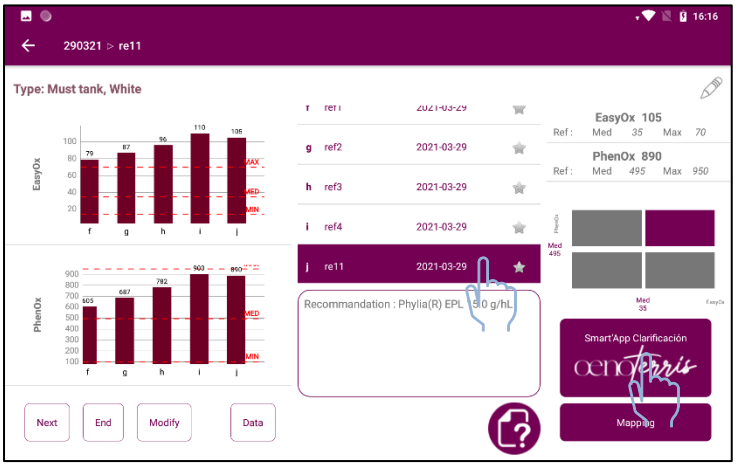
The graph on the right of the window makes it possible to categorize the juices according to their polyphenol content compared to the median content observed in the musts of the selected grape variety or color.



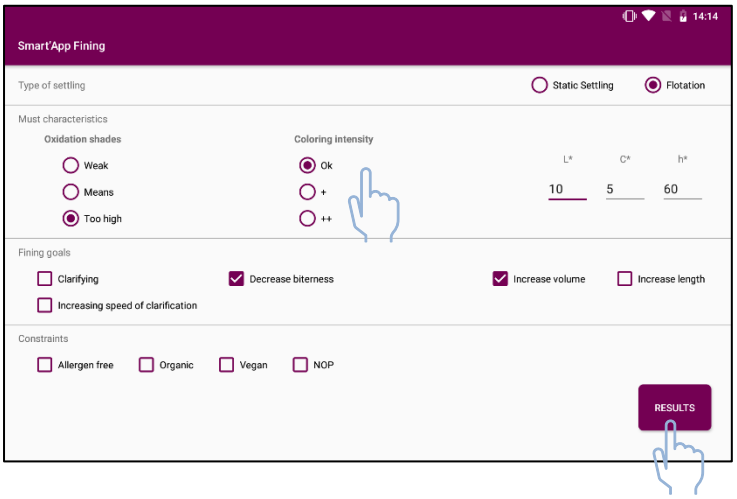
The colored box characterizes the sample according to references values (median of PhenOx and EasyOx from the database). In each category, musts have different profiles and need an adapted process.

4.2.2- Fining agent selector

To guide the choice of prefermentation finings, the Smart'App Collage Oenoterris application was developed based on the categorization of juices described above and on the knowledge of the SOFRALAB group of the effect of the glues of its different glues. Beyond the PolyScan measurement, the purpose of the bonding is requested from the user.



Select a sample and press Smart'App Fining Oenoterris.

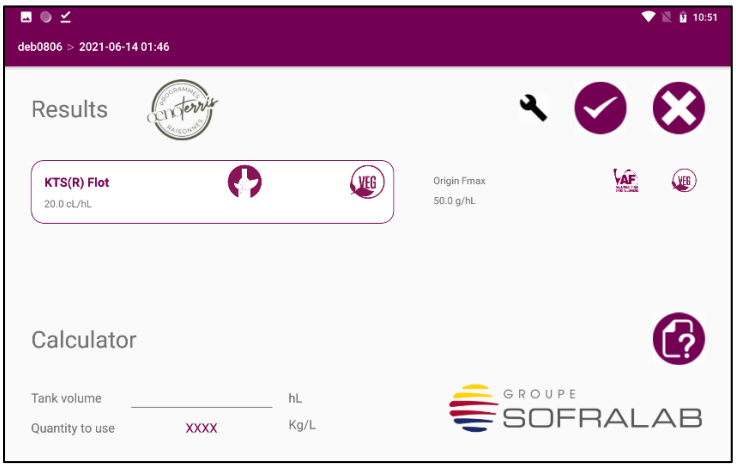


Set the goals and the constraints of the fining

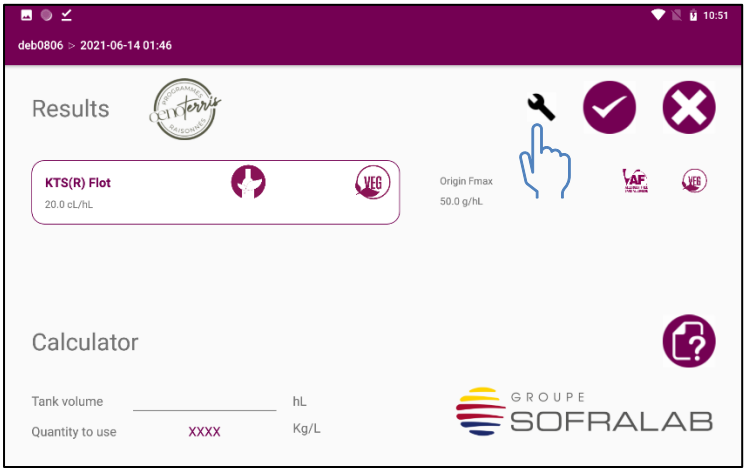
⚠ Maximum two goals

From zero to all constraints

⚠ Fining agents complying the selected constraints only can be recommended.

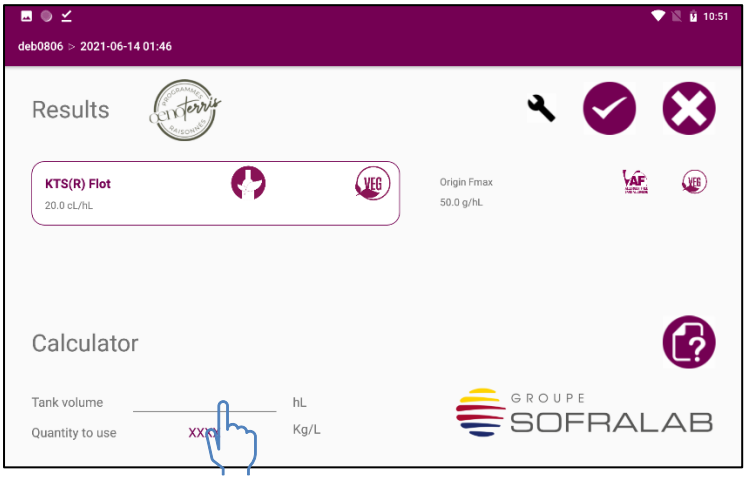


Displays the recommended fining agent and eventually an alternative.



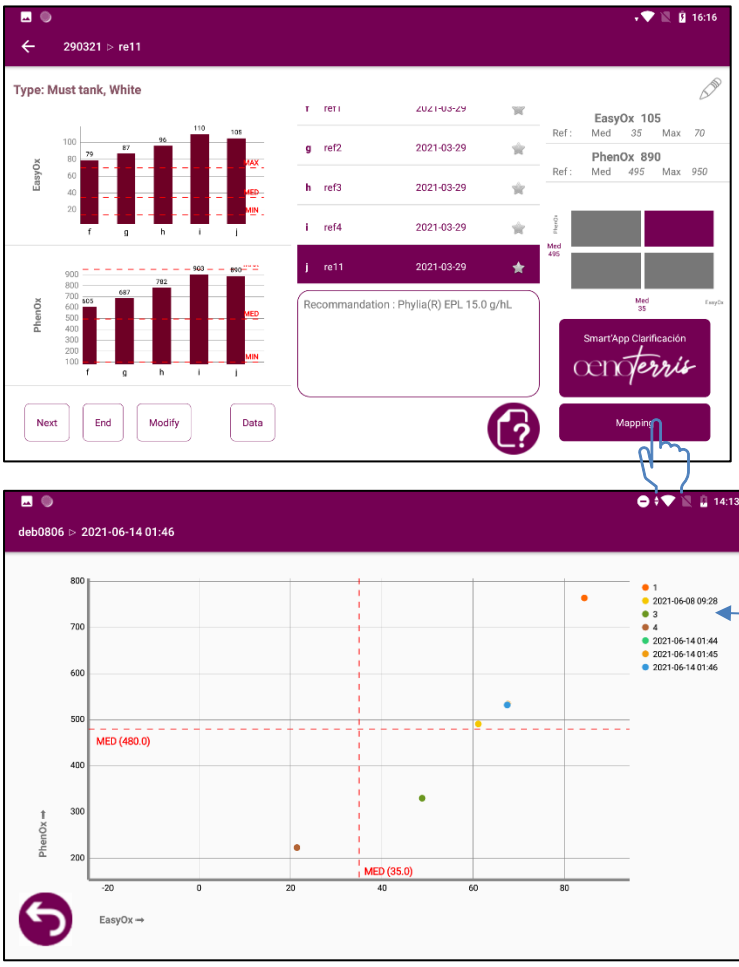
It is possible to access Fining Agent settings menu in order to modify the available fining agents.

