ZHAW
Zürcher Hochschule
für Angewandte Wissenschaften

Life Sciences und
Facility Management

Validation Report

Sensory Evaluation of Virgin Olive Oil

in sensory laboratories (in situ) vs.
home testing stations (remote)

Implementation: July / August 2020

Report from: September 04, 2020

Swiss Olive Oil Panel (SOP)

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Content

1   Summary

In the study at hand 10 olive oils (7 of them extra virgin and 3 defective ones) were independently tested by the Swiss Olive Oil Panel / SOP and the German Olive Oil Panel / DOP in different test situations - namely in sensory laboratories (in situ) and at so called home testing stations (remote).

Test results were analyzed regarding the validity of the data and focusing on the following three aspects:

1. test situation (in situ vs. remote)
2. homogeneity between panels (SOP vs. DOP)
3. individual panel performance (SOP, DOP)

First, and for both panels separately, the agreement between data collected in different test situations - sensory laboratory (in situ) and home testing stations (remote testing) - was checked. For this purpose, raw data were analyzed using mixed model ANOVA. Results show that there are no statistically significant differences between the different test situations within each panel. This means that SOP and DOP can repeat their results from the laboratory situation at home testing stations.

Second, mixed model ANOVA was used to analyze whether there exist differences between the data collected from the two IOC recognized panels separately. It was found that there are statistically significant differences between the two panels. The largest difference for the mean value is 0.5 on a 10 cm scale. This means, that panels show variance, but nevertheless results are within the expected and accepted variation proposed by the IOC.

Third, and based on COI/T.28/Doc. No.1/Rev. 5 2019, the panel performance was analyzed according to the following selected criteria: Z-Score, Deviation Number as well as Normalised Error and Precision Number for both participating panels, SOP and DOP. Results show that both panels meet the IOC requirements in all criteria mentioned.

Overall, results show that the influence of testing through different panels (SOP vs. DOP) is bigger than a potential negative impact of testing in different test situations (in situ vs. remote). However, it is important to mention that in order to achieve such reliable data, professional equipment and an intense and adequate training of the panelists / panels is required. DOP and SOP fully meet these expectations.

2 Introduction

This validation report deals with the sensory performance of trained expert panels in context of the sensory evaluation of olive oil according to the EU regulation 2568/91 and the underlying IOC documents.

The two expert panels participating in the validation study, namely the German Olive Oil Panel / DOP and the Swiss Olive Oil Panel / SOP, are objective panels whose members have many years of experience in the sensory evaluation of olive oil. Both panels exist already for about 20 years, are accredited in accordance to EN ISO/IEC 17025 and are recognized by the IOC. The panelists of both panels are regularly trained and undergo a permanent monitoring of their performance, which is - in addition to other requirements - an important basis for their consistent, reliable and successful work.

Sensory evaluations are carried out in both panels either synchronously and "in situ" in a sensory laboratory, equipped with test booth or asynchronously at so-called home testing stations. In order to ensure that results are valid, regardless of the test location at which they get obtained (and regardless of other influencing factors), panelist and panel performance tests as well as inter-laboratory comparisons are made regularly.

3 Objective

The aim of the validation study at hand is to proof the overall panel performance of the participating panels. Special attention is paid in this report to the suitability of "in situ" test situations (in a sensory laboratory) vs. "remote" test situations (at home test stations) for the sensory evaluation of olive oil. Additionally, the criteria of homogeneity between the considered panels as well as homogeneity, consistency and repeatability of each single panel are particularly interesting in this context.

4 Material & Methods

4.1 Panel / Panelists

Swiss Olive Oil Panel / SOP:

The Swiss Olive Oil Panel (SOP) consists of 38 panelists and was founded in 2002. Since 2006 the SOP is accredited in accordance with EN ISO/IEC 17025 (Appendix 1: last Accreditation Certificate by SAS) and it is recognized by the International Olive Council (IOC) since 2009.

German Olive Oil Panel / DOP:

The German Olive Oil Panel (DOP) consists of 25 panelists and was founded in 1999. Since 2012 the DOP is accredited in accordance with EN ISO/EC 17025 (Appendix 2: last Accreditation Certificate by DAkkS) and it is recognized by the International Olive Council (IOC) since 2012.

4.2 Sensory Evaluation in Sensory Laboratories (in situ)

Swiss Olive Oil Panel / SOP:

The sensory laboratory of SOP is located on the ZHAW campus in Wädenswil. It consists of 12 separate test booths. Each booth is equipped with a computer (incl. data acquisition software FIZZ by Biosystemes) and a heating device by Ettore Pasquali (mod. 145). Each heating device is recorded in a device list of the QMS and is checked regularly. Detailed information concerning the procedure of testing in the sensory laboratory (and concerning additional equipment like test glasses, spittoons, palate cleansing agents, etc.) can be found in Appendix 3: QMS – Standard Operation Procedure LMT-SEN-A5-302_translated EN → Sensory Evaluation at ZHAW (Sensory Laboratory).

German Olive Oil Panel / DOP:

The sensory laboratory of DOP is located in Nürnberg, Maxfeldstr. 50. It consists of 12 separate mobile test booths. Each booth is equipped with a computer (incl. data acquisition software SENSORY by IMEDIA) and a heating device by Ettore Pasquali (mod. 145). Each heating device is recorded in a device list of the QMS and is checked regularly. Detailed information can be found in Appendix 4: Standard Operation Procedure (SOP 08-02-05).

4.3   Sensory Evaluation at Home Testing Stations (remote testing)

Swiss Olive Oil Panel / SOP:

Each panelist has set up a personal testing station in a room in his or her home. Each testing station is equipped with a heating device (Rosenstein & Söhne), a thermometer (Testo Mini penetration thermometer) and blue glasses including a cover glass. Each heating device and thermometer is recorded in a device list and is checked regularly. Detailed information concerning the procedure of testing in a home testing station can be found in Appendix 5: QMS – Standard Operation Procedure → LMT-SEN-A5-303_translated EN → Sensory Evaluation at Home Testing Stations.

German Olive Oil Panel / DOP:

Each panelist has set up a personal testing station in a room in his or her home, which meets the test conditions of the IOC in terms of light, temperature, noise and odours (COI/T.20/DOC. No 6/Rev. 1). The mobile booth is made up of folding elements in such a way that the panelist is isolated from negative ambient conditions. Each test station is equipped with a heating device (Ettore Pasquali, mod. 145), a thermometer (Testo Mini penetration thermometer) and blue glasses including a cover glass. Each heating device and thermometer is recorded in a device list and is checked regularly. Detailed information can be found in Appendix 4: Standard Operation Procedure (SOP 08-02-05)

4.4   Test Methodology – EU 2568/91 (actual version)

The applied sensory methodology is based on the official panel test according to the EU regulation 2568/91 and related IOC documents.

4.5   Validation Concept

To be able to record reliable data in the context of sensory evaluation of olive oil, the validity of raw data must be ensured. Therefore, a validation concept, based on the recommendations of the IOC (COI/T.28/Doc. No.1/Rev. 5 2019), was designed.

Among other criteria analyzing the panelist and panel performance, the concept focuses especially on the aspect of the test situation (sensory laboratory vs. home testing stations).

Validation Criteria:

- **Agreement between different test situations (chapter 5.1)**
    - o Focus: Sensory laboratory vs. Home testing stations
    - o Attributes:
        - Fruitiness
        - Bitterness
        - Pungency
        - Defect
    - o Methodological Approach:
        - Graphical visualization
        - Mixed model ANOVA
        - Analyzed for each panel separately

- **Agreement between different panels (chapter 5.2)**
    - o Focus: DOP vs. SOP
    - o Attributes:
        - Fruitiness
        - Bitterness
        - Pungency
        - Defect
    - o Methodological Approach:
        - Graphical visualization
        - Mixed model ANOVA

- **Panel Performance (chapter 5.3)**
    - o Focus:
        - Homogeneity
        - Consistency
        - Repeatability
    - o Attributes:
        - Fruitiness
        - Bitterness
        - Pungency
    - o Methodological Approach:
        - Trueness (< 2.0)
            - z-score$_p$ $\rightarrow$ *homogeneity*
            - Deviation (DN$_p$) from other panels per session $\rightarrow$ *homogeneity*
        - Precision (< 2.0)
            - Normalised error (En): panel mean / panel mean $\rightarrow$ *repeatability*
            - Precision number (PN$_p$): panel mean / panel mean $\rightarrow$ *consistency*
        - Analyzed for each panel separately

4.6 Test Samples

Both participating panels did evaluate the same selection of 10 olive oils (same lot number) on the one hand "in situ" (in the sensory laboratory) and on the other hand "remote" (at home testing stations). The order of testing was the same in all testing situations (Table 1), but in each test situation individual three-digit-codes were used to avoid influencing the testers.

Table 1: Test samples

No.	Sample Code*	Product information
P1	104	100% Italian olive oil; different varieties, extra virgin
P2	507	European Blend; different varieties, extra virgin
P3	620	100% Italian olive oil, 100% Nocellara, extra virgin
P4	733	100% Italian olive oil; different varieties, extra virgin
P5	249	100% French olive oil; different varieties, extra virgin
P6	362	Olive Oil from IOC Org 2 - 2020, extra virgin
P7	878	Olive Oil from IOC Org 1 - 2020, defective
P8	168	Olive Oil from IOC Org 1 - 2020, extra virgin
P9	055	Olive Oil from IOC Org 2 - 2020, defective
P10	652	Olive Oil from IOC Org 2 - 2020, defective

* For each test situation individual three-digit-codes were used to avoid influencing the testers.

