FOODLAB fat

FoodLab Fat

Analysis methods

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DEFINITION AND SCOPE

Anisidine value test is used to assess the secondary oxidation of oil or fat, which is mainly imputable to aldehydes and ketones, and is therefore able to tell the oxidation "history" of an oil or a fat. Furthermore, AnV analysis on oil is an indicator of excessive oil deterioration in deep frying process.

PRINCIPLE

Aldehydes, derived from the secondary oxidation of fat matrix, react with the p-anisidine determining a variation in the absorbance, measured at 366 nm. Anisidine value is expressed as AnV (Anisidine value) following AOCS (Cd 18-90) the reference method.

COMPOSITION OF THE KIT AND REAGENTS

Reagent test kit *300502, suitable for 10 tests, contains:
- 1 bag includes 10 pre-filled cuvettes with reagent (mixture of alcohols and chromogenous compounds).

Reagent test kit *300500, suitable for 100 tests, contains:
- 1 box includes 10 x reagent test kit *300502.

Stability / Storage conditions: Reagent is stable through expiration date if stored at **2 - 8 °C**. ***Avoid light exposure*.**

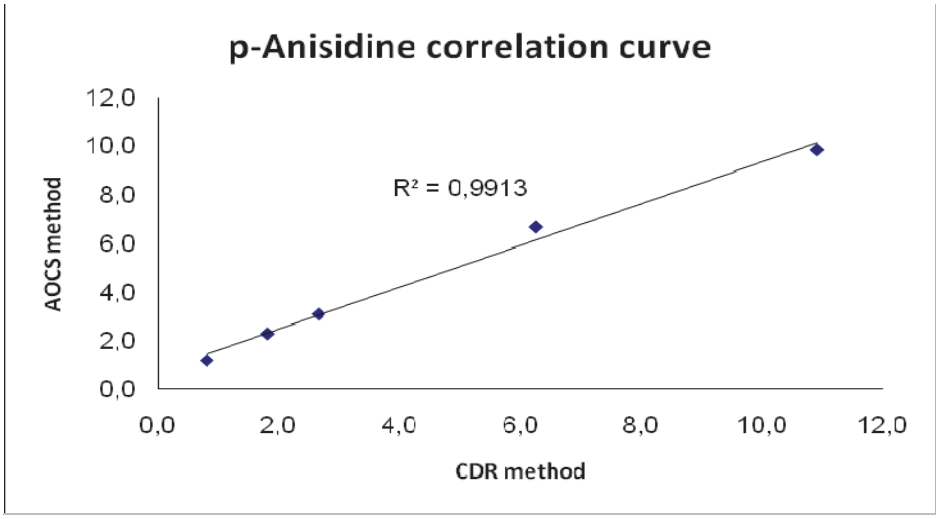
SAMPLE AND MEASURING RANGE

Use melted oil.

Reagent test kit	Curve	Measuring range AnV	Sample volume	Resolution AnV	Accuracy	Repeatability
*300502 *300500	p-Anisidine	0,5 - 100	**20 µL**	0,1	+/- 5%	CV <5%

CALIBRATION CURVE / CORRELATION DATA

CDR method shows a good correlation with AOCS Official Method Cd 18-90.



TEST PROCEDURE

Reagent preparation

1. Pre-filled test cuvettes are ready to use.
2. Incubate pre-filled test cuvette in the incubation cells for at least **5 minutes**.

Note:	*The stability of the reagent R1 declines if pre-warmed exceeding 2 hours.*

3. Press **key 2** on keyboard to display available analysis on **reading cell 2.**
4. Select p-Anisidine curve, confirm your selection by pressing **ENTER** (*on display shows **INSERT SAMPLE**).*

Sample adding and reading

5. Remove the cap of the incubated cuvette and add in **20 µL** of the sample using the specific pipette. Close the cuvette and mix vigorously. Insert the cuvette into the reading cell identified by green LED. Press **ENTER** to start the sample reading.

Note:	*Homogenize samples in the bottle before taking it.* *It is recommended to use a positive displacement pipette for oil samples for higher accuracy.* *Remove excess oil by wiping the outer surface of pipette tip gently using a blotting paper.* *Immerse the pipette tip in the reagent while dispensing sample. Press and release the piston of pipette several times to ensure all sample has been transferred.* *Mix the sample with reagent, after adding, by inverting the cuvette several times.*

6. If there are more samples to analyze, repeat the operations starting from **point 4.** Otherwise, press the **ARROW KEY UP** to end the test session and **the test results will be printed automatically**.

SYSTEM STANDARDIZATION

The system is supplied pre-calibrated and **ready for use**.
Results are expressed in accordance with the reference method.
It is also possible to standardize the system using samples with a known value.
For information on the operating procedure, see the manual provided with the system.