Then the recommendation will be updated.



It is possible to type in the volume of the tank in order to know the quantity of fining agent to use.

4.2.3.- Mapping of the series sample



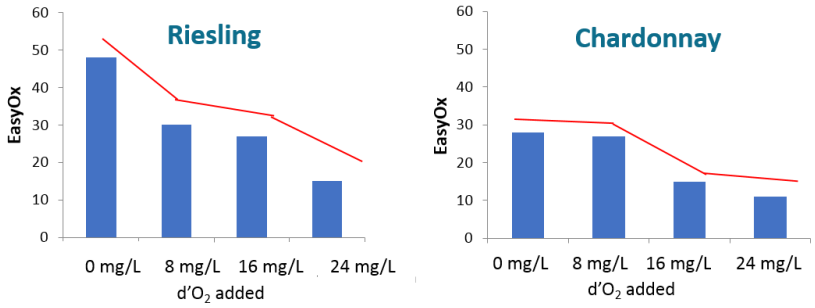
Legend.

By pressing « Mapping », it is possible to display all the samples of the series in a chart PhenOx vs EasyOx in order to identify the samples with similar values and the position of each sample in relation to references values (median of EasyOx and PhenOx).

3.4. Must oxygenation

This analysis allows to follow the evolution of polyphenols during hyperoxygenation. To monitor the effect of O2 supply on the must, it is important to take the samples from a place in the tank that is sufficiently representative of the mass of oxygenated must.

Example of successive oxygen addition on white juices => monitoring of EasyOx and/ or Phenox decrease



When a significant drop in the indexes is observed, a pop-up message appears on the screen recommending stopping O_2 intake.

L'échantillon sélectionné comme témoin est repéré par la le symbole (T), il est possible de choisir n'importe quel échantillon de la série comme témoin. Par défaut, le premier échantillon de la série est défini comme témoin.

3.5. Thermovinification

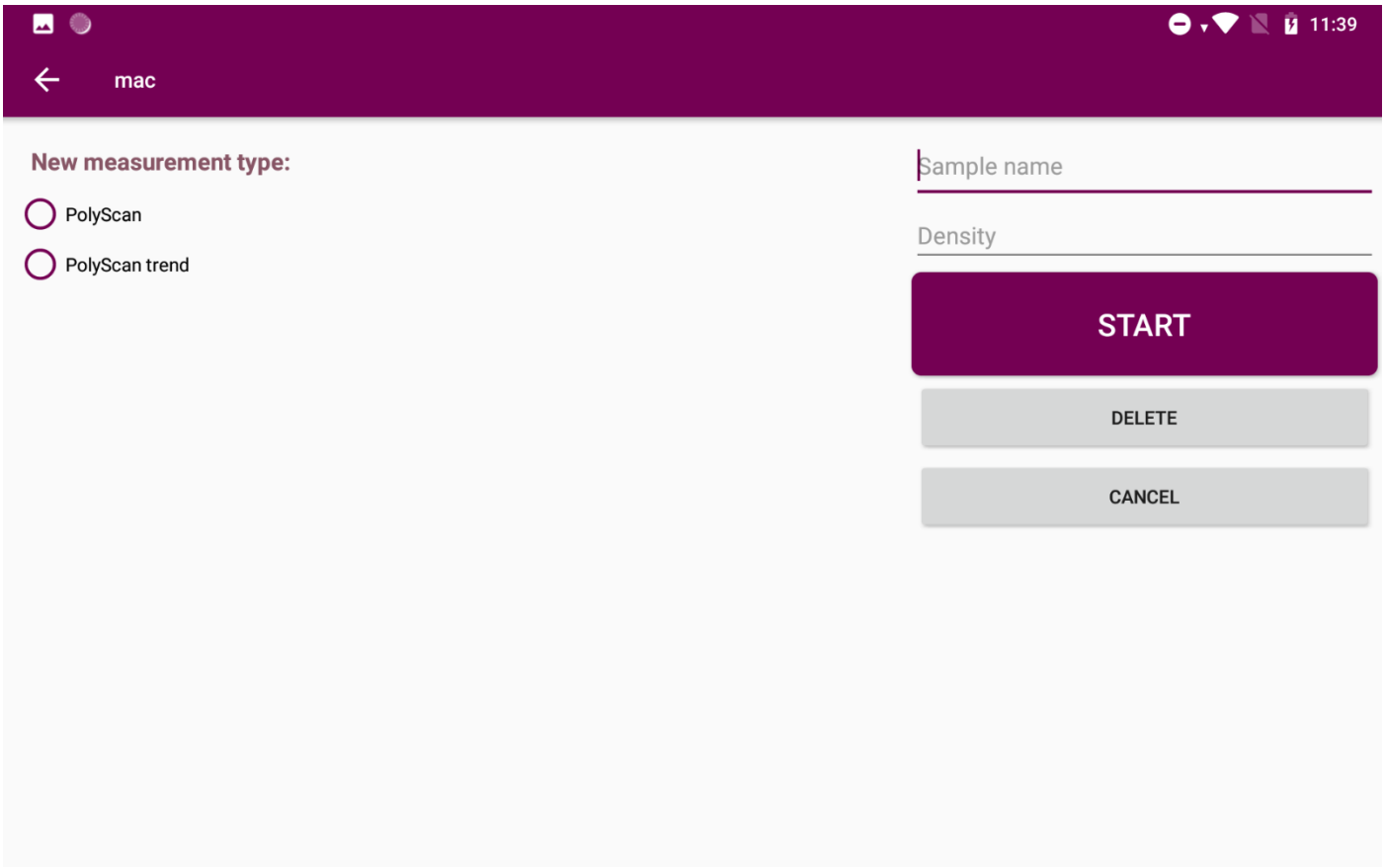
This analysis allows following the extraction of polyphenols from red juices during thermovinification. Different indices can be followed: EasyOx, PhenOx, TAN / ACN

Note: Measuring the temperature of the sample corrects its impact on the PolyScan measurement (cf. chapter 5).

3.6. Pre-fermentative and fermentative maceration

For red wines only.
This analysis allows monitoring phenolic (PhenOx and TPI for red wines) evolution, easily oxidizable polyphenols (EasyOx) and T/A ratio during:
-Skin contact
-Cold or Hot pre-fermentative maceration,
-Traditional skin contact (red)

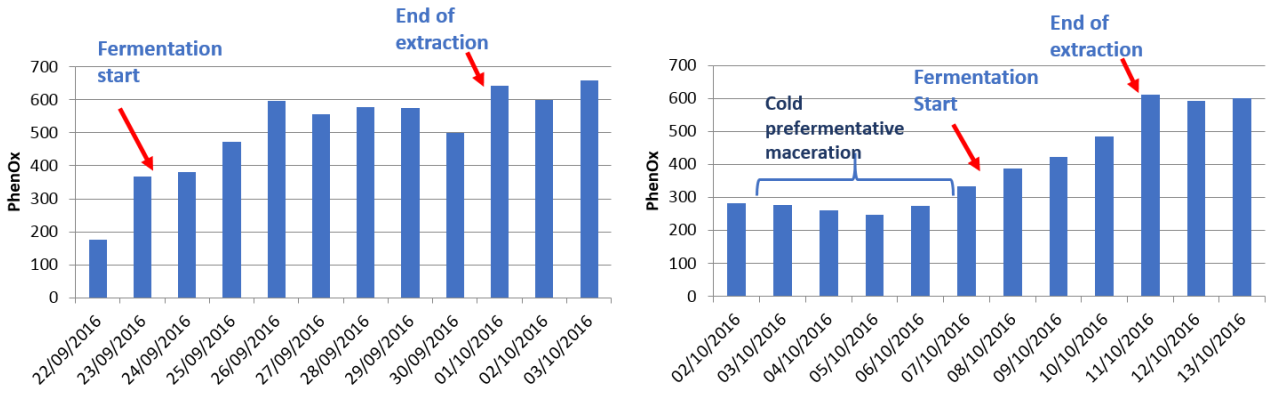
It also makes it possible to perform tendency of evolution measurements in the same series. PLEASE NOTE: the " tendency of evolution " type measurements must only be carried out when the alcoholic fermentation is complete and before raking off.



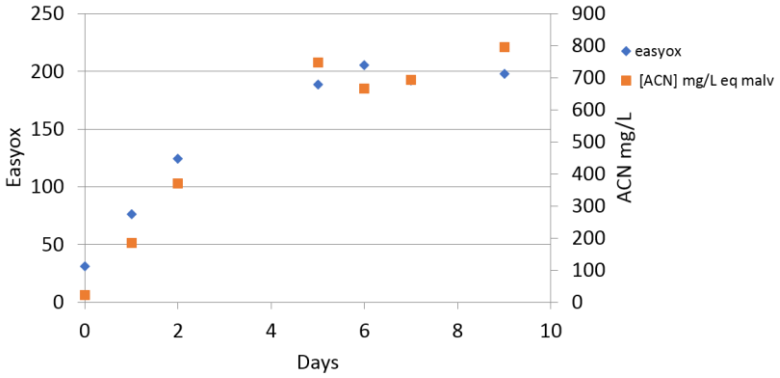
When launching a measurement, it is possible to choose a "PolyScan" type measurement, single measurement, or “Tendency of evolution” air resistance test with two measurements.