4.7 Test Dates

<u>Swiss Olive Oil Panel / SOP:</u>
- Tests in the sensory lab of SOP took place synchronously on July 09, 2020.
- Tests at the home testing stations took place asynchronous between July 01 and July 07, 2020.

<u>German Olive Oil Panel / DOP:</u>
- Tests in the sensory lab of DOP took place synchronously on July 17, 2020.
- Tests at the home testing stations took place asynchronous between June 30 and July 10, 2020.

4.8 Data Collection

Swiss Olive Oil Panel / SOP:

- Sensory laboratory: To collect data, panelists from SOP are provided with PC's in the test booth, equipped with the sensory software Fizz (Biosystemes Fizz for Windows 2.46 A), which allows direct electronic recording of individual panelist data on an electronic profile sheet.
- Home testing stations: To collect data, panelists from SOP use a profile sheet (paper) and transfer individual panelist data via Software LimeSurvey to the panel leader.

The criteria on both profile sheets used from SOP (paper / electronically) is identical (see Appendix 6).

German Olive Oil Panel / DOP:

- Sensory laboratory: To collect data, panelists from DOP are provided with PC's in the test booth, equipped with the sensory software SENSORY by IMEDIA, which allows direct electronic recording of individual panelist data on an electronic profile sheet.
- Home testing stations: To collect data, panelists from DOP use a profile sheet (paper) and transfer individual panelist data via Software SENSORY by IMEDIA via Internet to the panel leader.

The criteria on both profile sheets used from DOP (paper / electronically) is identical (see Appendix 7).

4.9 Data Evaluation (Assessment)

All results of the different tasting sessions with all panelists and all panels were combined to a common data set, using the software program "Excel" (Microsoft Office Excel 365). The following data evaluation was done with help of the Add-in Software "XLStat" (version 2020).

5 Results and Discussion

In the following chapter the results of the validation study are presented and discussed.

5.1 Agreement between different test situations (in situ vs. remote)

Swiss Olive Oil Panel / SOP:

Figure Figure *1* visualizes the comparison of medians of the attribute fruitiness of the 7 extra virgin olive oils analyzed by the Swiss Olive Oil Panel. The maximum difference between medians for the attribute fruitiness is 0.4 for sample 249.

There is no significant difference between results coming from the test in the sensory laboratory (in situ) compared to the home testing stations (remote) regarding the attribute fruitiness. Results from mixed model ANOVA are shown in Table 2.
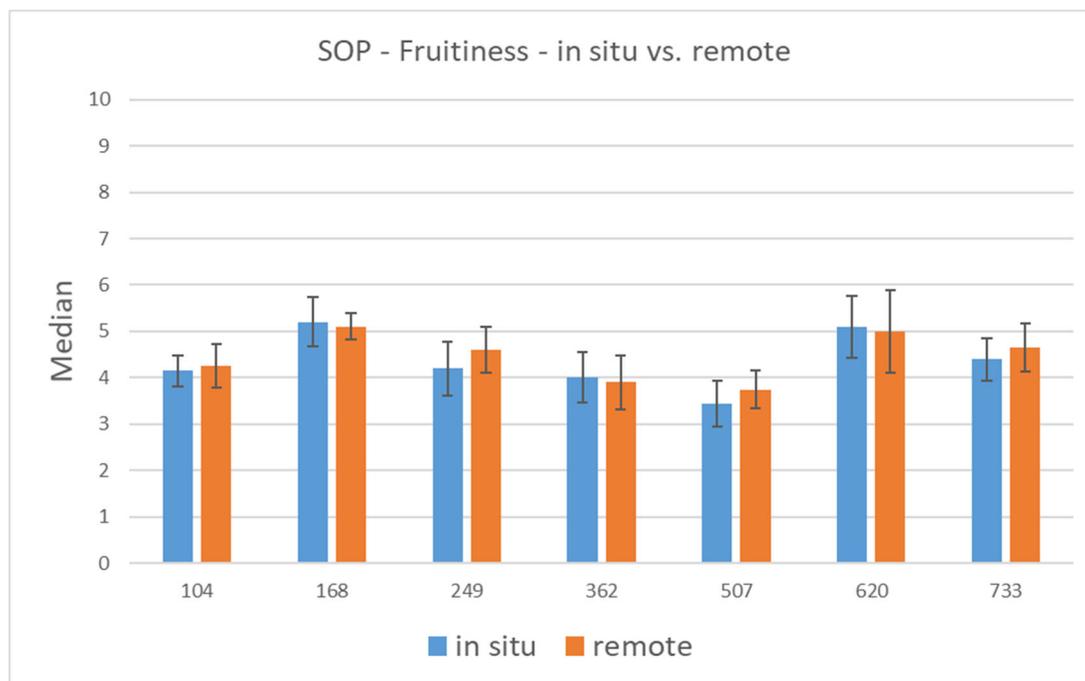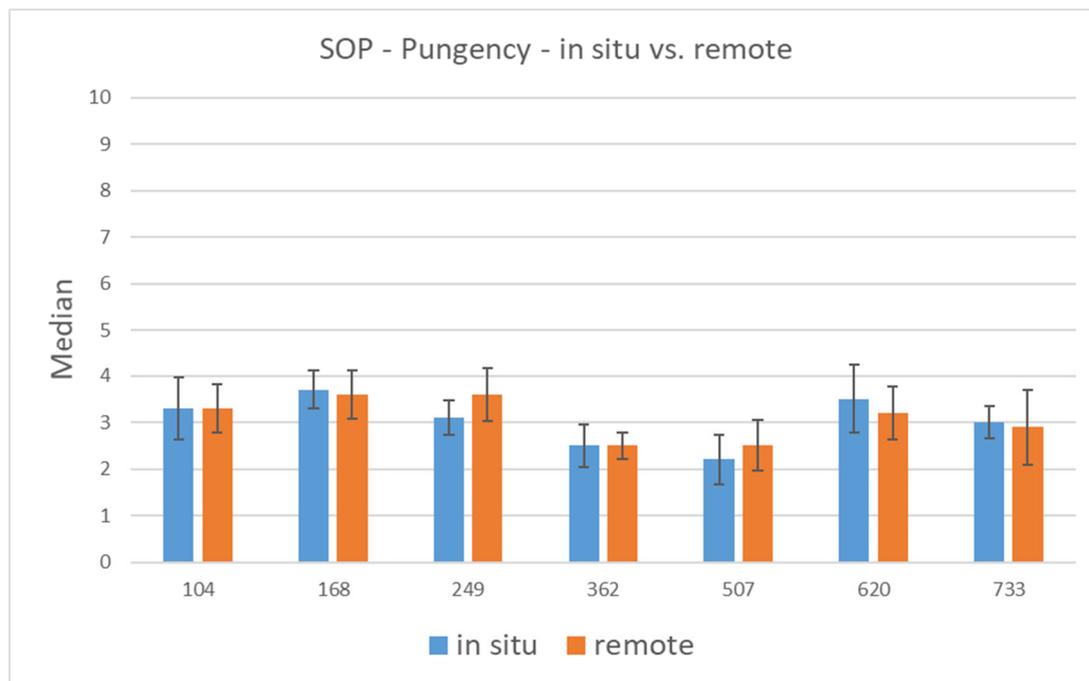

Figure 1: Median Fruitiness - SOP - in situ vs. remote

Table 2: ANOVA Fruitiness - SOP - in situ vs. remote

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
In situ vs. remote	0.142	0.991	2.120	0.336	No

Figure Figure **2** visualizes the comparison of medians of the attribute bitterness of the 7 extra virgin olive oils analyzed by the Swiss Olive Oil Panel. The maximum difference between medians for the attribute bitterness is 0.3 for sample 104.