For in vitro use only

DEFINITION AND SCOPE

The amount of peroxides of fats indicate the degree of primary oxidation and therefore its likeliness of becoming rancid. A lower number of peroxides indicates a good quality of oil and a good preservation status.
Unsaturated free fatty acids react with oxygen and form peroxides, which determine a series of chain reactions that generate the production of smelling volatile substances. Those reactions are accelerated by high temperature and by light and oxygen exposure.
CDR innovative method simplifies and speeds up the standard procedure, because it enables the analysis to be carried out using micro-quantities of samples and to be applied to fats that are difficult to extract.

PRINCIPLE

R-O-O-R peroxides oxidize Fe2+ ions. The Fe3+ ions resulting from oxidation are grouped and form a red complex. Its colorimetric intensity, measured at 505 nm, is directly proportional to the concentration of peroxides in the sample. Results are expressed as meqO2/Kg.

COMPOSITION OF THE KIT AND REAGENTS

Reagent test kit *300150, suitable for 100 tests, contains:
- 10 bags with 10 pre-filled cuvette with reagent R1 (mix of alcohols and chromogenous compounds).
- 2 bottles with R2 reagent (redox solution).

Reagent test kit *300159, suitable for 20 tests, contains:
- 2 bags with 10 pre-filled cuvette with reagent R1 (mix of alcohols and chromogenous compounds).
- 1 bottle with R2 reagent (redox solution).

Dilution kit *300129, suitable for 100 tests, contains:
- Diluent: Bottle with 100 mL of diluent (mixture of alcohols).
- 100 test cuvettes with caps.

Stability / Storage conditions: Reagent is stable through expiration date if stored at **15-25 °C**.

SAMPLE AND CURVES

Liquid fats: collect the sample without any treatment.
For samples like **solid fats, butter, margarine, cream, nuts, flours and other extracted fat matrix,** refer to **"preparation of test sample for fat matrix analysis".**

Curve	Measuring range ($meqO_2/Kg$)	Sample volume	Resolution ($meqO_2/Kg$)	Accuracy	Repeatability
Perox. 50µL	0,01 – 3,4	**50 µL**	0,01	+/- 5%	CV <3%
Perox. 25µL	0,1 – 5,5	**25 µL**	0,01	+/- 5%	CV <3%
Perox. 10µL	0,5 – 11	**10 µL**	0,01	+/- 5%	CV <3%
Perox. 5µL	0,3 – 25	**5 µL**	0,01	+/- 5%	CV <3%
Perox. 2,5µL	1 - 50	**2,5 µL**	0,01	+/- 5%	CV <3%
Perox.dil-100µL	4 – 275	**5 µL diluted ***	1	+/- 5%	CV <3%
Perox.dil-50µL	7 – 550	**5 µL diluted ****	1	+/- 5%	CV <3%
Perox. flours	0,05 – 4,5	**100 µL**	0,01	+/- 5%	CV <3%

***Application method for curve Perox.dil-100µl:** Take **100 µL** of oil, using the specific pipette (see Note 1) and add it to the cuvette with diluent (see reagent preparation). Mix the oil with diluent, after adding, by inverting test cuvette. Use 5 µl of diluted sample for testing.
****Application method for curve Perox.dil-50µl:** Take **50 µL** of oil, using the specific pipette (see Note 1) and add it to the cuvette with diluent (see reagent preparation). Mix the oil with diluent, after adding, by inverting test cuvette. Use 5 µl of diluted sample for testing.

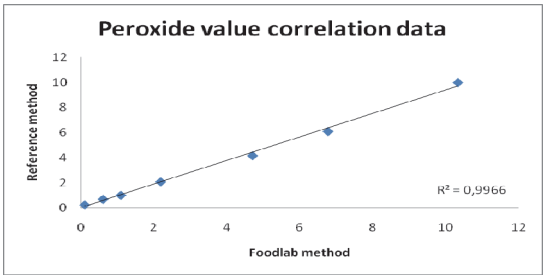
Note 1: *In order to do a correct dilution of the sample, it is recommended to use the specific precision positive-displacement pipette, set up to 50 or 100 µL, supplied by CDR.*

SYSTEM STANDARDIZATION

The system is supplied pre-calibrated and **ready for use**.
Results are expressed in accordance with the reference method.
It is also possible to standardize the system using samples with a known titration.
For information on the operating procedure, see the manual provided with the system.

CALIBRATION CURVE / CORRELATION DATA

CDR method shows a very good correlation with AOCS Official Method Cd 8-53.



REAGENT PREPARATION

R1: Pre-filled test cuvettes are ready to use.
R2: Ready to use.
Dilution kit: Dispense exactly 1 mL of reagent in each cuvette and close it with its supplied cap.

***Note**: In order to verify the correct filling level, make sure that reagent level matches the arrow tip on the reading side.*

BLANK READING

It is recommended to update the blank value, stored in the instrument, whenever a new lot of reagent is used, or when results obtained differ from expected. Follow the instructions below:

1. Follow the point 1-2-3 of instructions in **TEST PROCEDURE**.
2. Using the pipette MINIPET 10 µL, add 10 µL of reagent R2 in each cuvette and insert it in the incubation cell. Press **ENTER** to start the incubation.
3. At the end of incubation, press **ENTER** (*on display shows* **BLK***),* press **ARROW KEY UP** (*on display shows* **Insert Blank***).*
4. Invert the incubated cuvette to mix and insert it in the reading cell 2. Green LED is on, press **ENTER** to read blank. Updating of blank value will be done automatically.