It is also possible to enter the density.

<u>Example of PhenOx monitoring during a traditional red skin contact</u> => end of extraction when highest polyphenolic content is reached



<u>Example of EasyOx</u> monitoring during a traditional skin contact on a tank of Syrah: => assess end of anthocyanin extraction



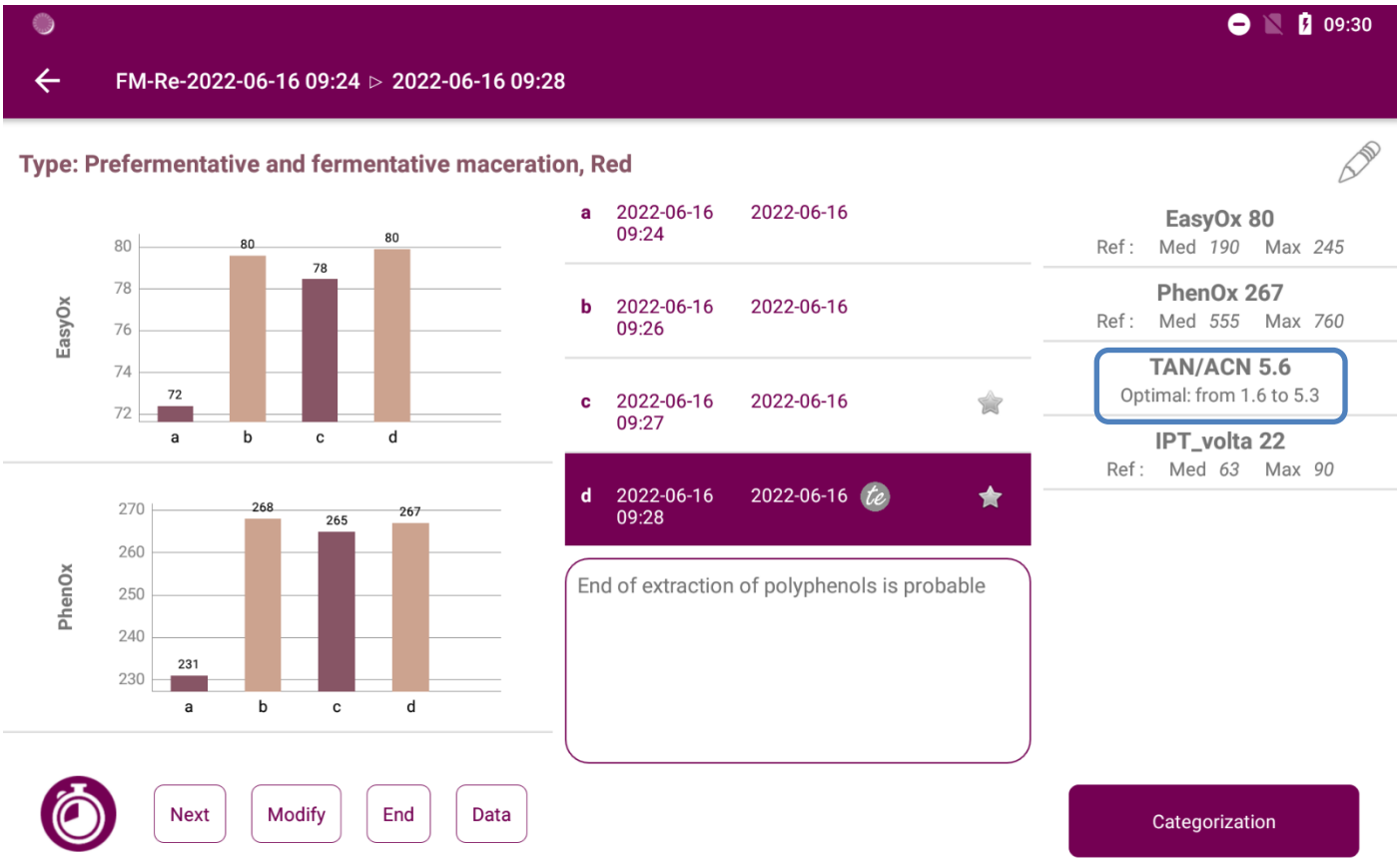
Evolution of EasyOx index gives the same profile as the evolution of anthocyanin concentration measured by the Puissant-Léon method

The T/A ratio of the tank is to be considered from mid alcoholic fermentation. If the tank is oxygenated under marc, an impact can be observed on the indices, consult us.

When the indexes reach a plateau, a pop-up message appears to indicate the probable end of the extraction.

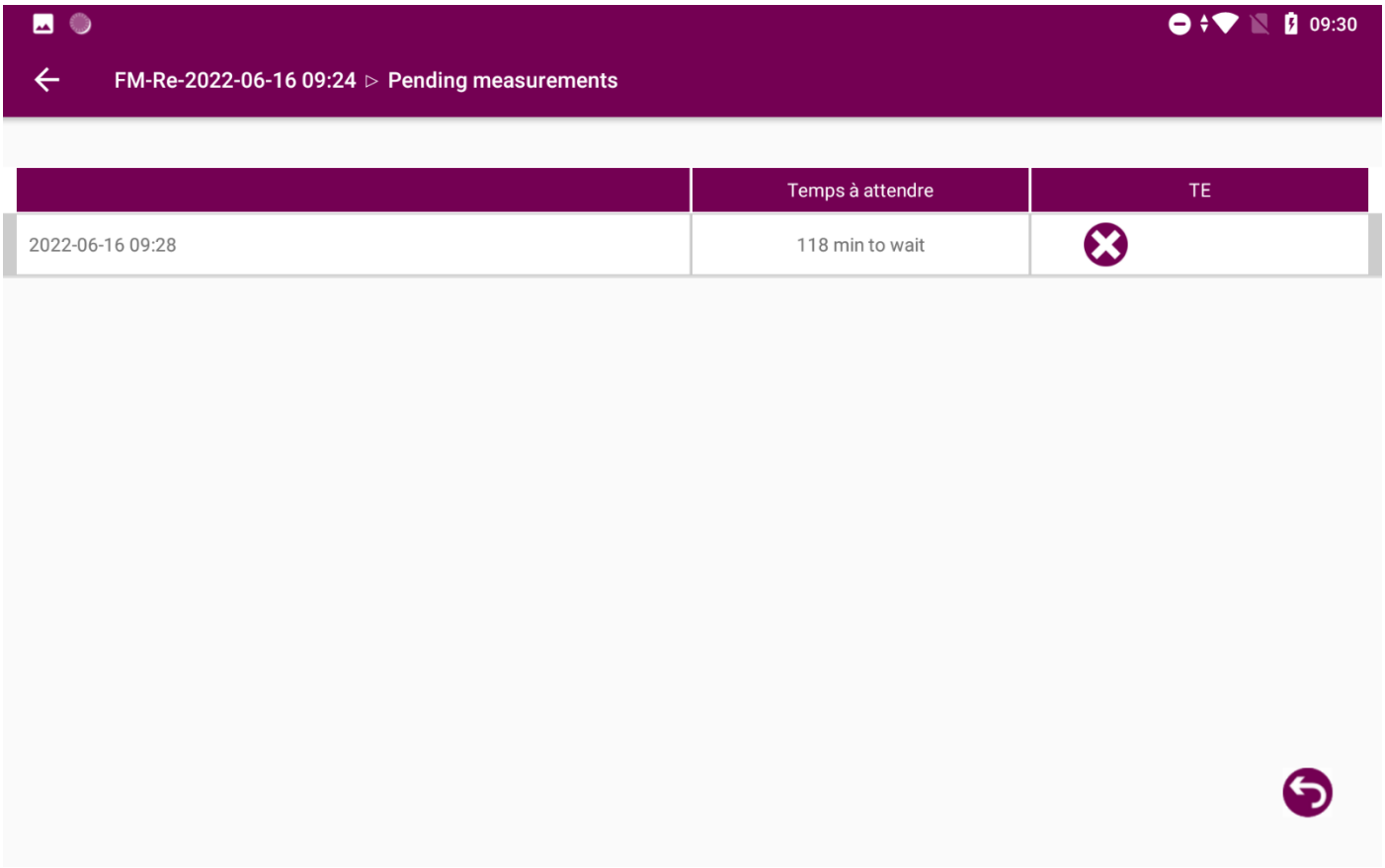
Tan/Acn Ratio

Tan/Acn ratio is determined for each sample. However this ratio changes during fermentative maceration, most of the time increasing during maceration. A measurement when the density is between 1040-1020 is recommended to obtain a value related to the grape characteristic, on which the ageing strategy can be based. The most representative Tan/Acn ratio from the while series for the tank is displayed on the right of the screen