There is no significant difference between results coming from the test in the sensory laboratory (in situ) compared to the home testing stations (remote) regarding the attribute bitterness. Results from mixed model ANOVA are shown in Table 3.
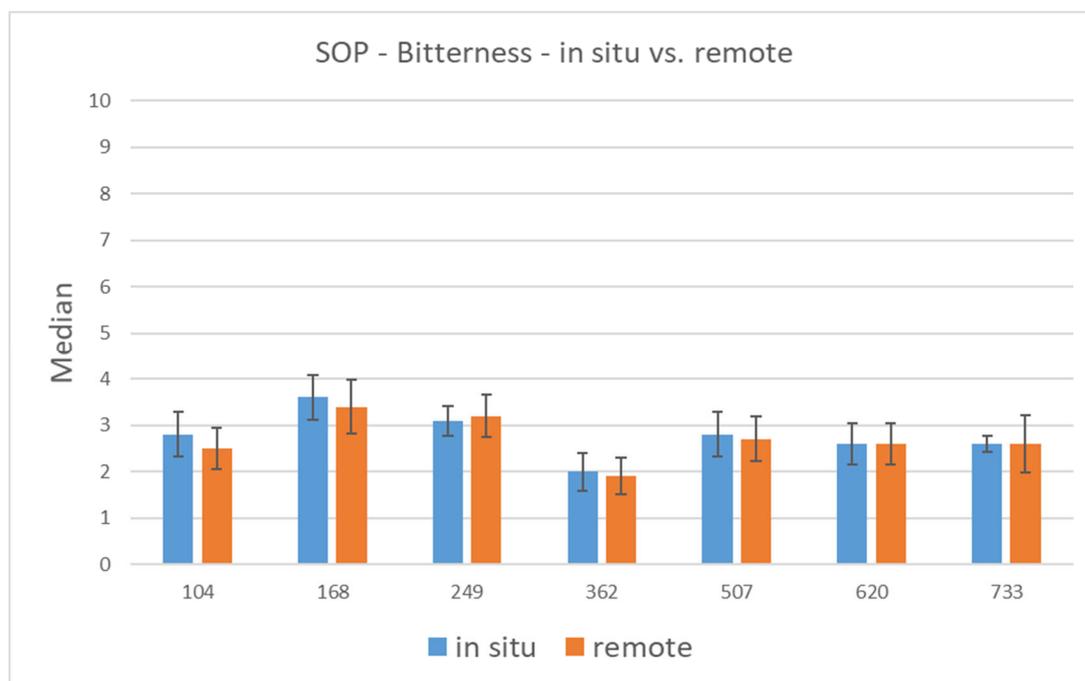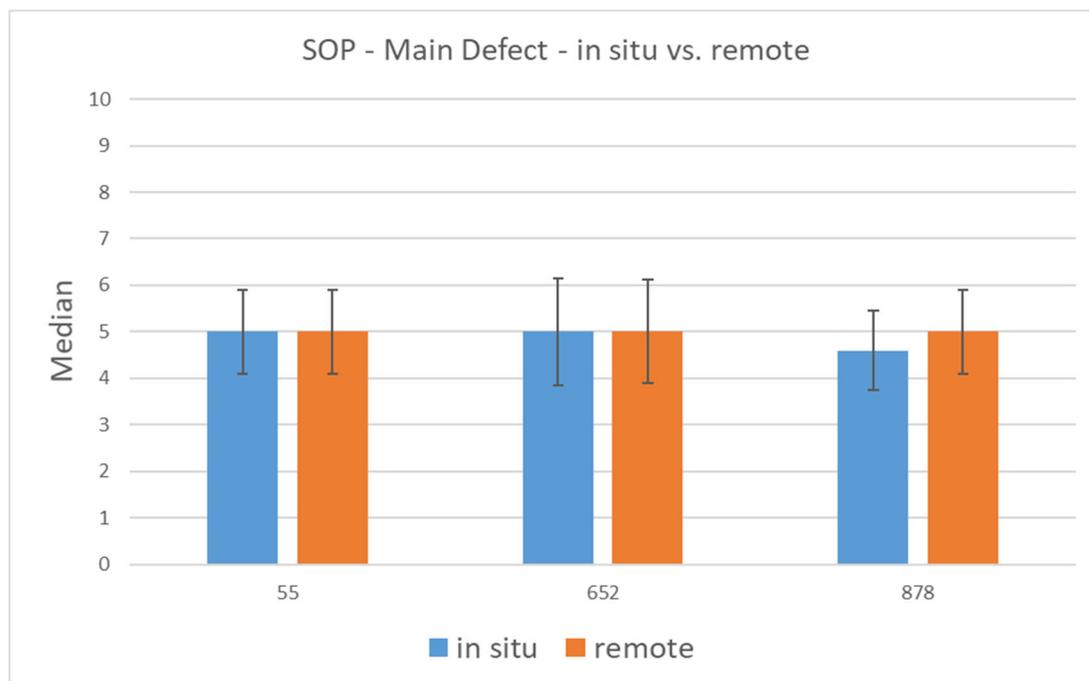

Figure 2: Median Bitterness - SOP – in situ vs. remote

Table 3: ANOVA Bitterness - SOP - in situ vs. remote

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
In situ vs. remote	0.065	0.532	2.120	0.602	No

Figure Figure **3** visualizes the comparison of medians of the attribute pungency of the 7 extra virgin olive oils analyzed by the Swiss Olive Oil Panel. The maximum difference between medians for the attribute pungency is 0.5 for sample 249.

There is no significant difference between results coming from the test in the sensory laboratory (in situ) compared to the home testing stations (remote) regarding the attribute pungency. Results from mixed model ANOVA are shown in Table 4.
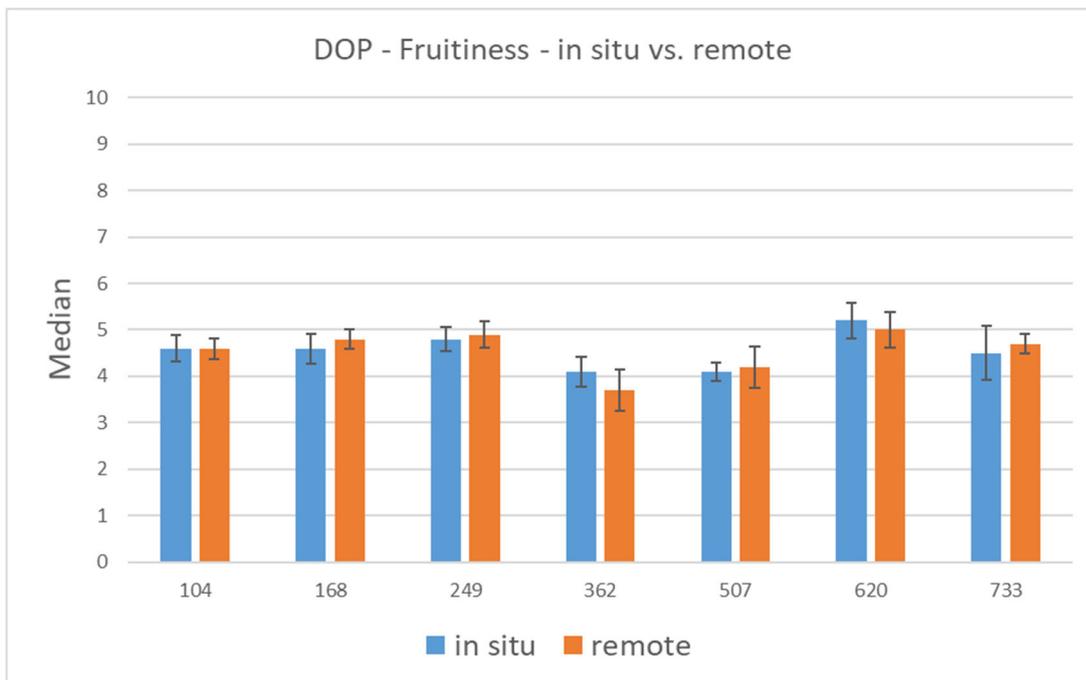

Figure 3: Median Pungency - SOP – in situ vs. remote

Table 4: ANOVA Pungency - SOP - in situ vs. remote

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
In situ vs. remote	0.017	0.125	2.120	0.902	No

Figure **Figure 4** visualizes the comparison of medians of the main defect of the 3 defective olive oils analyzed by the Swiss Olive Oil Panel. The maximum difference between medians for main defect is 0.4 for sample 878.

There is no significant difference between results coming from the test in the sensory laboratory (in situ) compared to the home testing stations (remote) regarding the main defect. Results from mixed model ANOVA are shown in Table 5.

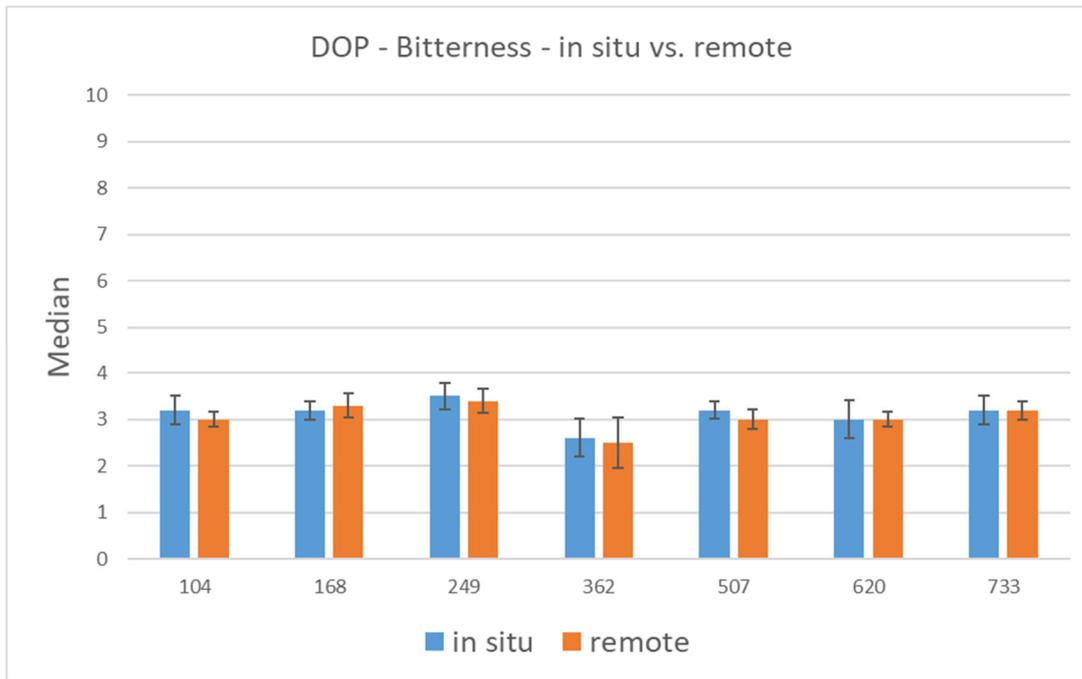*Figure 4: Median of Main Defect - SOP – in situ vs. remote*

Table 5: ANOVA Main Defect - SOP - in situ vs. remote

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
In situ vs. remote	0.082	0.289	2.086	0.775	No

German Olive Oil Panel / DOP:

Figure 5 visualizes the comparison of the medians of fruitiness of the 7 extra virgin olive oils analyzed by the German Olive Oil Panel. The maximum difference between medians for the attribute fruitiness is 0.4 for sample 362.