***Note 2:** Blank reading can be carried out during a routine analysis session.*

TEST PROCEDURE

R1 incubation and sample adding

1. Incubate pre-filled test cuvette in the incubation cells for at least **5 minutes**.

***Note:** The stability of the reagent R1 declines if pre-warmed exceeding 2 hours.*

2. Press **key 2** on keyboard to display available analysis on **reading cell 2.**
3. Select the appropriate **peroxides** curve, depending on the expected value of the sample and the matrix to be tested, confirm your selection with **ENTER** key (*on display shows **INCUBAT. 3 MIN.**).*
4. Using the specific pipette, add in proper amount of melted or diluted sample, depending on the peroxides range. Mix the reagent with the sample, immediately after adding, by inverting the cuvette. **Repeat for subsequent samples.**

***Note:** Homogenize the sample in the bottle before taking it.*
It is recommended to use a positive displacement pipette for oil samples for higher accuracy.
To prevent cross-contamination between samples, take the sample with pipette and discard it. Repeat the procedure for 2-3 times before transferring it to the reagent.
Remove excess oil by wiping the outer surface of pipette tip gently using a blotting paper.
Immerse the pipette tip in the reagent while dispensing sample. Press and release the piston of pipette several times to ensure all sample has been transferred.
Mix the sample with reagent, after adding, by inverting the cuvette several times.

R2 adding and incubation

5. Using the pipette MINIPET 10 µL, add 10 µL of reagent R2 in each cuvette and insert it in the incubation cell. **Repeat for subsequent samples.** Press **ENTER** to start the incubation.
6. At the end of the incubation phase, press **ENTER.** (*on display shows **INSERT SAMPLE**).*

Sample reading

7. Invert the incubated cuvette to mix and insert it in the reading cell 2. Green LED is on, press **ENTER** to read sample. **Repeat for subsequent samples.** A session of analysis allows reading up to 14 samples continuously. *It is recommended to homogenise test cuvette before reading.*
8. At the end, press **ARROW KEY UP** to stop the reading session. Results, expressed as meqO_2/Kg, will be displayed and printed.

For in vitro use only

DEFINITION AND SCOPE

The acid content of edible fats is given by the quantity of free fatty acids deriving from the hydrolytic rancidity of triglycerides. As this alteration occurs in unsuitable conditions for the processing and preservation of fats, acidity represents a basic indicator of the genuineness of the product. The test is particularly important during the refining of oils and fats, for the assessment of the processing cycle and for the definition of product categories. This test has the same accuracy and yet it is easier than AOCS Official Method Ca 5a-40.

PRINCIPLE

Free fatty acids of the sample, at pH<7,0, react with a chromogenous compound and decrease its color. The decreasing of color, read at 630 nm, is proportional to the acid concentration of the sample, expressed as % of oleic acid.

COMPOSITION OF THE KIT AND REAGENTS

Reagent test kit *300128, suitable for 10 tests, contains:
- 1 bag includes 10 pre-filled cuvettes with reagent (mixture of alcohols and chromogenous compounds).

Reagent test kit *300125, suitable for 100 tests, contains:
- a box includes 10 x reagent test kit *300128.

For samples, with high acidity, **where a dilution is requested,** use the proper test kit:
Reagent test kit *300129, suitable for 100 tests, contains:
- bulk with 100 mL of a proper diluents
- 100 empty cuvettes
- 100 caps

Stability / Storage conditions: Reagent is stable through expiration date if stored at **2-8°C**.

SAMPLE AND MEASURING RANGE

Liquid fats: collect the sample without any treatment.
For samples like **solid fats, butter, margarine, cream, nuts, flours and other extracted fat matrix,** refer to **"preparation of test sample for fat matrix analysis".**

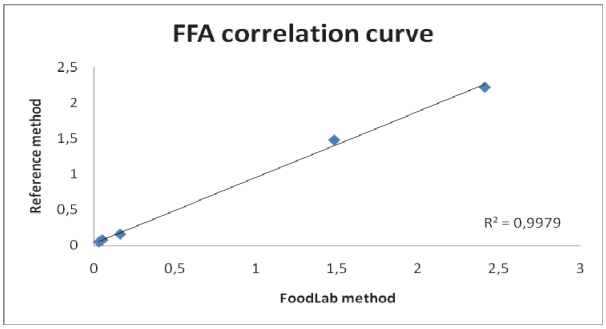
Curve	Measuring range (% oleic acid)	Sample volume	Resolution (% oleic acid)	Accuracy	Repeatability
Acid. 10µL	0,01 - 0,30	**10 µL**	0,01	+/- 5%	CV <3%
Acid. 5µL	0,01 - 0,59	**5 µL**	0,01	+/- 5%	CV <3%
Acid. 2,5µL	0,03 - 1,10	**2,5 µL**	0,01	+/- 5%	CV <3%
Acid. 1µL	0,90 - 3,50	**1 µL**	0,01	+/- 5%	CV <3%
Acid. dil - 100uL	1,00 – 13,01	**2,5 µL diluted ***	0,01	+/- 5%	CV <3%
Acid. dil - 50uL	5,00 – 26,03	**2,5 µL diluted ****	0,01	+/- 5%	CV <3%

