

Oxidation Stability of Cold wax strips

Reference: EURACHEM GUIDELINES

Tested with VELP Scientifica OXITEST Oxidation Stability Reactor (Code F30900248)



Introduction

Forms of hair removal have been practiced in almost all human cultures since at least the Neolithic era. Each culture of human society has developed social norms relating to the presence or absence of body hair, which has changed from one time to another for cultural, sexual, medical or religious reasons.

In the western culture, from 50s, with the increased popularity in many countries of women wearing shorter dresses and swimsuits during the 20th century and the consequential exposure of parts of the body on which hair is commonly found, there has been an increase in the practice of women removing unwanted body hair, such as on legs, underarms and elsewhere.

In only a few years, this form of waxing has gone from the esoteric to the everyday and is becoming a normal home procedure for women of all ages, by using ready to use device as cold wax strips.

Oxidation Stability in Cosmetics

One of the most important factors defining the quality of cosmetics is product alterations caused by the absorption of oxygen resulting in ageing, loss of functional properties and in some cases yellowing.

Hence the lifetime of many cosmetics is closely related to oxidation which is promoted by oxygen, light, high temperatures, trace metals and, in some cases, enzymes.

OXITEST can determine the oxidation stability of various sample types, testing the whole sample, without the need of pretreatments.

OXITEST Principle

OXITEST speeds up the oxidation process because of the two accelerating factors, temperature and oxygen pressure, according to the most common applications.

The instrument measures the absolute pressure change inside the two chambers, monitoring the oxygen uptake by reactive components in the sample and automatically generates an IP value.

IP Definition: IP stands for Induction Period and it is the time required to reach the starting point of oxidation, corresponding to either a level of detectable rancidity or a sudden change in the rate of oxidation. The longer the Induction Period, the higher the stability against oxidation over time.

Sample

Cold wax strips for legs and arms epilation, specially formulated:

- Cold wax strips formula 1
- Cold wax strips formula 2
- Cold wax strips formula 3

Equipment and Chemicals

- Analytical balance, 3 decimals
- Silicone grease
- Oxygen, purity grade 5.0

Sample Preparation

Store the samples at room temperature. Each sample consists of a double-strip, the two strips being united by a layer of wax. The samples were analyzed as they are without separating the strips or removing the wax.

Placed the wax strips directly into oxidation chambers.

In each reaction chamber (A and B), place 4 double-strip (~20 g).

Analysis Procedure

Grease the O-rings with silicon grease and set them in their position. Close the chambers with the titanium covers and turn the discharge valves in open position. Set the following conditions on the OXISoft™ software:

Temperatures: 100 °C

Oxygen Pressure: 6 bars

When the temperature set is reached inside the chambers, close the discharge valves and start loading oxygen.

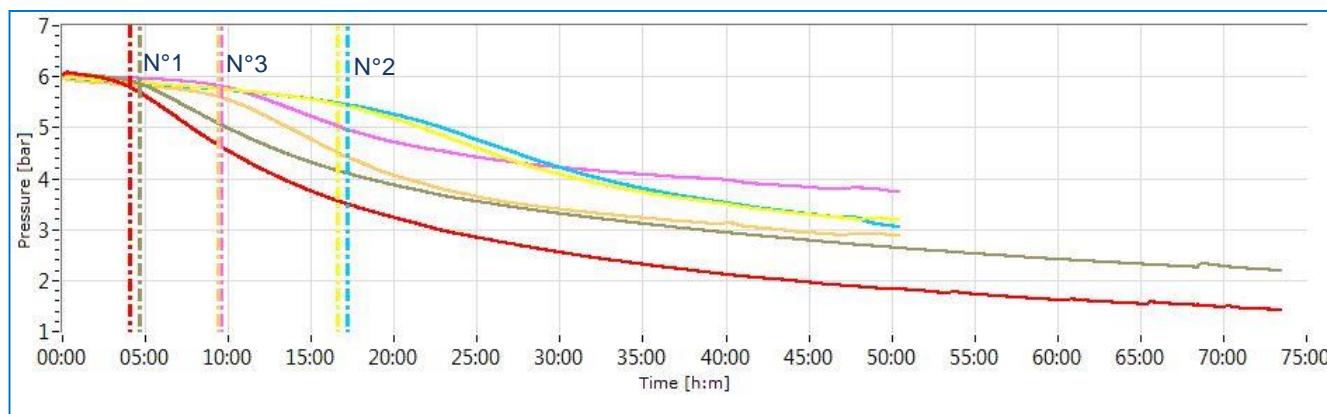
Data acquisition is automatically started by the software.

