Date: 3 September 2020

Report: 11892/001

Test Report:

- **Elemental Content Analysis**
  - Determination of Prodegradant Catalyst

Test Reference: **11892 Helwan Plast**

Product Tested: **HDPE/LLDPE/LDPE Bag**

Prepared for: **Helwan Plast**

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TEST REPORT

1.0 AIMS

To evaluate the presence of prodegradant catalysts in the HDPE/LLDPE/LDPE bag samples by means of determination of the prodegradant catalyst metal cation by x-ray fluorescence (XRF) spectroscopy.

2.0 SAMPLE DETAILS

Samples Provided by: Helwan Plast

Product Type: HDPE/LLDPE/LDPE Bag

Date Received: 02/09/2020

Table 1: Sample Details

SEPTL Sample ID	Sample Reference	Polymer Type	Prodegradant Additive
11892 A	…	HDPE/LLDPE/LDPE	1% d_2w 93390

Table 1 is based solely on information provided by the customer.

3.0 RESULTS & CONCLUSIONS

3.1 Determination of Prodegradant Catalyst

The presence of the prodegradant catalyst in each sample is confirmed by determination of the prodegradant catalyst metal cation by energy-dispersive X-ray fluorescence (XRF) spectroscopy.

The prodegradant catalyst content of the HDPE/LLDPE/LDPE hdpe bag samples, as determined by x-ray fluorescence (XRF) spectroscopy, is shown in Table 2.

Table 2: Determination of Prodegradant Catalyst

Sample ID	Spectrum Ref.	Prodegradant Content
11892 A	2710/52312	Prodegradant Present, Effective Concentration

4.0 TEST METHODOLOGY

4.1 XRF Spectroscopy

4.1.1 Determination of Prodegradant Catalyst

The XRF spectrum of each unaged sample is recorded using a Bruker S2 Ranger A20-X10 bench top spectrometer in air over 120 s with 40.00 kV, 250 mA X-ray source and a 500.0 µm aluminium filter. Film samples were prepared in 38 mm diameter HDPE XRF sample cups and the total thickness made up to ~200 µm with 36 mm discs cut from the bulk material using a James Heal 230/10 sample cutter.

The concentration of the prodegradant catalyst metal cation is quantified by correlation with a calibration of validated reference samples.

5.0 REPORT HISTORY

Date	Report Ref.	Comments
Current Version - This report supersedes all previous versions		
03/09/2020	11892/001	Prodegradant content report.

6.0 REPORT AUTHORISATION

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