***Application method for curve Acid. dil - 100:** Take **100 µL** of oil, using the specific pipette (see Note 1) and add it to the diluent. Mix the oil with diluent, after adding, by inverting test cuvette. Use 2,5 uL of diluted sample for testing.
****Application method for curve Acid. dil - 50:** Take **50 µL** of oil, using the specific pipette (see Note 1) and add it to the diluent. Mix the oil with diluent, after adding, by inverting test cuvette. Use 2,5 uL of diluted sample for testing.

Note 1: *In order to do a correct dilution of the sample, it is recommended to use the specific precision positive-displacement pipette, set up to 50 or 100 µL, supplied by CDR.*

CALIBRATION CURVE / CORRELATION DATA

FoodLab method shows a very good correlation with AOCS Official Method Ca 5a-40.



TEST PROCEDURE

Reagent preparation

1. Pre-filled test cuvettes are ready to use.
   Incubate pre-filled test cuvette in the incubation cells for at least **5 minutes**.

Note:	*The stability of the reagent R1 declines if pre-warmed exceeding 2 hours.*

2. Where a dilution of the sample is requested, before starting an analysis session, it's necessary to prepare a number of test cuvettes. Each cuvette is suitable for one single test.
   Follow the instruction below:
   - Dispense exactly 1 mL of diluent in each cuvette and close with its supplied cap.

Note:	*In order to verify the correct filling level, make sure that diluent level matches the arrow tip on the reading side.*

Test selection and blank reading

Press **key 1** on keyboard to display available analysis on **reading cell 1.**

3. Select the appropriate **Acidity** curve, depending on the expected value of the sample, confirm your selection by pressing **ENTER** (*on display shows **INSERT BLANK**).*
4. Invert the incubated cuvette to mix before inserting in the reading cell 1. Green LED is on, press **ENTER** to read blank value. **Repeat for subsequent blanks.** A session of analysis allows reading up to 14 blanks/samples continuously.

Note:	*It is recommended to homogenize reagent in the cuvette before reading blank.* *If the display shows **BLANK KO** after reading, it indicates that the cuvette in the reading cell is invalid (e.g. wrong or expired reagent, used cuvette, damaged reagent).*

5. At the end, press **ARROW KEY UP** to stop the blanks reading session *(on display shows **INSERT SAMPLE**).*

Sample adding and reading

6. Using the specific pipette, add in proper amount of sample, depending on the range of acidity. Mix the reagent with the sample, immediately after adding, by inverting the cuvette. Insert the cuvette in the reading cell 1 and start the reading by pressing **ENTER. Repeat for subsequent samples.**

Note:	*Homogenize samples in the bottle before taking it.* *It is recommended to use a positive displacement pipette for oil samples for higher accuracy.* *Remove excess oil by wiping the outer surface of pipette tip gently using a blotting paper.* *Immerse the pipette tip in the reagent while dispensing sample. Press and release the piston of pipette several times to ensure all sample has been transferred.* *Mix the sample with reagent, after adding, by inverting the cuvette several times.*

7. At the end of the analysis session, results, expressed as **% *of oleic acid,*** will be displayed and printed.

SYSTEM STANDARDIZATION

The system is supplied pre-calibrated and **ready for use**.
Results are expressed in accordance with the reference method.
It is also possible to standardize the system using samples with a known value.
For information on the operating procedure, see the manual provided with the system.

DEFINITION AND SCOPE

The amount of peroxides of fats indicate the degree of primary oxidation and therefore its likeliness of becoming rancid. A lower number of peroxides indicates a good quality of oil and a good preservation status.
Unsaturated free fatty acids react with oxygen and form peroxides, which determine a series of chain reactions that generate the production of smelling volatile substances. Those reactions are accelerated by high temperature and by light and oxygen exposure.
CDR innovative method simplifies and speeds up the standard procedure, because it enables the analysis to be carried out using micro-quantities of samples and to be applied to flour with know percentage of fat.
Infect during the analysis it is possible to specify the percentage of fat contained in sample of flour.

PRINCIPLE

R-O-O-R peroxides oxidize Fe2+ ions. The Fe3+ ions resulting from oxidation are grouped and form a red complex. Its colorimetric intensity, measured at 505 nm, is directly proportional to the concentration of peroxides in the sample. Results are expressed as meqO2/Kg.

COMPOSITION OF THE KIT AND REAGENTS

Reagent test kit *300150, suitable for 100 tests, contains:
- 10 bags with 10 pre-filled cuvette with reagent R1 (mix of alcohols and chromogenous compounds).
- 2 bottles with R2 reagent (redox solution).