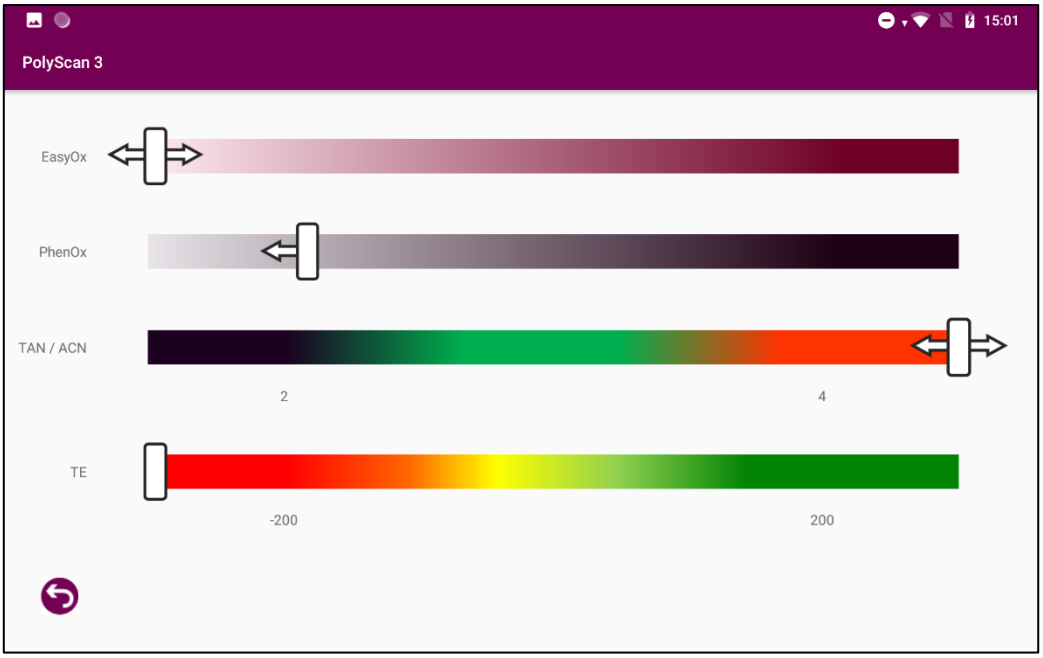
For this type of analysis, for each measurement, it is possible to enter the density either at the launch of measurement or by clicking on Modify (for the selected sample).

The icon allows access to the "tendency of evolution" type measurements pending in the series displayed. It is possible through this screen to know delay for the second measurement and to launch the second measurement when the 2 hours have elapsed.



To perform "Tendency of evolution" type measurements, see paragraph: 3.11 Tendency of evolution

Pressing the "categorization" button displays a summary of the tank, value of the indexes compared to the references and evolution of the indexes.

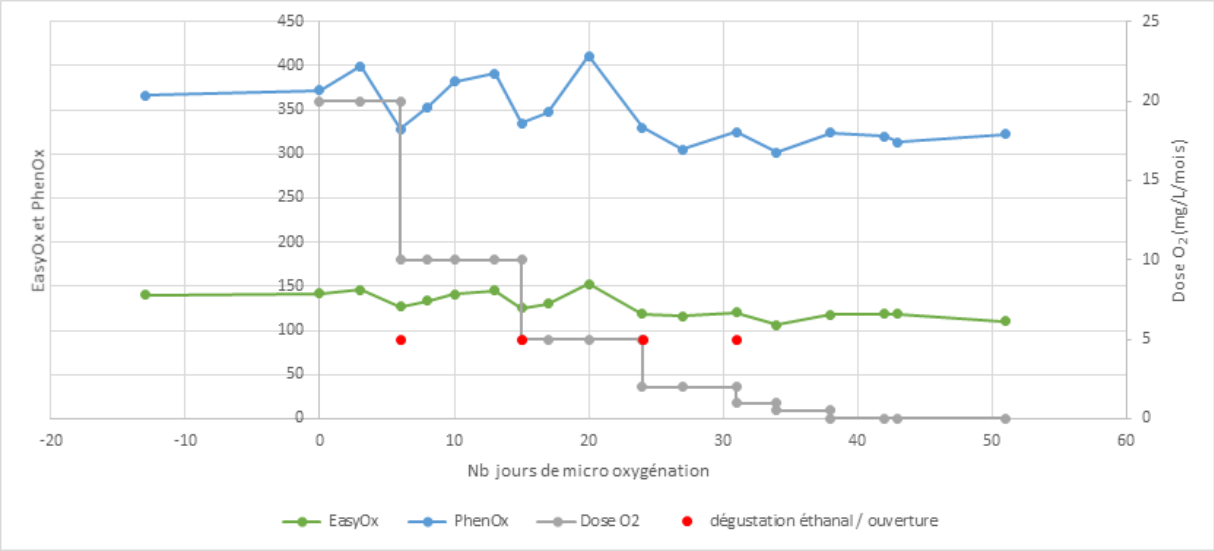


3.7. Microoxygenation / lees ageing

This analysis allows monitoring opening state (Aging State) evolution and easily oxidizable polyphenols (EasyOx) during micro-oxygenation and /or lees ageing.

It helps to make decision for controlling the dose between AF and MLF. Measurement must be done on the wine sampled at the same time of sampling wine for tasting it. The decrease of the EasyOx and /Ageing State indices comes simultaneously with the apparition of opening notes (ripe fruit, candied fruit, marmalade, chocolate) when tasting the wine. It helps making decision regarding injection flow decrease according to the chosen micro-oxygenation strategy.

Merlot from Languedoc 2018:

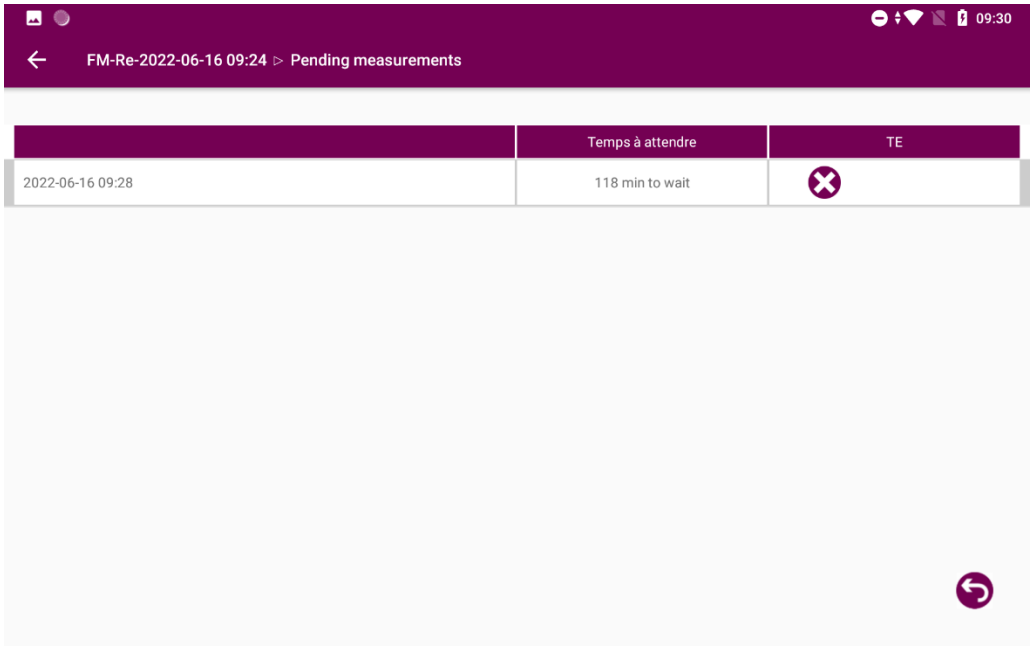


When a significant drop in the indices is observed, a pop-up message appears on the screen recommending stopping O_2 intake.

3.8. Ageing Strategy

Only "Tendency of Evolution" type measurements are available in this menu.

The results are presented in tabular form. The second measurement can be made from the table in the index cell of the sample when the 2 hour wait has elapsed.



The "mapping" button allows you to visually compare the samples in an Aging State / Tendency of evolution graph. To categorize the tanks and adapt the ageing, contact us.

3.9. Barrel Ageing

Tendency of evolution type only.

Monitoring of ageing in barrels. No decision rule in this menu. Allows to separate measurements on barrel from other in the database.