There is no significant difference between results coming from the test in the sensory laboratory (in situ) compared to the home testing stations (remote) regarding the attribute fruitiness. Results from mixed model ANOVA are shown in Table 6.
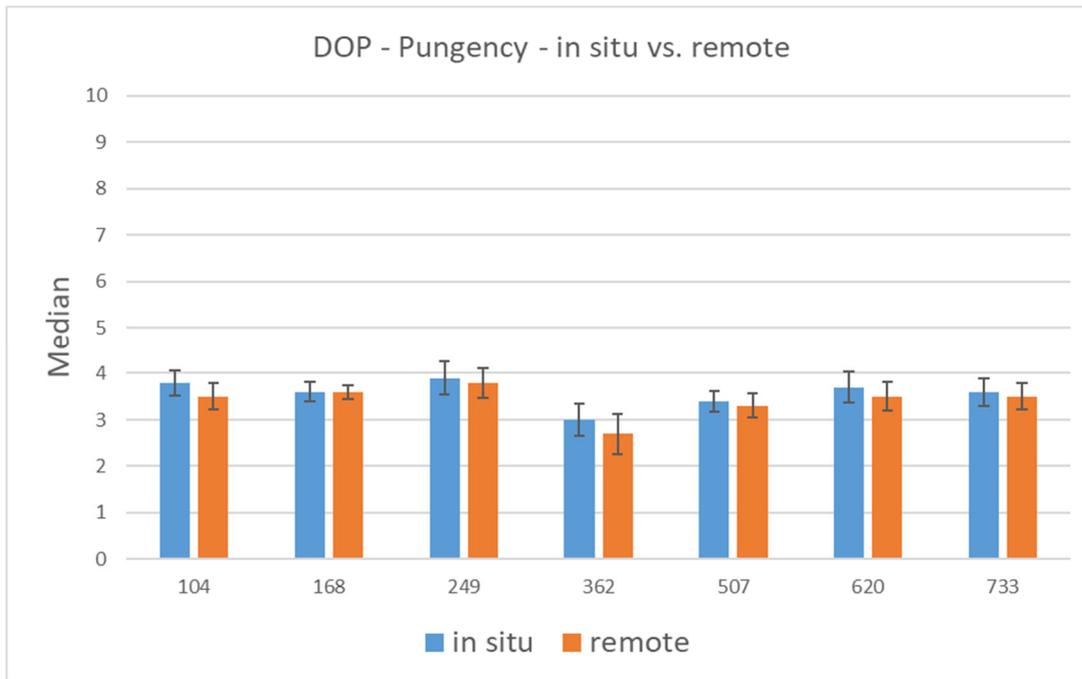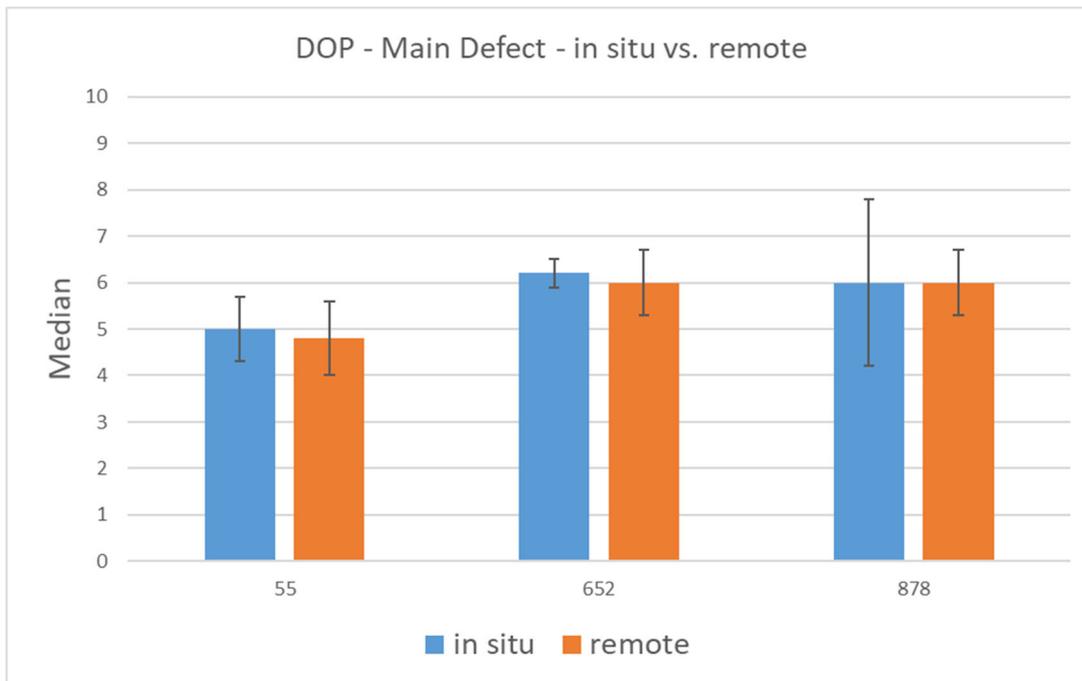

Figure 5: Median Fruitiness - DOP – in situ vs. remote

Table 6: ANOVA Fruitiness - DOP - in situ vs. remote -

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
In situ vs. remote	0.004	0.044	2.086	0.966	No

Figure 6 visualizes the comparison of the median of bitterness of the 7 extra virgin olive oils analyzed by the German Olive Oil Panel. The maximum difference between medians for the attribute bitterness is 0.2 for samples 104 and 507.

There is no significant difference between results coming from the test in the sensory laboratory (in situ) compared to the home testing stations (remote) regarding the attribute bitterness. Results from mixed model ANOVA are shown in Table 7.

Figure 6: Median Bitterness - DOP – in situ vs. remote

Table 7: ANOVA Bitterness - DOP - in situ vs. remote

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
In situ vs. remote	0.095	1.500	2.086	0.149	No

Figure 7 visualizes the comparison of the median of pungency of the 7 extra virgin olive oils analyzed by the German Olive Oil Panel. The maximum difference between medians for the attribute pungency is 0.3 for samples 104 and 362.

There is no significant difference between results coming from the test in the sensory laboratory (in situ) compared to the home testing stations (remote) regarding the attribute pungency. Results from mixed model ANOVA are shown in Table 8.

Figure 7: Median Pungency - DOP – in situ vs. remote

Table 8: ANOVA Pungency - DOP - in situ vs. remote

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
In situ vs. remote	0.134	1.958	2.086	0.064	No

Figure Figure *8* visualizes the comparison of the median of the main defect of the 3 defective olive oils analyzed by the German Olive Oil Panel. The maximum difference between medians for main defect is 0.2 for samples 055 and 652.

There is no significant difference between results coming from the test in the sensory laboratory (in situ) compared to the home testing stations (remote) regarding the main defect. Results from mixed model ANOVA are shown in Table 9.