Reagent test kit *300159, suitable for 20 tests, contains:
- 2 bags with 10 pre-filled cuvette with reagent R1 (mix of alcohols and chromogenous compounds).
- 1 bottle with R2 reagent (redox solution).

Stability / Storage conditions: Reagent is stable through expiration date if stored at **15-25 °C**.

SAMPLE AND CURVES

To determine peroxide value on samples like flours which contain a certain amount of fat:
- Weight 1 gr. of flour in a centrifuge tube, add 3 ml of n-propanol.
- Mix the solution for about 30 min. and then centrifuge for 1 minute.
- Take 100µL of clear solution for testing.
- Use the *"Perox. flours"* curve for testing.

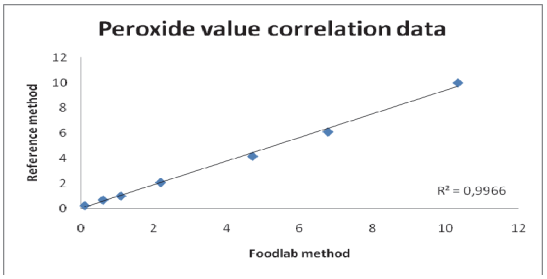
Curve	Measuring range ($meqO_2/Kg$)	Sample volume	Resolution ($meqO_2/Kg$)	Accuracy	Repeatability
Perox. flour	0,05 – 4,60 (with 100% fat)	**100 µL** of solution	0,01	+/- 5%	CV <3%

SYSTEM STANDARDIZATION

The system is supplied pre-calibrated and **ready for use**.
Results are expressed in accordance with the reference method.
It is also possible to standardize the system using samples with a known titration.
For information on the operating procedure, see the manual provided with the system.

CALIBRATION CURVE / CORRELATION DATA

CDR method shows a very good correlation with AOCS Official Method Cd 8-53.



REAGENT PREPARATION

R1: Pre-filled test cuvettes are ready to use.
R2: Ready to use.

Note: *In order to verify the correct filling level, make sure that reagent level matches the arrow tip on the reading side.*

REAGENT BLANK READING

It is recommended to update the reagent blank value, stored in the instrument, whenever a new lot of reagent is used, or when results obtained differ from expected. Follow the instructions below:

1. Follow the point 1-2-3 of instructions in **TEST PROCEDURE**.
2. Using the pipette MINIPET 10 µL, add 10 µL of reagent R2 in **one R1 cuvette** and insert it in the incubation cell. Press **ENTER** to start the incubation.
3. At the end of 2nd incubation, press **ENTER** (*on display shows* **BLK***),* press **ARROW KEY UP** (*on display shows* **Insert Blank***).*
4. Invert the incubated cuvette to mix and insert it in the reading cell 2. Green LED is on, press **ENTER** to read blank. Updating of blank value will be done automatically.

Note 2: *Blank reading can be carried out during a routine analysis session.*

TEST PROCEDURE

R1 incubation and sample adding

1. Incubate pre-filled test cuvette in the incubation cells for at least **5 minutes**.

Note: *The stability of the reagent R1 declines if pre-warmed exceeding 2 hours.*

2. Press **key 2** on keyboard to display available analysis on **reading cell 2.**
3. Select the **Perox. flour** curve, confirm your selection with **ENTER** key (*on display shows* ***INCUBAT. 3 MIN.****).*
4. Add 100 µL of sample **(supernatant).** Mix the reagent with the sample, immediately after adding, by inverting the cuvette. **Repeat for subsequent samples.**
5. **Press enter- key to start 1st incubation.**
6. At the end of the incubation phase, press **ENTER.** (*on display shows* ***INSERT BLANK****).*

Sample Blank reading

7. Invert the incubated cuvette to mix and insert it in the reading cell 2. Green LED is on, press **ENTER** to read the **sample blank value** (R1 + sample). **Repeat for subsequent samples.**
   It is recommended to homogenise test cuvette before reading.
8. At the end, press **ARROW KEY UP** to stop the sample blank reading session *(on display shows* ***INCUBAT. 3 MIN.****).*

R2 adding and incubation

9. Using the pipette MINIPET 10 µL, add 10 µL of reagent R2 in each cuvette and insert it in the incubation cell. Press **ENTER** to start the 2nd incubation.
10. At the end of the incubation phase, press **ENTER.** (*on display shows* ***INSERT SAMPLE – 100.0%****)*

Sample reading

11. Press **LEFT ARROW KEY** and insert the **percentage fat value** of sample. Final result will be calculated considering this value (if you do not want to use this option insert 100%).
    Press **ENTER** to go to the sample reading phase.