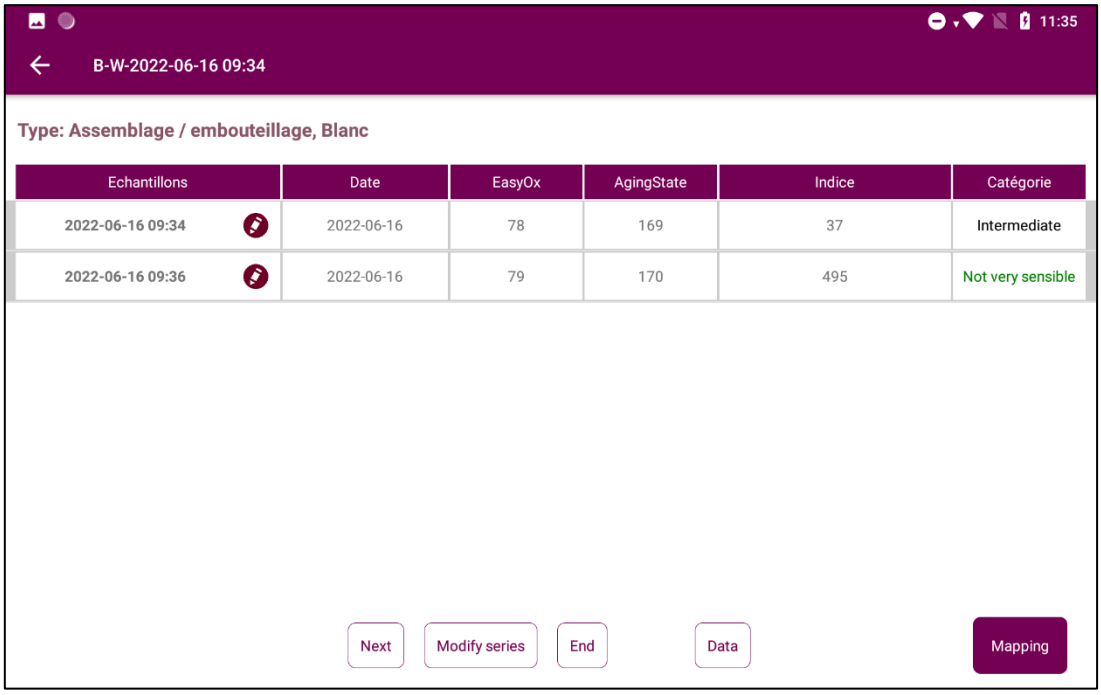
3.10. Blending/bottling

Tendency of evolution type only.

Pre-blending analysis (optimizing polyphenols and oxidizable compounds content of the finished wines)

Analysis after bottling.

3.11. Tendency of evolution test



The tendency of evolution test is available in the menus:

- Prefermentative and fermentative maceration
- Orientation end FA
- Barrel aging
- Blending/bottling

The Tendency of Evolution test allows determining if the wine is sensitive to oxidation at the time the test is performed.

Notes:

- SO2 has no influence on the measurement result
- An "oxidized" wine can sometimes not oxidize further. It is therefore possible that the test no longer judges the wine "sensitive" simply because the oxidation mechanism is already advanced.
- The first measurement at T0 of the sample must be carried out immediately after the wine has been sampled, without waiting for the wine to get into contact with air.

Protocol to follow:

- Choose the menu "Ageing strategy", "Prefermentative and Fermentative maceration* ", "Barrel Ageing" or "Blending/Bottling". (* select the type of measurement “Tendency of evolution”)

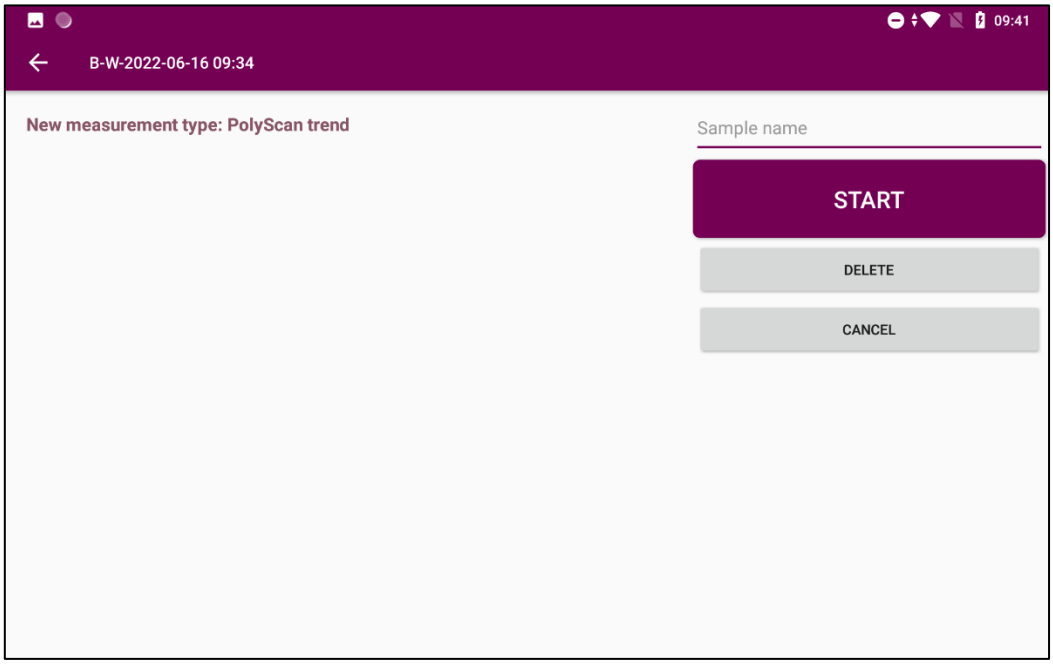
- Fill in the color, the grape variety, the name of the series, the name of the sample
- Insert the strip

1st measurement T0:

A/ In case of sampling from a tank or a barrel:

- Sample directly 50 mL from the tank or the barrel, carefully, in a 125 mL flask with septum, taking care not to oxygenate the wine,

- Put one drop of wine on the electrode immediately after sampling
- Click on « Start », then click again on « Start ».



- Close the flask with the septum. Do not stir.

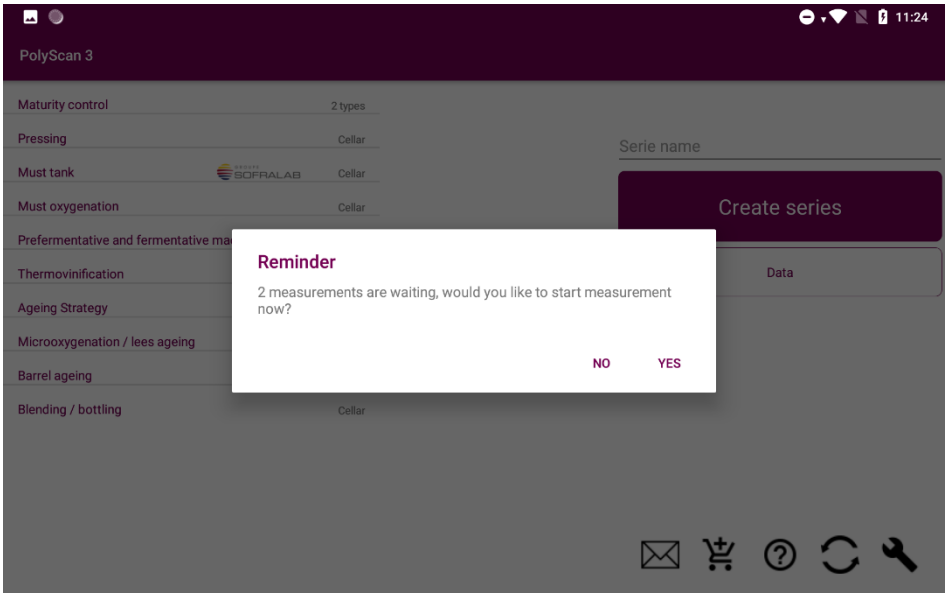
B/ In case of sampling from a bottle

- Sample one drop of wine and put it on the electrode immediately after opening the bottle
- Click on « Start », then click again on « Start ».
- Sample 50 mL of wine from the bottle with cautions (without oxygenating) in a 125 mL flask with septum.

- Close the flask with the septum. Do not stir.