Typical Results on Cold wax strips

Each sample has been monitored two times. At the end of the oxidation tests, the IP of every run is calculated by the software OXISoft™.

It is possible to elaborate the oxidation curves obtained for each formula of cold wax strip.

Sample	Weight (g)	Set Point (bars)	Set Point (°C)	IP (hh:mm)	Line
Cold wax strip n° 1	20.000	6.00	100.0	4:20	
Cold wax strip n° 1	20.000	6.00	100.0	4:39	
Cold wax strip n° 2	20.000	6.00	100.0	16:37	
Cold wax strip n° 2	20.000	6.00	100.0	17:11	
Cold wax strip n° 3	20.000	6.00	100.0	9:26	
Cold wax strip n° 3	20.000	6.00	100.0	9:31	



Repeatability Test

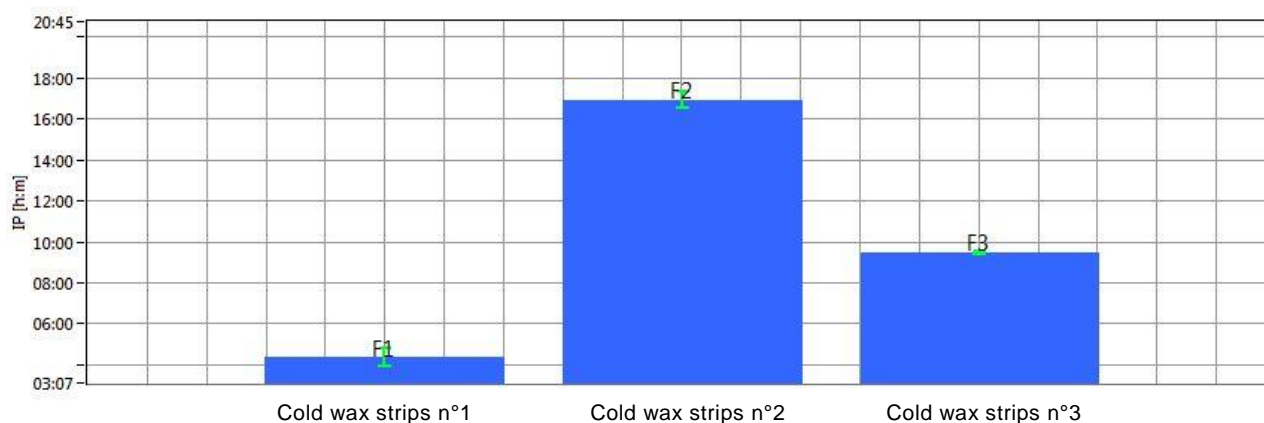
With OXISoft™, it is possible to create a repeatability test for each analysis, in order to obtain the average, standard deviation and relative standard deviation of the results.

For repeatability test, it is necessary to analyze the same quantity of the sample in duplicate or more, at the same values of temperature and pressure. In the table below the results are summarized:

Sample	IP average (hh:mm)	SD (hh:mm)	RSD %
Cold wax strip n° 1	04:30	0:13	5.0
Cold wax strip n° 2	16:54	0:24	2.4
Cold wax strip n° 3	09:28	0:03	0.6

Formulas Comparison

With OXISoft™, it is also possible to easily compare the obtained IP values, of different formulations tested at the same condition, and identify the most stable one.



Conclusion

The results obtained by OXISoft™ and the formulas comparison function clearly discriminate the cold wax strips resistance to oxidation: n° 1 has the shortest IP value, followed by n° 3. Formula n° 2 shown the highest resistance against oxidation.

Benefits of OXITEST are:

- Test is made directly on the whole sample
- No need for preliminary fat separation of the sample
- Resistant titanium chamber
- Time saving analysis, if compared to the traditional methods
- Especially designed for R&D, Product Development and Quality Control labs
- Many investigations available through the software OXISoft™:
 1. Repeatability test: a series of tests run on the same sample or standard to verify its IP period, to calculate accuracy and repeatability of the data
 2. Freshness test: to verify the quality of different lots, for example of the same raw material, and compare them
 3. Formula comparison: to identify the most stable formula of a finished product, under the same conditions
 4. Packaging comparison: for testing which packaging maintains the product in the freshest condition
 5. IP during ageing: to obtain a graph of the decrease of the product IP during the shelf-life period
 6. Estimated shelf life: to have a prediction of oxidation stability during the shelf life.