12. Invert the incubated cuvette to mix and insert it in the reading cell 2. Green LED is on, press **ENTER** to read sample. **Repeat for subsequent samples.** A session of analysis allows reading up to 14 samples continuously.
    It is recommended to homogenise test cuvette before reading.
13. At the end, press **ARROW KEY UP** to stop the reading session. Results, expressed as meqO_2/Kg, will be displayed and printed. The results are refferred to the percentage of fat contained in the samples.
    The instrument automatically multiply the result by percentage fat value of sample.
    Example of calculation: Sample with 4,2% fat = partial result x (100/4.2).

DEFINITION AND SCOPE

Soaps are salts of fatty acids obtained from a reaction that occurs between free fatty acids and sodium carbonate. Thanks to their water solubility and insolubility in oil, they can be separated from fat through specific procedures. Food industries use this technique to lower fat acidity and to enhance its organoleptic characteristics. For such industries, it is important to carry out a chemical test for determining the concentration of soaps in oil and fat.

PRINCIPLE

At specific pH values soaps mixed with bromphenol, generate a specific blue colour. Its intensity, measured at 604 nm, is directly proportional to the concentration of soaps in the sample. CDR innovative method simplifies and accelerates the standard procedure, because it enables the test to be carried with micro-quantities and to be applied to fats that are difficult to extract.

COMPOSITION OF THE KIT AND REAGENTS

Reagent test kit *300175, suitable for 100 tests, contains:
- 10 bags includes 10 pre-filled cuvette with reagent R1 (mixture of alcohols).
- 2 bottles with R2 reagent (chromogen).

Reagent test kit *300179, suitable for 10 tests, contains:
- 1 bag includes 10 pre-filled cuvette with reagent R1 (mixture of alcohols).
- 1 bottle with R2 reagent (chromogen).

Stability / Storage conditions: Reagent is stable through expiration date if stored at **15-25 °C**.

SAMPLE AND CURVES

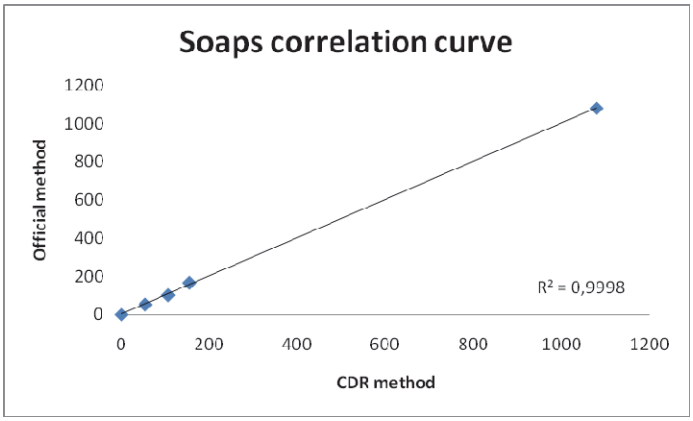
Liquid fats: collect the sample without any treatment.
For samples like solid fats, butter, margarine, cream, nuts, flours and other extracted fat matrix, refer to "preparation of test sample for fat matrix analysis".

Curve	Measuring range (ppm)	Sample volume	Resolution (ppm)	Accuracy	Repeatability
Soaps 50µL	1 – 300	**50 µL**	1	+/- 5%	CV <5%
Soaps 5µL	50 – 1350	**5 µL**	1	+/- 5%	CV <5%
Soaps 2,5µL	100 – 3000	**2,5 µL**	1	+/- 5%	CV <5%

CALIBRATION CURVE / CORRELATION DATA

CDR method shows a very good correlation with Official Method NGD C8-1976.

CDR method (ppm)	Official method (ppm)
<5	0
54	53
106	102
154	166
1079	1080



TEST PROCEDURE

Reagent preparation

1. R1: Pre-filled test cuvettes are ready to use.
2. R2: Ready to use.
3. Incubate pre-filled test cuvette in the incubation cells for at least **5 minutes**.

Note:	*The stability of the reagent R1 declines if pre-warmed exceeding 2 hours.*

4. Press **key 3** on keyboard to display available analysis on **reading cell 3.**
5. Select the appropriate **soaps** curve, depending on the expected value of the sample, confirm your selection by pressing **ENTER** (*on display shows **INSERT BLANK.**).*

R2 adding and Blank reading

6. Using the pipette SOCOREX 20-200, add 30 µL of reagent R2 in the cuvette and insert it in the reading cell 3. Press **ENTER** to read blank value. **Repeat for subsequent blanks.** A session of analysis allows reading up to 14 blanks/samples continuously.

