



RESULTS REPORT

General information

Date: May 12, 2015

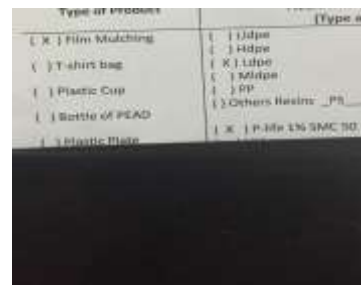
Analysis number: Q-180315F101
Client: Ecoventur
Analysis period: 18-03-2015/20-04-2015
Test Description: Accelerated Photodegradation

I.- Sample Description:



C.3. Agro Films
Client: Negreira - Velper
P-Life Go Green 50 - 2%
with Carbon Black Pigment

C.3. Agro Films
Client: Negreira - Velper
P-Life Go Green 50 - 1%
with Carbon Black Pigment



II.- Objective:

Accelerated Degradation based on temperature of the structure and determination of its shelf life time. According to; "Standard Practice for Determining Degradation End Point in Degradable Polyethylene and Polypropylene Using a Tensile Test" ASTM D3826-98 and "Standard Practice for Exposure of Photodegradable Plastics" ASTM D5208.

III.- Laboratory equipment:

- Universal Testing Machine.
- QUV accelerated weathering tester. Cycle: Continues of UV at 50°C and 0.70 W/m2.

IV.- Sampling:

The sampling is done as set out in the sampling procedure PR-LAB-11.
During the test the environmental conditions are controlled as it is indicated by the standard ASTM D3826-98 and following the elongation test method.



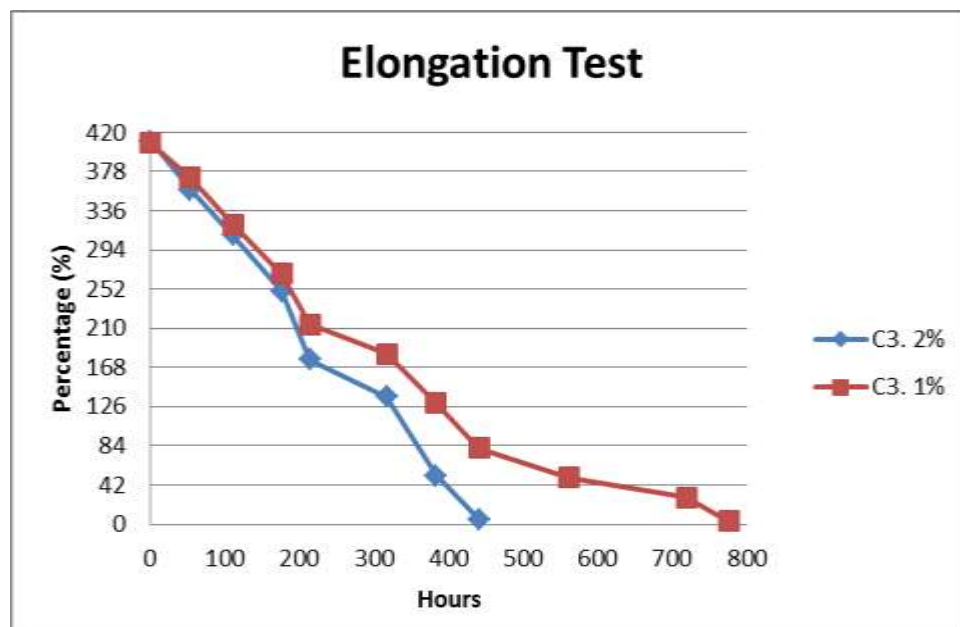
IV.- Results:

In the following table are shown the values obtained during the evaluation of the force for each sample. Importantly, these results are specifically for these samples.