Figure 8: Median of Main Defect- DOP - in situ vs. remote

Table 9: ANOVA Main Defect - DOP - in situ vs. remote

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
In situ vs. remote	0.078	0.142	2.120	0.889	No

5.2 Agreement between different panels

Exemplary for all attributes, Figures 9 and 10 visualize results of the medians of fruitiness of the 7 extra virgin olive oils analyzed by the Swiss Olive Oil Panel and the German Olive Oil Panel for in situ and remote testing.
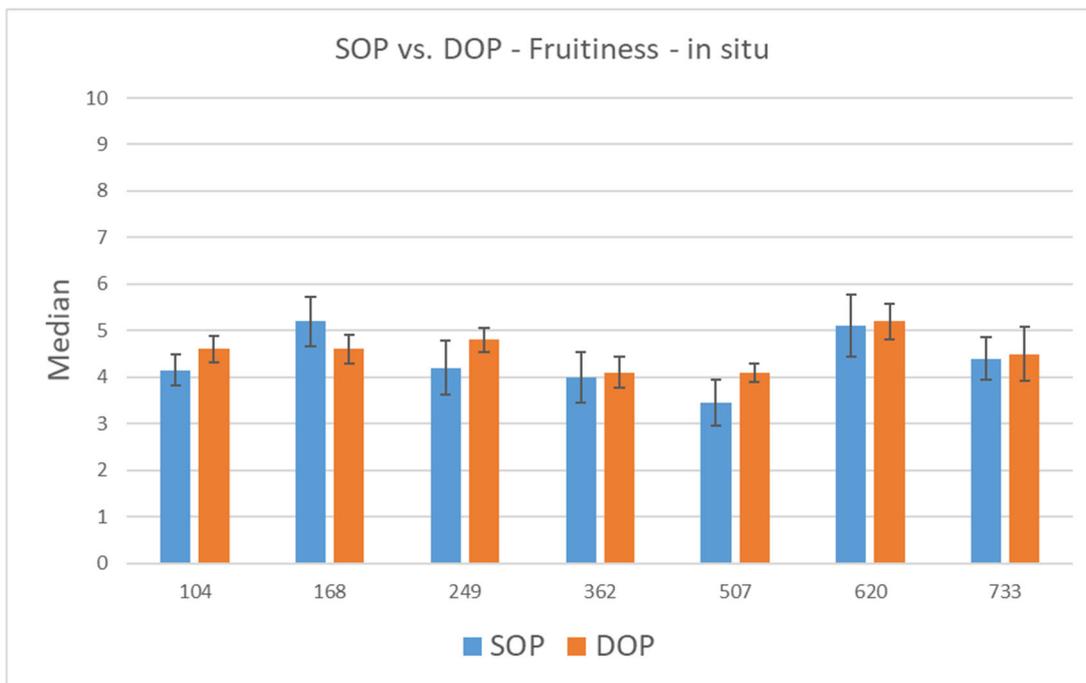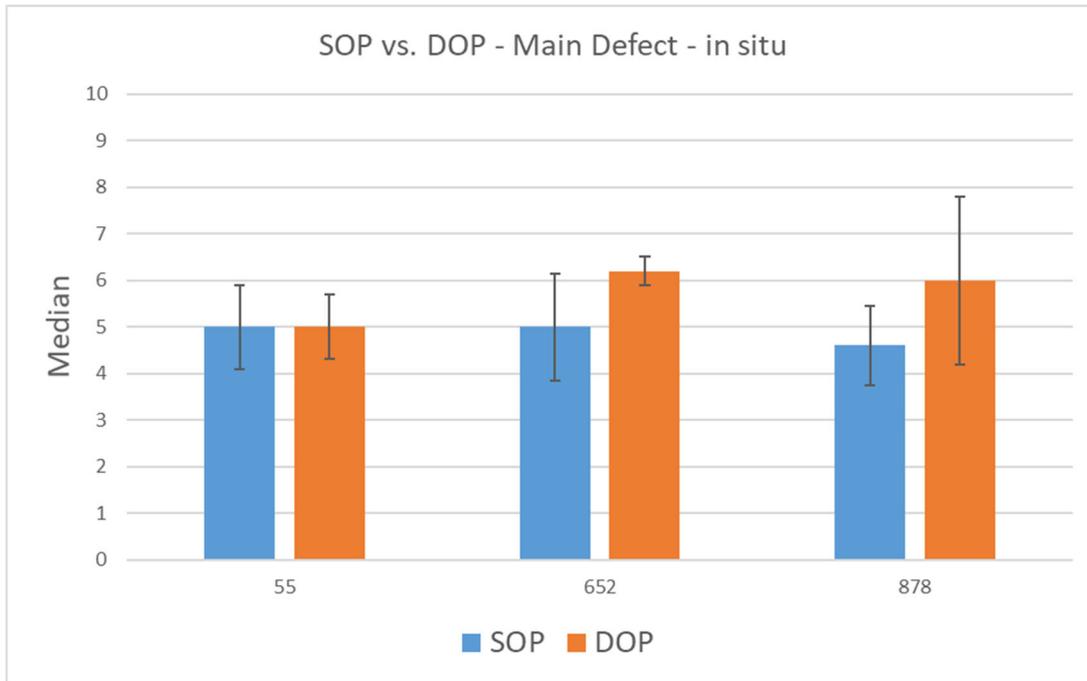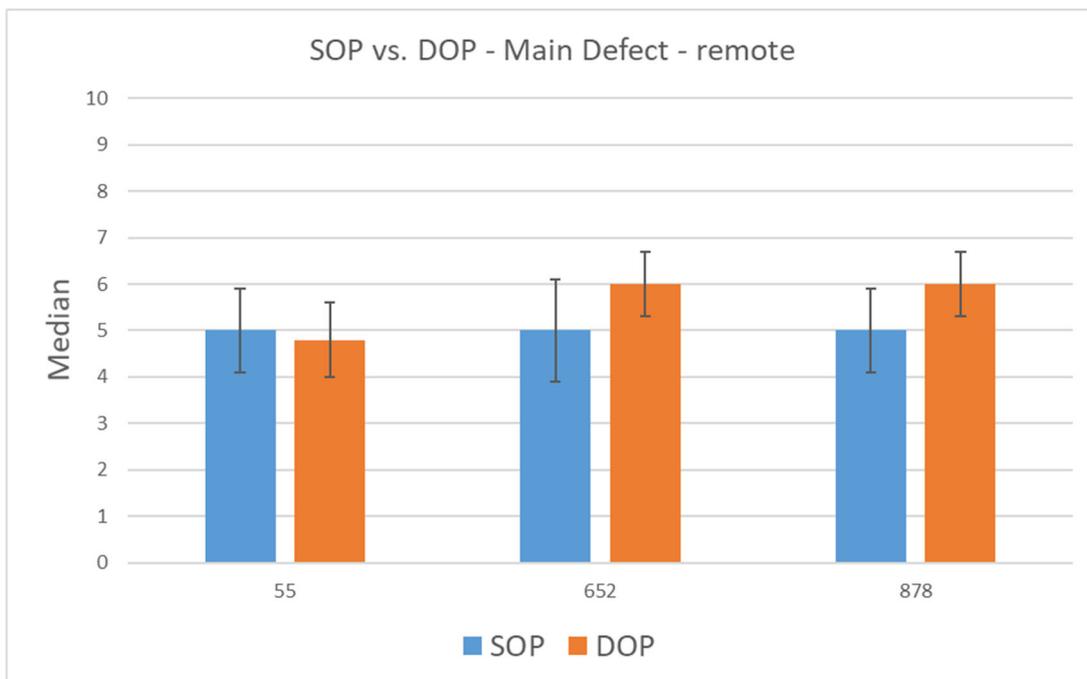

Figure 9: Median Fruitiness – SOP vs. DOP – in situ
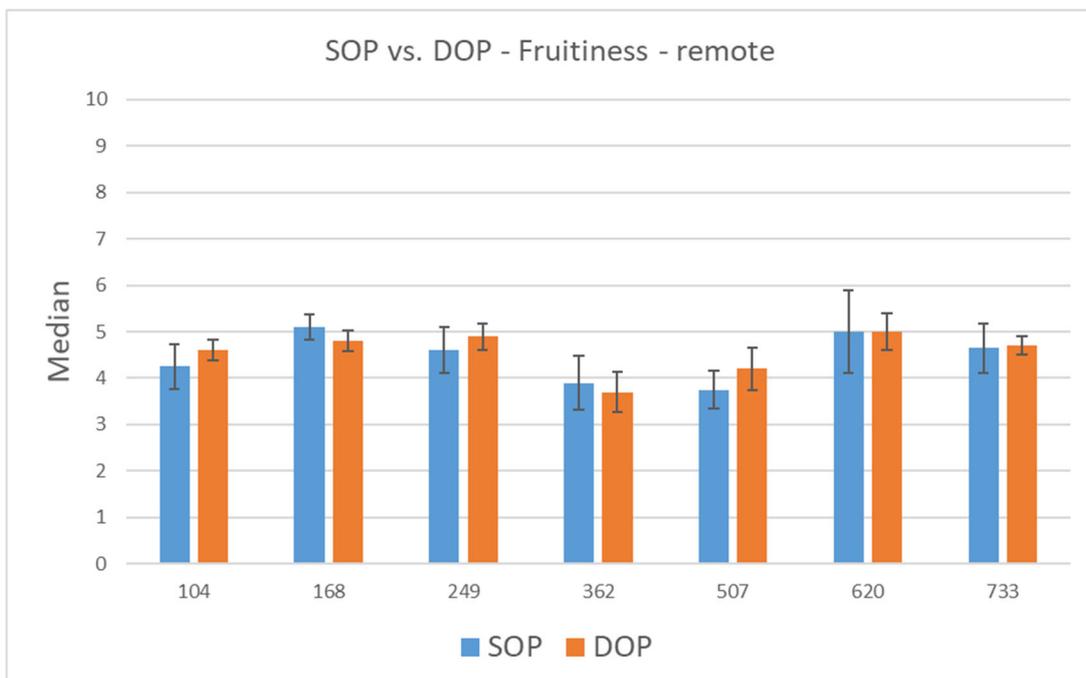
Figure 10: Median Fruitiness – SOP vs. DOP - remote

Comparing results of the two panels (SOP, DOP) for the sensory evaluation of the 7 extra virgin olive oils, a significant difference in all attributes (fruitiness, bitterness and pungency) can be found. Nevertheless, the maximum deviation in the mean value was only 0.5. Results are shown in tables 10, 11 and 12.