Note:	*It is recommended to use a proper fixed volume pipette SOCOREX 20-200, provided, to add R2 reagent.* *It is recommended to homogenize reagent in the cuvette before reading blank.* *If the display shows **BLANK KO** after reading, it indicates that the cuvette in the reading cell is invalid (e.g. wrong or expired reagent, used cuvette, damaged reagent).*

7. At the end, press **ARROW KEY UP** to stop the blanks reading session *(on display shows **INSERT SAMPLE**).*

Sample adding and reading

8. Using the specific pipette, add in proper amount of sample, depending on the soaps range. Mix the reagent with the sample, immediately after adding, by inverting the cuvette. **Repeat for subsequent samples.**

Note:	*Homogenize the sample in the bottle before taking it.* *It is recommended to use a positive displacement pipette for oil samples for higher accuracy.* *To prevent cross-contamination between samples, take the sample with pipette and discard it. Repeat the procedure for 2-3 times before transferring it to the reagent.* *Remove excess oil by wiping the outer surface of pipette tip gently using a blotting paper.* *Immerse the pipette tip in the reagent while dispensing sample. Press and release the piston of pipette several times to ensure all sample has been transferred.* *Mix the sample with reagent, after adding, by inverting the cuvette several times.*

9. Insert the cuvette with sample in the reading cell 3. Green LED is on, press **ENTER** to read sample. **Repeat for subsequent samples.**

Note:	*It is recommended to homogenize test cuvette before reading.*

10. At the end of the analysis session, results, expressed as **ppm of sodium oleate*,*** will be displayed and printed.

SYSTEM STANDARDIZATION

The system is supplied pre-calibrated and **ready for use**.
Results are expressed in accordance with the reference method.
It is also possible to standardize the system using samples with a known titration.
For information on the operating procedure, see the manual provided with the system.

DEFINITION AND SCOPE

The most important application of the iodine value is to determine the amount of unsaturation contained in fatty acids. This unsaturation is in the form of double bonds which react with iodine compounds. The higher the iodine value, the more unsaturated fatty acid bonds are present in a fat.
Iodine value is used as a parameter in process control as well as a quality parameter in traded palm oil products.

PRINCIPLE

Double bonds react with iodine in alcoholic solution determining a variation in the reagent's absorbance. This amount measured at 420 nm is indirectly related with concentration of double bond in the sample, expressed as IV (Iodine Value).

COMPOSITION OF THE KIT AND REAGENTS

Reagent test kit *300560, suitable for 10 tests, contains:
- 1 bag includes 10 pre-filled cuvettes with reagent (mixture of alcohols, iodine and chromogenous compounds).

Reagent test kit *300561, suitable for 100 tests, contains:
- 1 box includes 10 x reagent test kit *300561.

Stability / Storage conditions: Reagent is stable through expiration date if stored at -**20 °C**.
***Avoid light exposure*.**

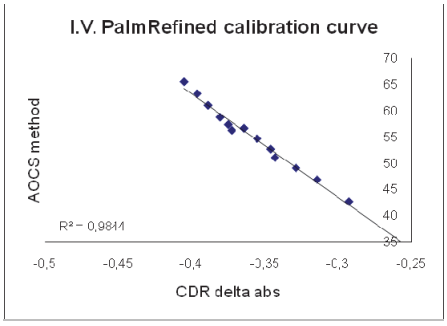
SAMPLE AND CURVES

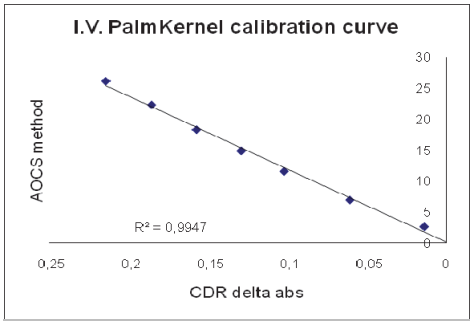
Solid samples at room temperature must be heated and dissolved before they can be analyzed.
The sample must be collected when the oil is consistently dissolved and still warm.

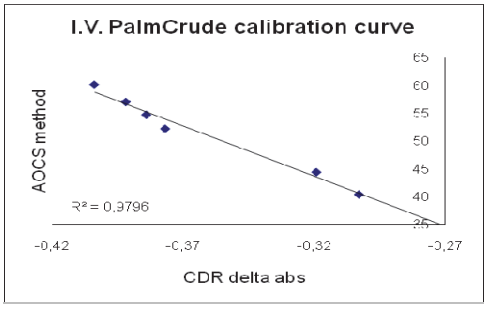
Curve	Measuring range I.V. (g/100g)	Sample volume	Resolution	Accuracy	Repeatability
I.V.PalmRefined	2 - 100	**20 µL of melted oil**	1	+/- 5%	CV <5%
I.V.PalmCrude	2 - 100	**20 µL of melted oil**	1	+/- 5%	CV <5%
I.V.PalmKernel	2 - 100	**20 µL of melted oil**	1	+/- 5%	CV <5%

CALIBRATION CURVE / CORRELATION DATA

CDR method shows a good correlation with AOCS Official Method Cd 1d-92.







TEST PROCEDURE

Reagent preparation

1. Pre-filled test cuvettes are ready to use.
2. Incubate pre-filled test cuvette in the incubation cells for **at least 5 minutes**.