MECHANICAL PROPERTIES

- Force

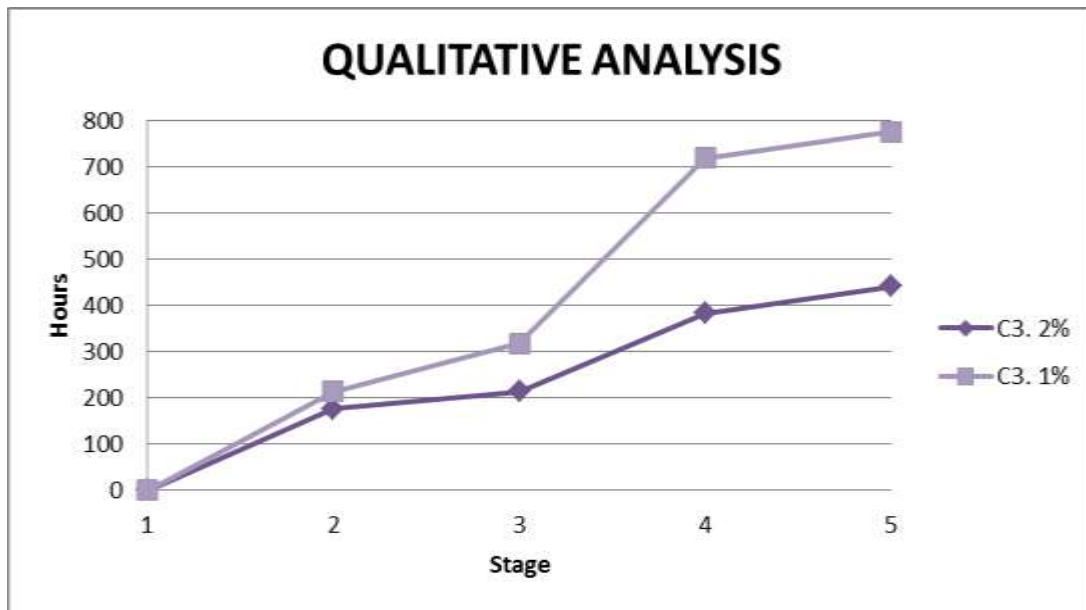
Days in the oven	Elongation (%)	
	C3. 2%	C3. 1%
0	410.83	408.23
53	358.16	371.27
111	309.23	321.42
176	249.65	268.35
214	175.93	214.24
317	136.67	182.34
383	51.75	129.25
441	4.89	81.55
562	-	49.69
719	-	28.24
776	-	3.01





QUALITATIVE ANALYSIS

		Sample	
		C3. 2%	C3. 1%
Stage		Hours	
1	The sample enters to study.	0	0
2	Maintains Physical Properties.	176	214
3	The structure changes his initial properties (color, hardness)	214	317
4	The product is broken easily.	383	719
5	The degradation process has finished.	441	776





V.- Conclusions:

- Sample C-3 with 2% of additive.

After exposing Sample C-3 (2%) to the accelerated aging process, the change in mechanical and physical properties were also clearly observed.

It is considered that the period of useful life ends by losing more than 50% of the initial force that took place after 9 days of exposure. Therefore, it is determined that **a shelf life of Sample M1 is considered to be 23 months (1 year with 11 months) under 30°C warehouse environment.**

Based on ASTM D5510-94 is considered that the sample has reached its accelerated degradation, when it support less than 5% of force that happened after 18 days of study therefore we concluded that this sample has a **degradation time of 45 months (3 years with 9 months).**

- Sample C-3 with 1% of additive.

After exposing Sample C-3 (1%) to the accelerated aging process, the change in mechanical and physical properties were also clearly observed.

It is considered that the period of useful life ends by losing more than 50% of the initial force that took place after 13 days of exposure. Therefore, it is determined that **a shelf life of Sample M1 is considered to be 33 months (2 years with 9 months) under 30°C warehouse environment.**

Based on ASTM D5510-94 is considered that the sample has reached its accelerated degradation, when it support less than 5% of force that happened after 33 days of study therefore we concluded that this sample has a **degradation time of 83 months (6 years with 11 months).**



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Biodegradable Plastic Technology

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Please be advised that 1 day of study shall be converted into 2.5 months under 30°C environment. The conversion rate is calculated based on Arrhenius Activation Energy.

Please be also advised that the determination of shelf life time as 50% retained property is based on our long term experiences we have been conducting a degradation test for a number of customers throughout the worldwide region.

Ing. Martha Castillo Cruz

Notes:

1. This inform don't mention any opinions or interpretation.
2. The results obtained are specifically for these samples.



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ANNEX IMAGE



Illustration 1. Laboratory equipment: QUV and Universal Testing Machine.



Illustration 2. Sample C-3 at 2% after 214 hours of study.



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Illustration 3. Sample C-3 at 2% after 383 hours of study.



Illustration 4. Sample C-3 at 2% after 441 days of study



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Illustration 5. Sample C-3 at 1% after 214 days of study



Illustration 6. Sample C-3 at 1% after 719 days of study



Illustration 6. Sample C-3 at 1% after 776 days of study