Table 10: Fruitiness ANOVA – SOP vs. DOP

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
SOP vs. DOP	0.181	2.702	1.978	0.008	Yes

Table 11: Bitterness ANOVA – SOP vs. DOP

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
SOP vs. DOP	0.294	5.969	1.976	<0.0001	Yes

Table 12: Pungency ANOVA – SOP vs. DOP

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
SOP vs. DOP	0.464	6.947	1.978	<0.0001	Yes

Figures 11 and 12 visualize results of the medians of main defect of the 3 defective olive oils analyzed by the Swiss Olive Oil Panel and the German Olive Oil Panel for in situ and remote testing.

Figure 11: Main Defect – SOP vs. DOP – in situ

Figure 12: Main Defect – SOP vs. DOP - remote

Comparing results of the two panels (SOP, DOP) for the sensory evaluation of the 3 defective olive oils, a significant difference can be found. The maximum deviation in the median was 1.2. Result is shown in tables 13.

Table 13: Main Defect ANOVA – SOP vs. DOP

Contrast	Difference	Standardized difference	Critical value	P-value	Significant
SOP vs. DOP	1.449	3.853	2.002	<0.0001	Yes

5.3   Panel Performance

Analyzing selected aspects of Panel Performance, in this validation report especially the criteria Trueness (Z-Score for Panel, Deviation Number for Panel) as well as Precision (Normalised Error, Precision Number for Panel) were evaluated, according to COI/T.28/Doc. No.1/Rev. 5 2019.

Trueness (homogeneity)

The calculation is based on the comparison of one single panel result vs. a reference result. The reference result is defined as the mean of all four test results: DOP remote, DOP in situ, SOP remote and SOP in situ.

Z-score$_p$ (Z-score for panels)

The calculation refers to the IOC standard deviation of +/- 0.7.

Swiss Olive Oil Panel / SOP:

Z-scores$_p$ for all tested samples - looking at the attributes: fruitiness, bitterness and pungency - were well below the warning limit of +/- 2 as well as the action limit of +/-3.0. The results were similar, regardless of the test situation (in situ / remote). This is proof for the homogeneity within the panel.

Exemplary results for fruitiness are shown in the Figures 13 and 14.
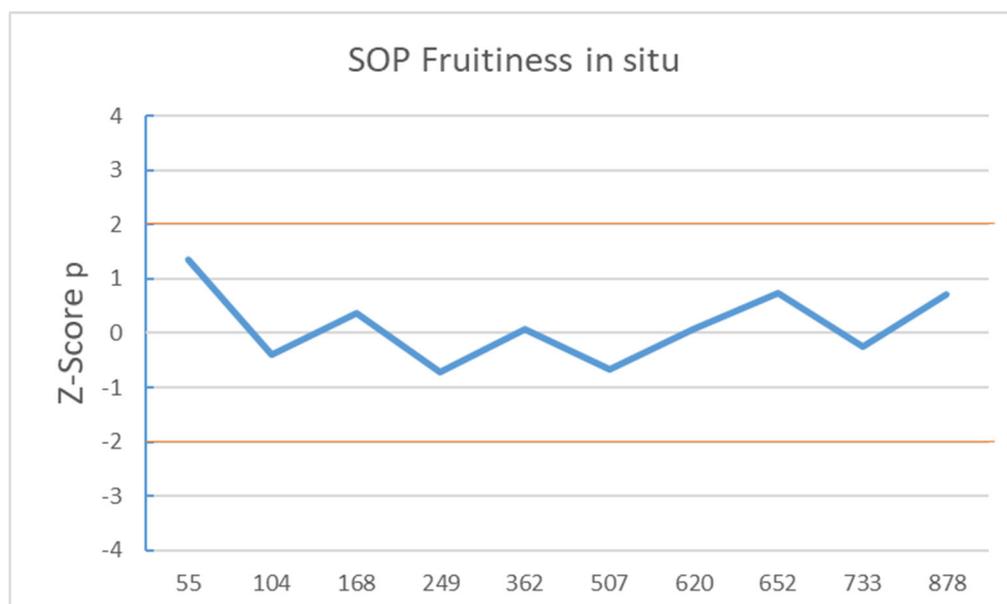
Figure 13: Z-Score$_p$ for Fruitiness – SOP – in situ
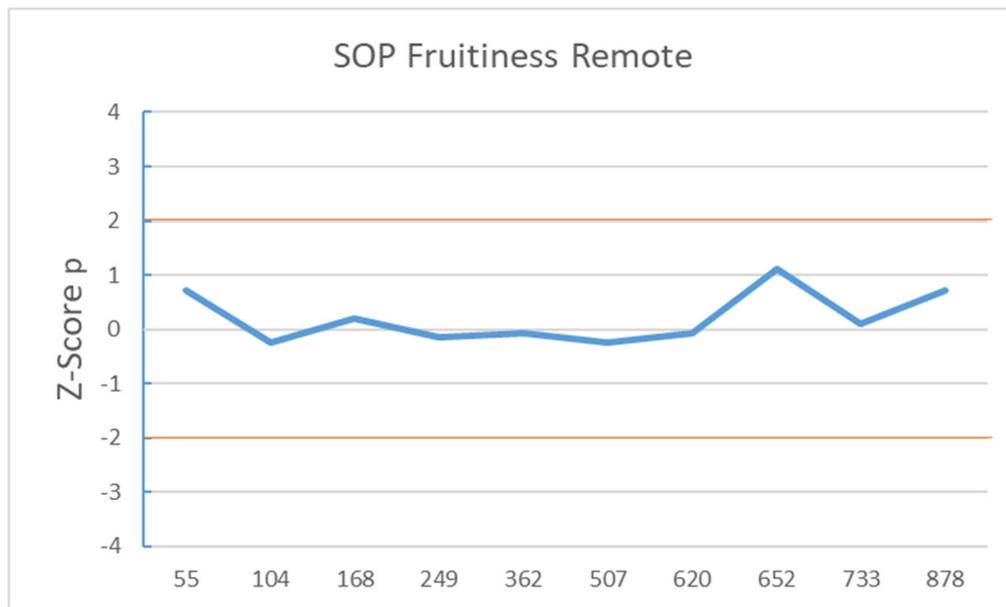
Figure 14: Z-Score$_p$ for Fruitiness - Swiss Olive Oil Panel - remote

German Olive Oil Panel / DOP:

Z-scores$_p$ for all tested samples - looking at the attributes: fruitiness, bitterness and pungency - were well below the warning limit of +/- 2 as well as the action limit of +/- 3.0. The results were similar, regardless of the test situation (in situ / remote). This is proof for the homogeneity within the panel.

Exemplary results for fruitiness are shown in the Figures 15 and 16.
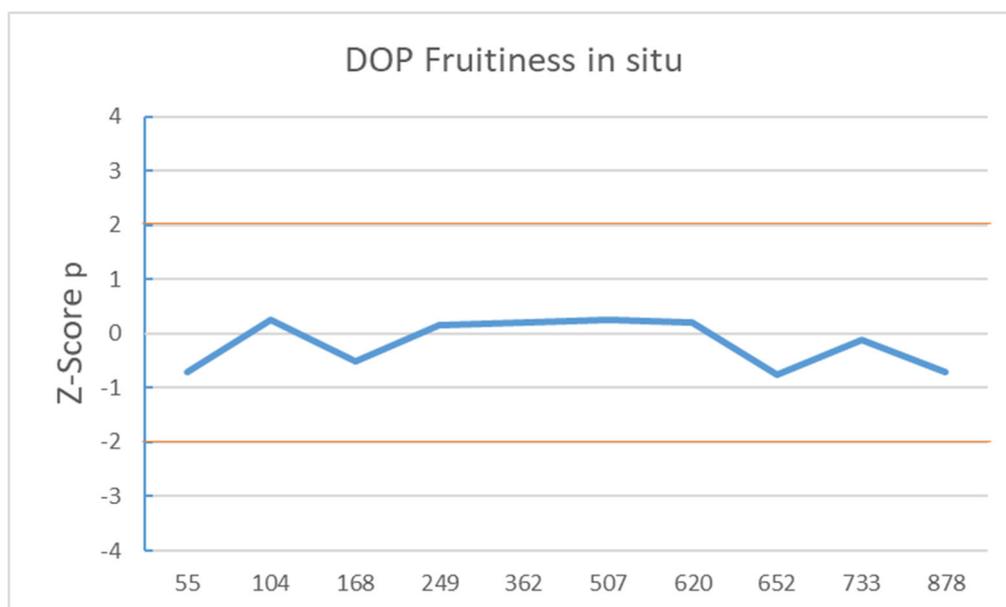
Figure 15: Z-scores$_p$ Fruitiness – DOP – in situ
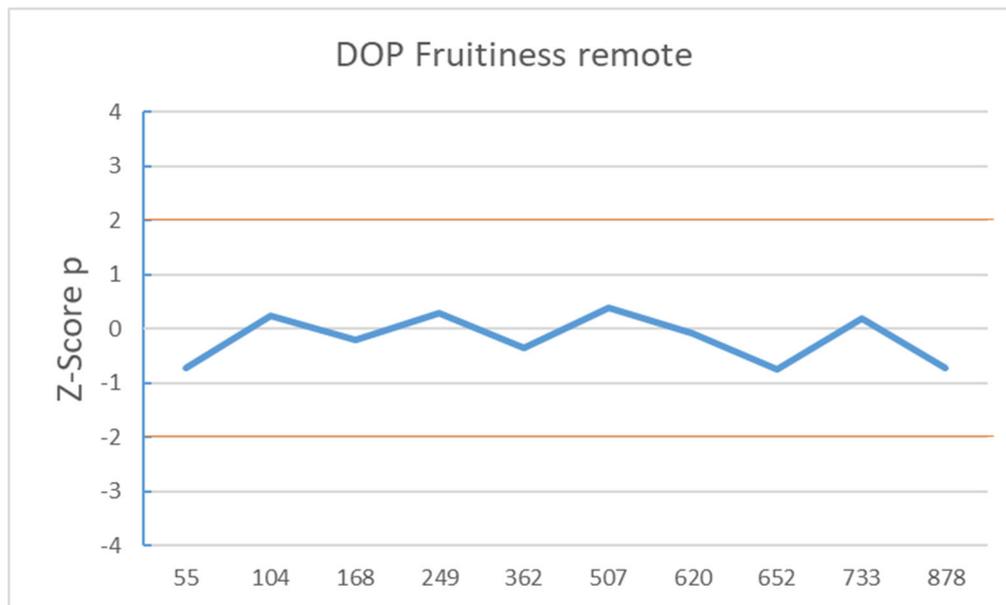
Figure 16: Z-scores$_p$ Fruitiness – DOP - remote