2nd measurement T2h

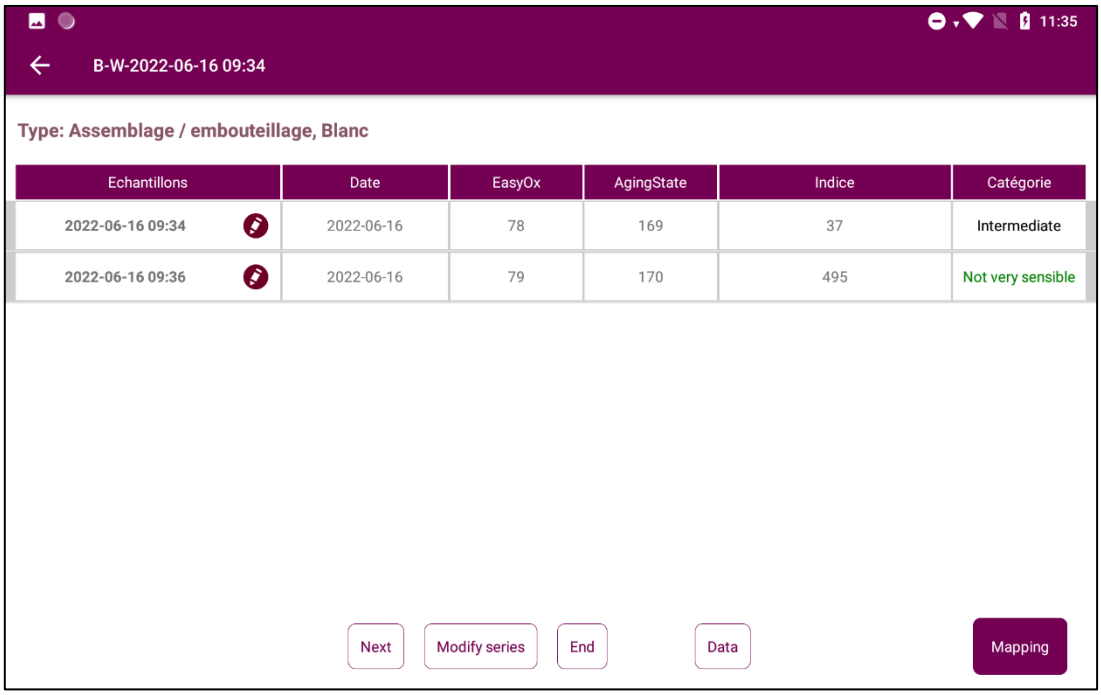
- Leave the 50 mL of sample in the closed bottle at the temperature at which the wine was (in the cellar for example) for 2 hours. A countdown is present on the PolyScan results screen to indicate the time remaining before performing the 2nd measurement.
- 2 hours after the first measurement, return to the PolyScan home screen. A reminder message appears indicating the pending measurements and allowing you to perform the 2nd measurement. Or go to the "Series" containing the measurements to be completed via the "Data" menu.



- Redo an electrochemical analysis (T 2h) by taking a drop of wine from the vial of the sample to be analysed.

Results :

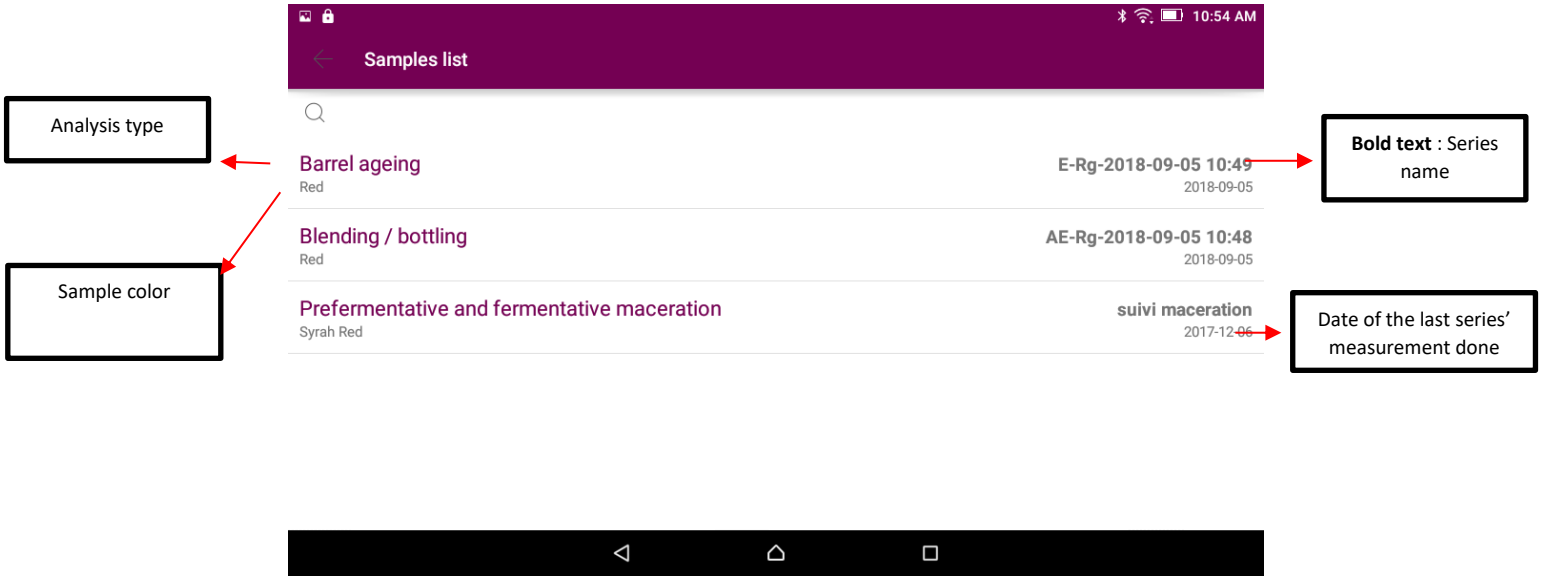
The PolyScan indicates the wine category: sensitive or not very sensitive, as well as the EasyOx and Aging State values of the initial sample. These values complete the analysis: if they are particularly low, it is possible that the sample is already oxidized



For further information, contact the WQS team (winequalitysolutions@vinventions.com)

4. Data

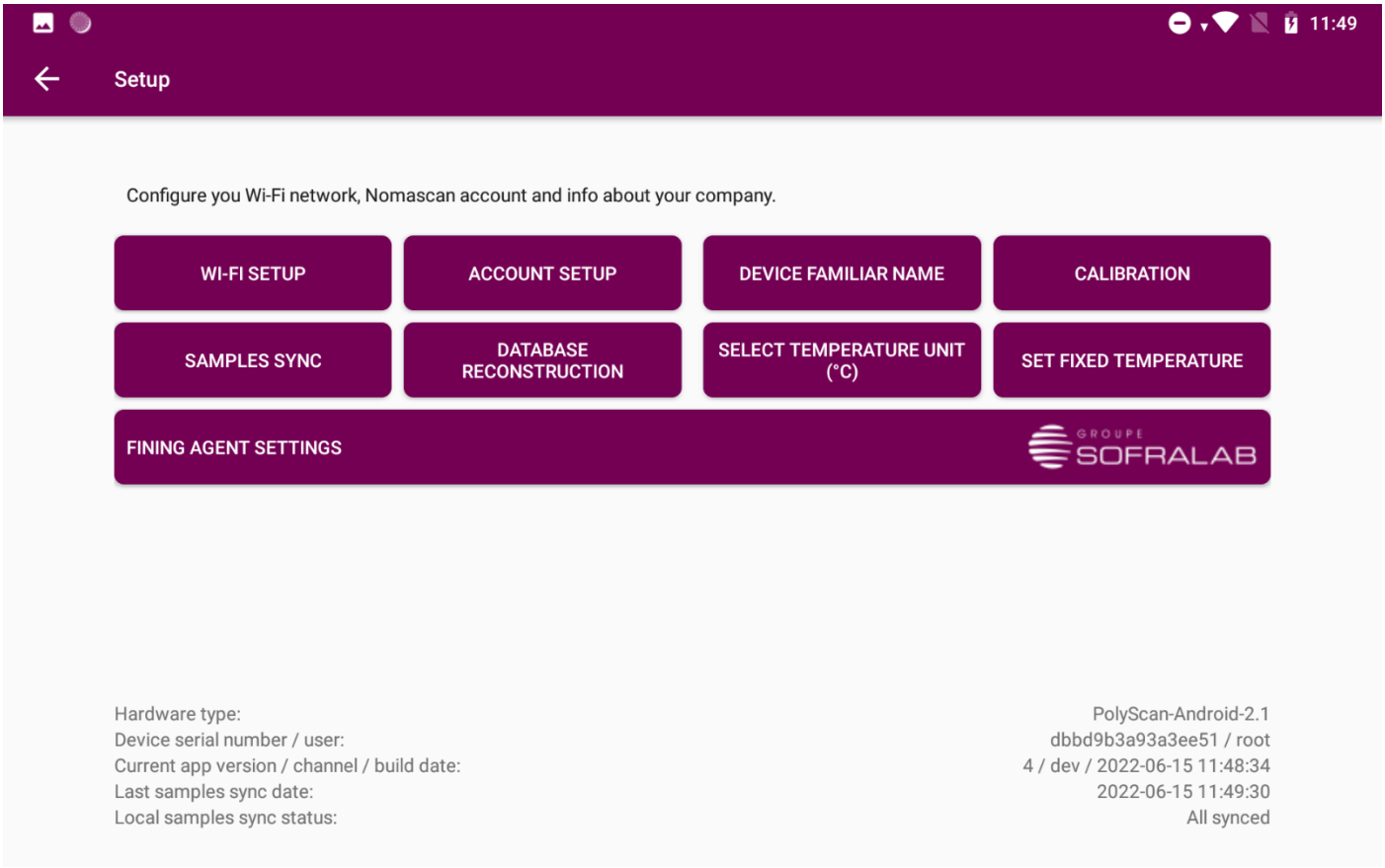
This function allows displaying the list of measurement series that was performed.