Note: *The stability of the reagent R1 declines if pre-warmed exceeding 30 mins.*

3. Press **key 1** on keyboard to display available analysis on **reading cell 1.**
4. Select the appropriate **PalmRefined, PalmCrude or PalmKernel IODINE VALUE** curve, depending on the matrix to be tested, confirm your selection by pressing **ENTER** (*on display shows **INSERT SAMPLE**).*

Sample adding and reading

5. Remove the cap of the incubated cuvette and add in **20 µL** of the sample using the specific pipette. Close the cuvette and mix vigorously. Insert **immediately** the cuvette into the reading cell identified by green LED. Press **ENTER** to initiate the sample reading.

Note: *Homogenize the sample in the bottle before taking it.*
It is recommended to use a positive displacement pipette for oil samples for higher accuracy.
To prevent cross-contamination between samples, take the sample with pipette and discard it. Repeat the procedure for 2-3 times before transferring it to the reagent.
Remove excess oil by wiping the outer surface of pipette tip gently using a blotting paper.
Immerse the pipette tip in the reagent while dispensing sample. Press and release the piston of pipette several times to ensure all sample has been transferred.
Mix the sample with reagent, after adding, by inverting the cuvette several times.
Do not remove the cuvette while the reading operation is in progress.

6. If there are more samples to analyze, repeat the operations starting from **point 4.** Otherwise, press the **ARROW KEY UP** to end the test session and **the test results will be printed automatically**.

SYSTEM STANDARDIZATION

The system is supplied pre-calibrated and **ready for use**.
Results are expressed in accordance with the reference method.
It is also possible to standardize the system using samples with a known titration.
For information on the operating procedure, see the manual provided with the system.

For invitro use only

The following instructions describe the procedure to follow to extract fat from various types of samples. The extracted fat can be tested with the proper CDR test kit like: acidity (FFA), peroxide value, anisidine value, soaps.

SOLID FATS

Solid fats at room temperature must be melted before being analyzed.
The sample must be collected when the oil is consistently melted and still warm.
The extracted fat can be tested with all the curves, proper for fat matrix.

CREAM

It is possible to test soaps on cream without any sample treatment, using the *"Soaps. 5uL"* curve
To extract fat from liquid samples like cream:

- weigh in a centrifuge test-tube about 5 gr. of sample.
- Add about 1 gr. of sodium sulfate anhydrous.
- Close the test-tube, mix well and centrifuge for 5 minutes.
- With the help of a spatula, transfer the extracted fat in a new vial and melt it in a water bath.
- Use the *"Acid. 5uL"* curve or *"Perox. 25uL"* curve for testing.

Note: *Attention: it's possible to use more sample in proportion to sodium sulfate (e.g. 50 gr of cream + 10 gr of sodium sulfate).*

BUTTER, MARGARINE, SEMI-FINISHED FATS

To extract fat from solid samples like butter:

- weigh in a centrifuge test-tube about 5 gr. of sample and melt it in a water bath.
- Add about 1 gr. of sodium sulfate anhydrous
- Close the test-tube, mix well and centrifuge for 5 minutes.
- Use the pipette for the analysis to collect the extracted fat.
- Use the *"Acid. 5uL"* curve or *"Perox. 25uL"* curve for testing.

Note: *Attention: it's possible to use more sample in proportion to sodium sulfate (e.g. 50 gr of butter + 10 gr of sodium sulfate).*

FRUIT, DRIED FRUIT AND SEEDS

The extraction system, supplied by CDR, can be used on a wide range of food matrix, on fresh olives, dried fruits like walnuts, hazelnuts, peanuts, almonds, Brazil nuts, sunflower seeds, without the need to remove the shells.
Another application consists in squeezing fruit and vegetables which contain a certain amount of oil in order to obtain liquid samples for the analysis. The system has been designed to provide small quantities of samples that are enough to run the test with CDR-FoodLab instruments.

- Put a small amount of sample (e.g. 10 – 15 sunflowers seeds) in the small container.
- Insert the punch and put the container below the screw.
- Rotate the levers clockwise. After finishing the seeds crushing, wait a few seconds to allow the oil get on to surface.
- Collect the sample with a pipette (not supplied) and place it in a centrifuge tube.
- Centrifuge and use the clear solution for testing.

The extracted fat can be tested with all the curves proper for fat matrix.

FLOURS

To determine peroxide value on samples like flours which contain a certain amount of fat:

- Weight 1 gr. of flour in a centrifuge tube, add 3 ml of n-propanol.
- Mix the solution for about 30 min. and then centrifuge for 1 minute.
- Take 100µL of clear solution for testing.

Use the *"Perox. flours"* curve for testing (see the specific analytical method "PEROXIDE VALUE on FLOUR")

For in vitro use only

FINAL PRODUCTS (chocolates, creams, cakes, bakery products)

Grind the product to be analyzed.

- Weight about 10gr. of product and add 5mL of EXTRAFLUID.
- Homogenize the sample and put it in centrifuge.
- Centrifuge for at least 4800rpm for 10 min.
- After the centrifugation take the oil extracted to do the analysis.

If the extracted oil is not enough rise the amount of product keeping the proportion with the EXTRAFLUID
EX: 15g of sample : 7,5mL of EXTRAFLUID.