DN$_p$ (Deviation number for panels)

<u>Swiss Olive Oil Panel / SOP:</u>

The Deviation numbers for the panel (DN$_p$) for all tested samples – looking at the attributes: fruitiness, bitterness and pungency - were well below the warning limit of 1.0 as well as the action limit of 2.0. This is proof for the homogeneity between testing sessions of the panel (in situ / remote).
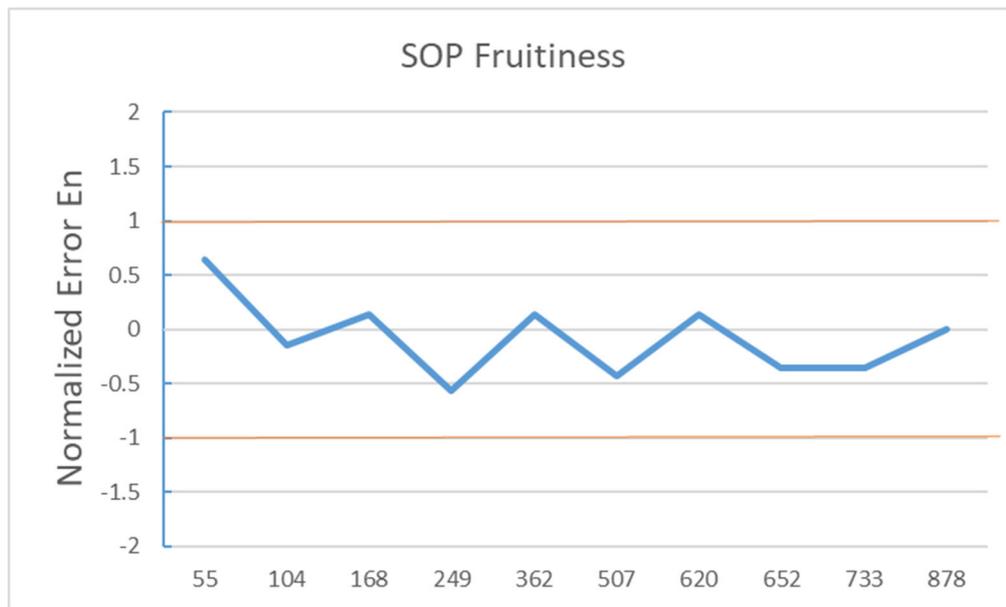
Exemplary results for fruitiness are shown in Figure 17.
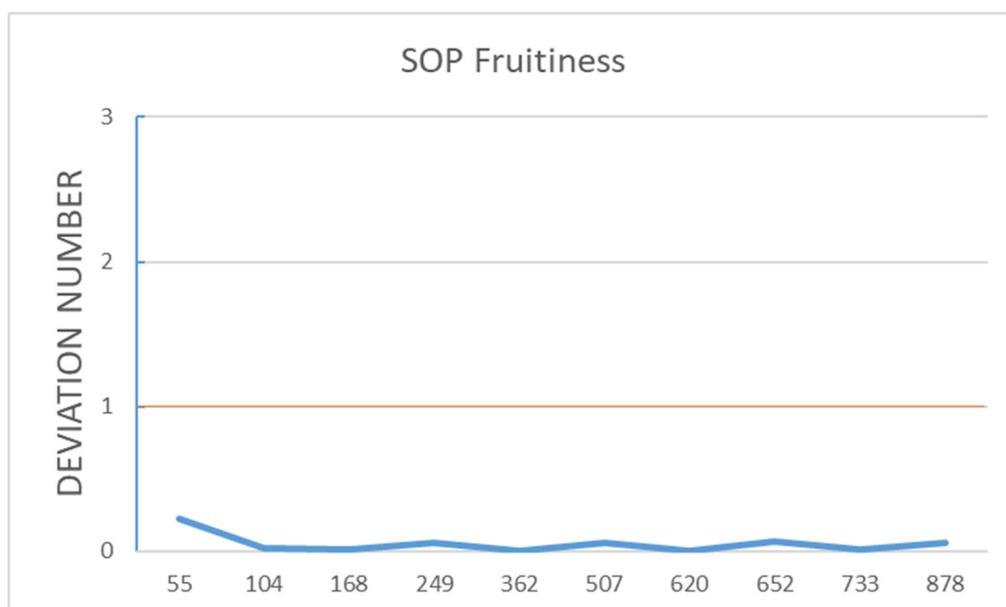
Figure 17: Deviation numbers Fruitiness - SOP

German Olive Oil Panel / DOP:

The Deviation numbers for the panel (DN_p) for all tested samples – looking at the attributes: fruitiness, bitterness and pungency - were well below the warning limit of 1.0 as well as the action limit of 2.0. This is proof for the homogeneity between testing sessions of the panel (in situ / remote).

Exemplary results for fruitiness are shown in Figure 18.
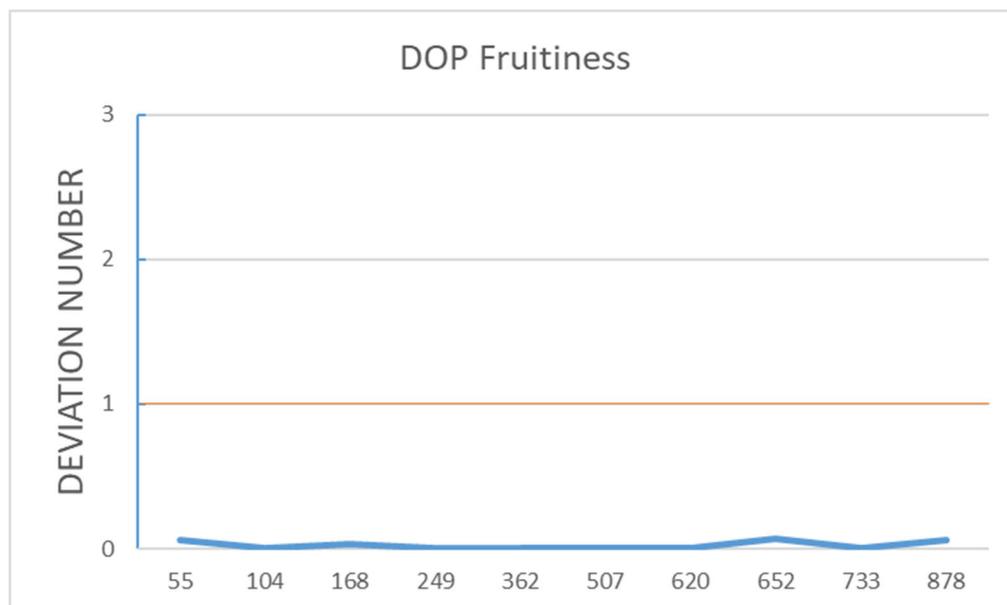
Figure 18: Deviation numbers Fruitiness - DOP

Precision (repeatability, consistency)

The calculation is based on the comparison of two single panel results. For both panels (DOP, SOP) always the test situation in situ and remote is compared.

En (Normalised error)

The calculation refers to the IOC standard deviation of +/- 0.7.

Swiss Olive Oil Panel / SOP:

The Normalised errors for the panel (En) for all tested samples – looking at the attributes: fruitiness, bitterness and pungency - were well below the action limit of 1.0. This is proof for the repeatability between testing sessions of the panel (in situ / remote).