Click on the measurement series to consult, the results screen displays. To edit or delete a series or data, see chapter 2.

5. Configuring the PolyScan

Go on Settings: click on (flat key logo)
The different settings appear on the screen.



5.1. WI-FI setup

- Click on WI-FI SETUP
- Select your WI-FI network
- Enter your WI-FI password

The PolyScan communicates with the domain https://vinventions.enologyportal.wqs.wine/ communications to this domain must be authorized by your network administrator if your network has a proxy.

5.2. Account Setup

The device is previously configured by the WQS teams. If this is not the case, a message will be sent to you. Proceed as follows:

- Click on ACCOUNT SETUP
- Enter your Login ID and your password - this one has been sent to you by email
- Click on SIGN IN

5.3. Application Update

Application updates are released when bugs are fixed or new features have been developed. **We strongly advise to install them**.
When an update is available and the PolyScan is connected to the Wi-Fi, a pop-up message appears to download the new version of the application.

- Download the new version of the application
- Then click on **INSTALL**

Installing a new application version without prior uninstallation is sufficient and does not cause data loss.

Warning: if you uninstall the app without first synchronizing, unsynchronized data will be lost permanently.

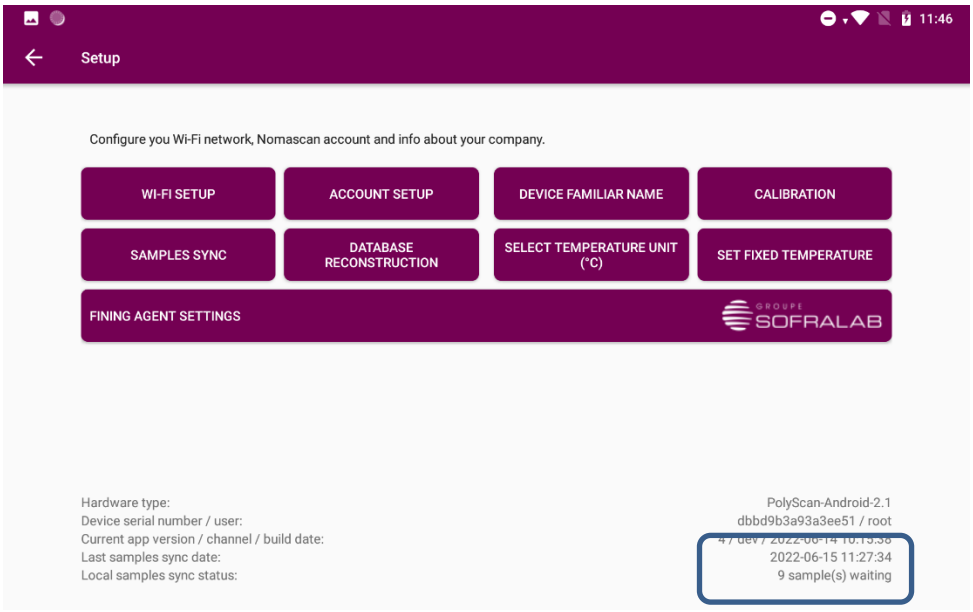
6. Settings

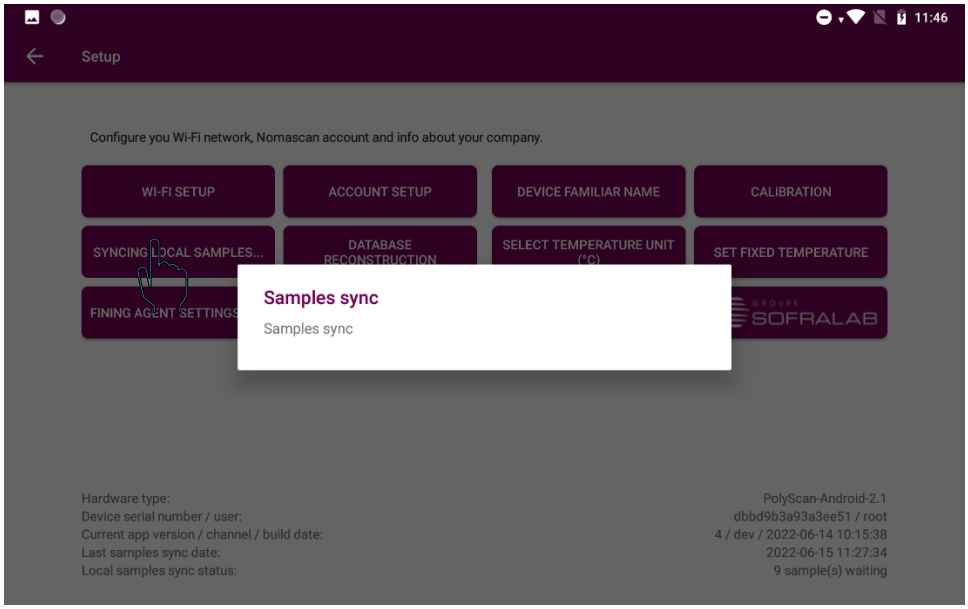
6.1. Force local sample sync

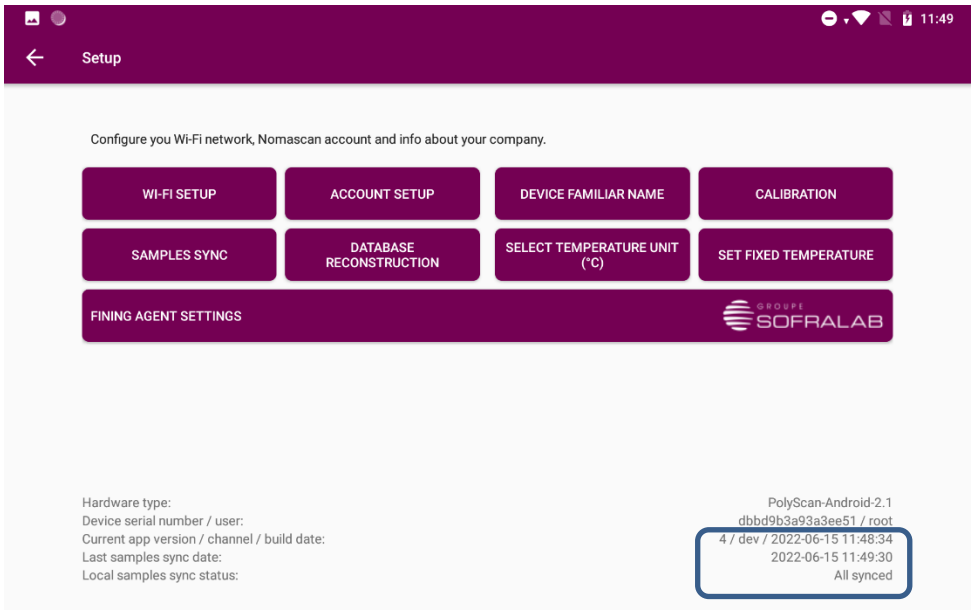
The PolyScan automatically backs up data on the web interface when there is a Wi-Fi connection.

If you cannot find your recent measurements in the web interface, click on "Force local samples sync" button in the Settings menu to manually synchronize the analyzer's data on the web interface.

It is possible to check if samples have not been synchronized.

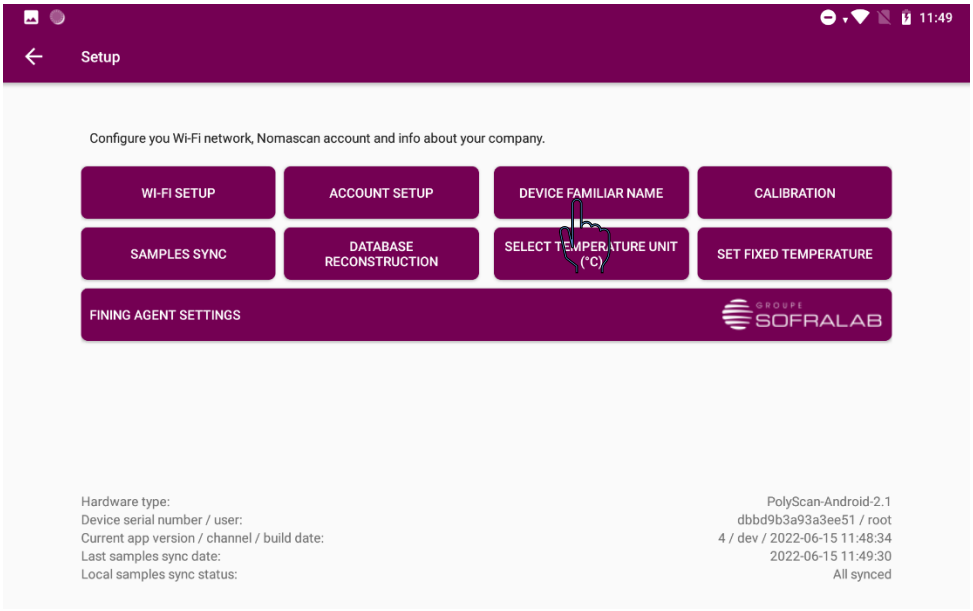

11:46
Setup
Configure you Wi-Fi network, Nomascan account and info about your company.
WI-FI SETUP
ACCOUNT SETUP
DEVICE FAMILIAR NAME
CALIBRATION
SAMPLES SYNC
DATABASE RECONSTRUCTION
SELECT TEMPERATURE UNIT (°C)
SET FIXED TEMPERATURE
FINING AGENT SETTINGS
SOFRALAB
Hardware type:
Device serial number / user:
Current app version / channel / build date:
Last samples sync date:
Local samples sync status:
PolyScan-Android-2.1
dbbd9b3a93a3ee51 / root
2022-06-15 11:27:34
9 sample(s) waiting

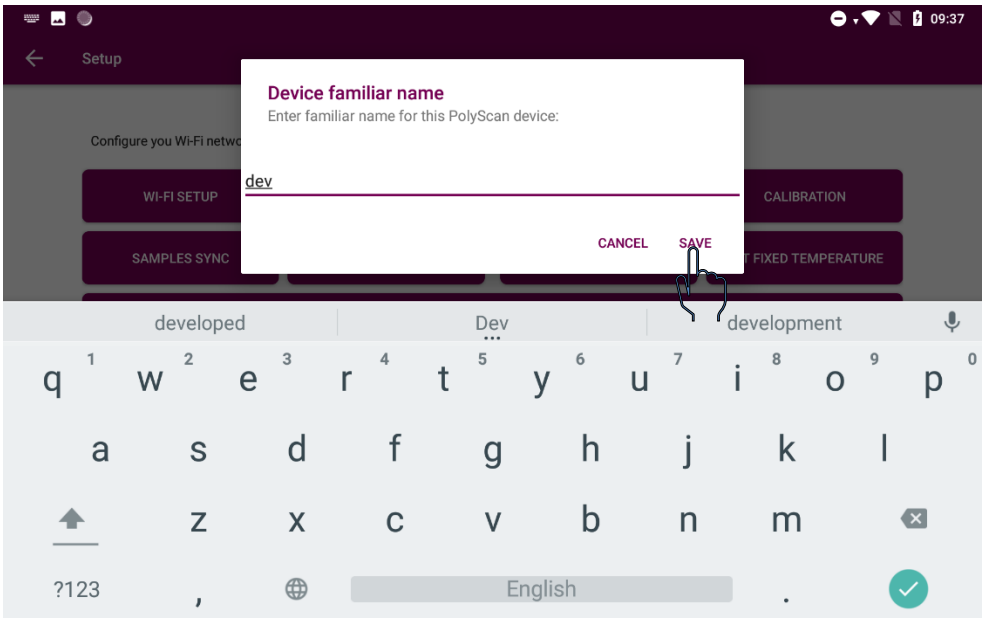

11:46
Setup
Configure you Wi-Fi network, Nomascan account and info about your company.
WI-FI SETUP
ACCOUNT SETUP
DEVICE FAMILIAR NAME
CALIBRATION
SET FIXED TEMPERATURE
SOFRALAB
Samples sync
Samples sync
Hardware type:
Device serial number / user:
Current app version / channel / build date:
Last samples sync date:
Local samples sync status:
PolyScan-Android-2.1
dbbd9b3a93a3ee51 / root
4 / dev / 2022-06-14 10:15:38
2022-06-15 11:27:34
9 sample(s) waiting


11:49
Setup
Configure you Wi-Fi network, Nomascan account and info about your company.
WI-FI SETUP
ACCOUNT SETUP
DEVICE FAMILIAR NAME
CALIBRATION
SAMPLES SYNC
DATABASE RECONSTRUCTION
SELECT TEMPERATURE UNIT (°C)
SET FIXED TEMPERATURE
FINING AGENT SETTINGS
GROUPE SOFRALAB
Hardware type: PolyScan-Android-2.1
Device serial number / user: dbbd9b3a93a3ee51 / root
Current app version / channel / build date: 4 / dev / 2022-06-15 11:48:34
Last samples sync date: 2022-06-15 11:49:30
Local samples sync status: All synced

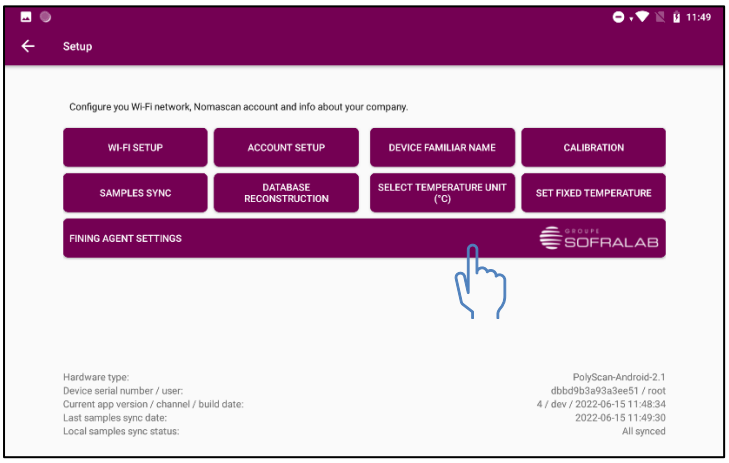
6.2. Device Familiar name

In case you use several devices, it is possible to define a ”name” for each device, this name appears in the export files.

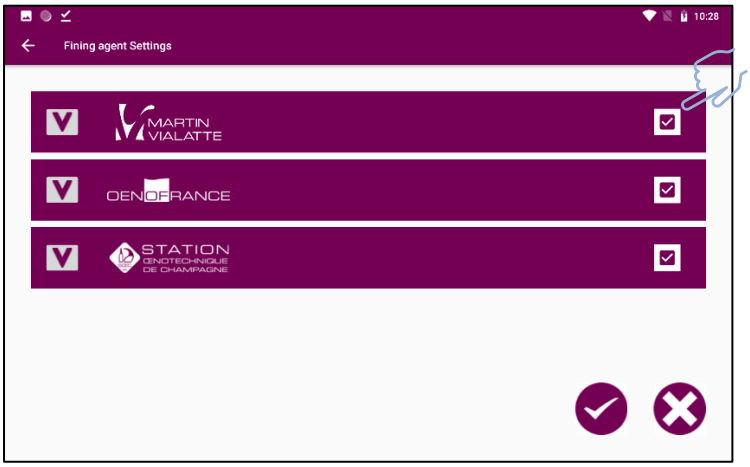




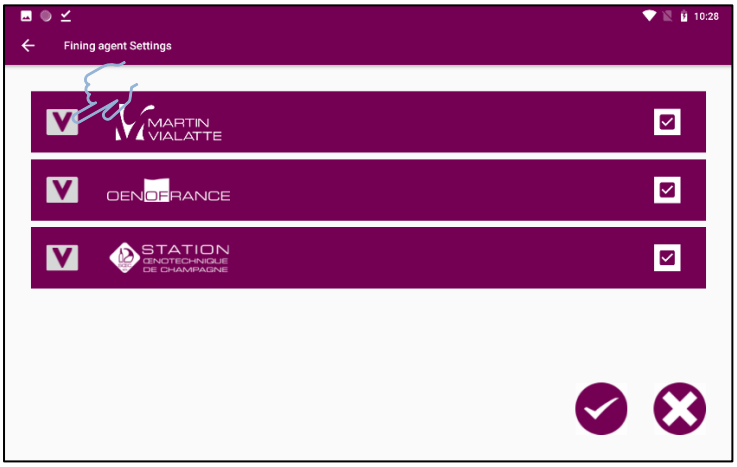
6.3. Fining agent settings



Click on « Fining agent settings »



In this menu, it is possible to select / unselect available fining agents to restrict recommendations to available fining agents. By clicking on the checkbox in front of the brands, it is possible to select / unselect all the fining agents of a brand.



By clicking on the arrow, it is possible to view all the fining agents of a brand and to make them available / unavailable individually.

Information is displayed for each fining agent :

Organic

Vegan

Allergen free

NOP

Brands accessible for each customer can be restricted according to market availability.

6.4. Calibration

This function is reserved for WQS specialist

No calibration is required for the use of the PolyScan or electrodes as both are pre-calibrated from the factory.

If you have questions about calibration, please contact the WQS team (winequalitysolutions@vinventions.com)

7. Troubleshooting :

Error	Causes	Corrective actions
NomaScan synchronization impossible	No Wifi network	Put your analyzer in a WIFI network zone Or Enter the WIFI key into the PolyScan application as described in section 5.1 or Reconnect the tablet to WiFi (if inactivated in tablet setting)
	Wrong setting of the tablet date and time (sometimes due to the complete battery discharge or device turned on again without access to WIFI)	Set the date and time in tablet setting

WQS

CONTACTEZ-NOUS:
winequalitysolutions@vinventions.com