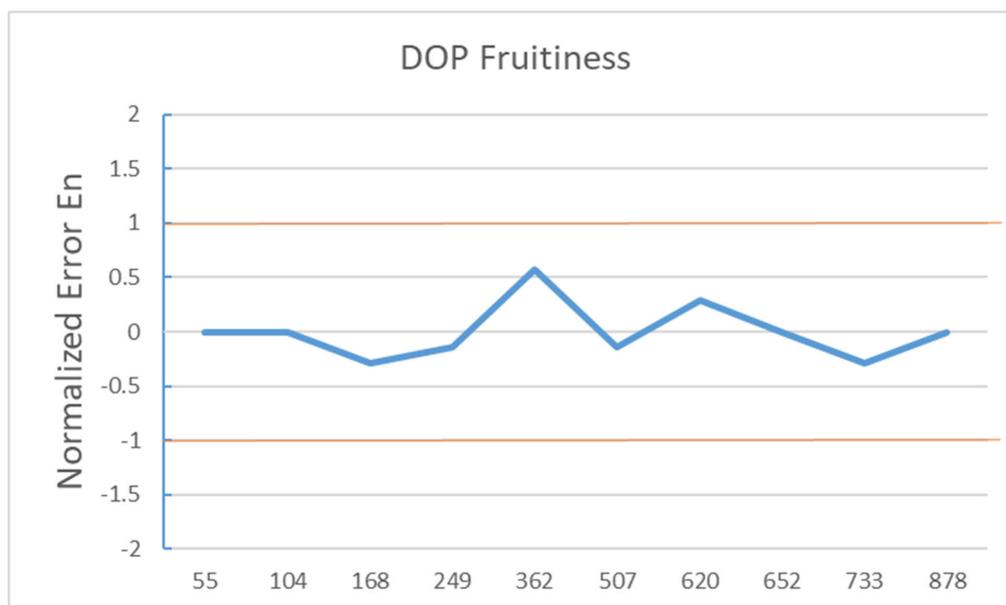Exemplary results for fruitiness are shown in Figure 19.

Figure 19: Normalised errors Fruitiness - SOP

German Olive Oil Panel / DOP:

The Normalised errors for the panel (En) for all tested samples – looking at the attributes: fruitiness, bitterness and pungency - were well below the action limit of 1.0. This is proof for the repeatability between testing sessions of the panel (in situ / remote).

Exemplary results for fruitiness are shown in Figure 20.

Figure 20: Normalised errors Fruitiness - DOP

PN$_p$ (Precision number for panels)

Swiss Olive Oil Panel / SOP:

The Precision numbers (PN$_p$) for all tested samples – looking at the attributes: fruitiness, bitterness and pungency - were well below 2.0. This is proof for the consistency between testing sessions of the panel (in situ / remote).

Exemplary results are shown in the figure 21.
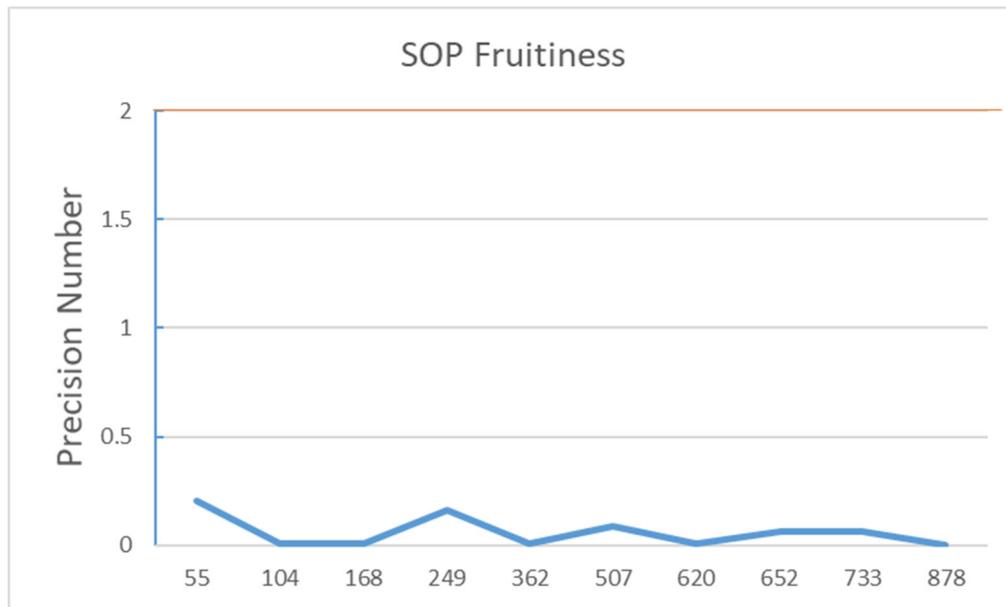
Figure 21: Precision number Fruitiness - Swiss Olive Oil Panel

German Olive Oil Panel / DOP:

The Precision numbers (PN_p) for all tested samples – looking at the attributes: fruitiness, bitterness and pungency - were well below 2.0. This is proof for the consistency between testing sessions of the panel (in situ / remote).

Exemplary results are shown in the figure 22.
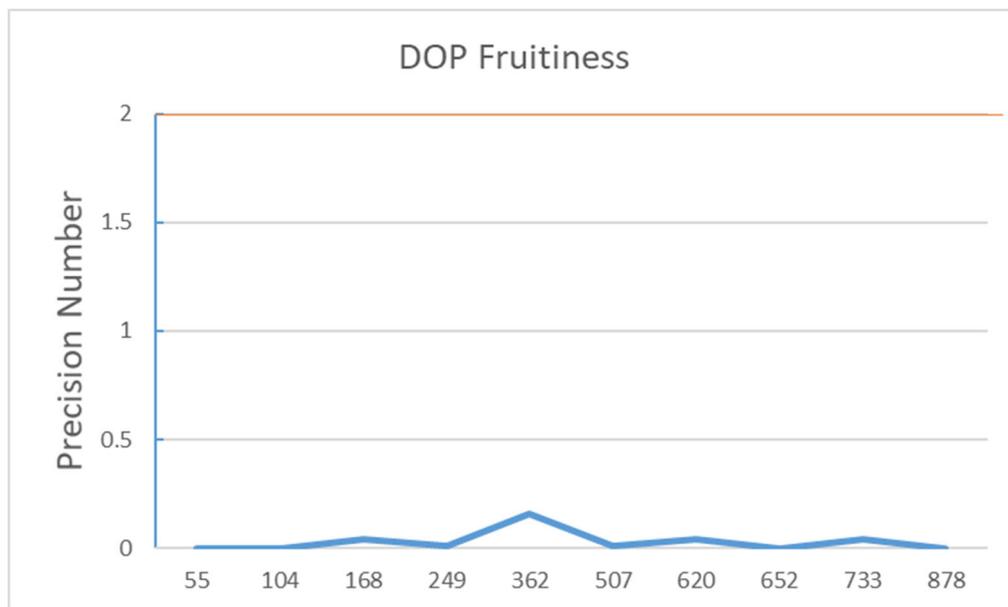
Figure 22: Precision number Fruitiness - German Olive Oil Panel

6   Conclusion

In order to proof the validity of panel results, 10 olive oils (7 of them extra virgin and 3 defective ones) were independently tested by the Swiss Olive Oil Panel / SOP and the German Olive Oil Panel / DOP in different test situations - namely in sensory laboratories (in situ) and at so called home testing stations.

Analyzing the raw data, various aspects of panel performance were looked at - especially the different test situations (in situ vs. remote), the variations between results from different panels as well as selected aspects concerning the individual panel performance per panel.

Data assessment shows that all results from both panels are valid in respect to IOC criteria and requirements.

1. No significant differences between test situations (in situ / remote) were found → panels can repeat results between laboratory and home testing situation.
2. Significant differences between the two considered olive oil panels were found, but the variation is within the accepted limits required by the IOC.
3. The individual panel performance per panel (selection of criteria based on COI/T.28/Doc. No.1/Rev. 5 2019) shows that both panels meet the requirements from IOC.

Conclusion: Data from both panels are fully reliable. Since significant, but acceptable, differences between panels (SOP vs. DOP) are even bigger compared to differences between test situations (in situ vs. remote), the impact of remote testing on results is negligible.

7   Outlook

The study at hand focused mainly on the data analysis of different test situations, comparing results collected in sensory laboratories (in situ) vs. results coming from home testing stations (remote). Since the collected raw data includes even more information, further analysis regarding panel performance and especially panelist performance, will take place. Findings are planned to be published in the scientific community, together with results and conclusions from the validation report at hand.

We would very much appreciate, if the IOC is interested in setting up advanced follow-up study with even more participating panels from other countries to even strengthen the trust in the data and conclusions of the validation report at hand. The responsible panel leaders from DOP and SOP would be happy to contribute to this study.

8   Directories

8.1   Tables

8.2 Figures

Appendix

Appendix 1: Accreditation Certificate ZHAW / Swiss Olive Oil Panel

Appendix 2: Accreditation Certificate German Olive Oil Panel

Appendix 3: Swiss Olive Oil Panel Standard Operation Procedure → Sensory Laboratory

Appendix 4: German Olive Oil Panel Standard Operation Procedure

Appendix 5: Swiss Olive Oil Panel Standard Operation Procedure → Home Testing Stations

Appendix 6: Swiss Olive Oil Panel Profile Sheet

Appendix 7: German Olive Oil Panel Profile Sheet

Responsible for the report:

Panel Leader SOP
Annette Bongartz

Panel Leader DOP
Richard Retsch

S wiss
O live Oil
P anel

deutsches
olivenoel panel
dop

Date: 04.09.2020

Remark:

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