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Certified Reference Materials

AOCS 0311-A2

Report of the certification process for

MON87708

Soybean Certified Reference Material

Second Batch

OECD Unique ID MON-877Ø8-9

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ISO 17034:2016
A2LA Certificate 3438.01

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Contents

Abstract.....	4
Acknowledgements.....	5
Glossary.....	6
Introduction	8
Material Processing	8
Trait Verification to Certify Presence of MON 87708.....	8
Certified Value and Measurement Uncertainty	9
Homogeneity	10
Stability	10
References.....	11

Abstract

This report describes the preparation and certification of the soybean CRM AOCS 0311-A2 produced by AOCS Technical Services in 2019. The CRMs have been prepared according to ISO 17034:2016 and are intended to serve as control material for third party testing of soybean for transformation events. The soybean MON 87708 powder was provided by Monsanto Company, St. Louis, MO (hereinafter “Monsanto”). It was prepared by grinding the bulk seed at Monsanto. The certified value of AOCS 0311-A2 was based on the purity of the bulk seed material and with 95% confidence, the true value is ≥ 993 g/kg. The powder was aliquoted and bottled in 27-mL glass headspace vials and sealed under a nitrogen gas environment at Illinois Crop Improvement Association. The presence of MON 87708 in AOCS 0311-A2 was verified using event-specific, qualitative PCR analysis by Eurofins-GeneScan, New Orleans, LA (an ISO 17025 accredited laboratory). CRM samples should be stored in a dry, sealed container at ambient or cooler conditions in the dark.

Acknowledgements

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Glossary

AOCS	American Oil Chemists' Society
Conventional Crop	Crop variety with no history of transgenic technology and is produced through traditional plant-breeding techniques that rely on selecting and mating parent plants possessing promising traits and repeatedly selecting for superior performance among their offspring
DNA	Deoxyribonucleic Acid is the linear, double-helix macromolecule that makes up the genetic material of most organisms
Detection Limit	Lowest level at which target DNA can be detected in a sample.
EC	European Commission
Genome	The full set of genes and associated DNA characteristic of an organism
ISO	International Organization for Standardization
GMO	Organism that has had genetic sequences modified using molecular-level techniques
PCR	Polymerase Chain Reaction: technique used to determine whether a sample of plant tissue contains a particular DNA sequence. PCR relies on primer sets that zero in on a particular target DNA sequence and a special DNA-copying enzyme (DNA polymerase) that makes enough copies of the target sequence for identification and measurement
Qualitative PCR	PCR methods that determine the presence or absence of a specific target DNA sequence at a particular level of detection

Quantitation Limit	Lowest level at which the amount of target DNA sequence in a sample can be reproducible.
Quantitative PCR	PCR methods that estimate the relative amount of target DNA sequence in a mixture of DNA molecules
Trait: MON 87708	Dicamba herbicide tolerant soybean

Introduction

Plant genetic modification is an extension of traditional plant breeding. It allows plant breeders to develop crops with specific traits including insect, disease, and herbicide resistance; processing advantages; and nutritional enhancement. An important component for identifying these new traits is a Certified Reference Material created from leaf, seed, or grain containing the new trait as well as a CRM created from the conventionally bred matrix. The European Commission has mandated that from 18 April 2004, a method for detecting a new event derived from transgenic technology and Certified Reference Material must be available before the EC will consider authorizing acceptance of a new crop derived from transgenic technology. Several nations outside Europe also require grain and ingredients to be labeled above a threshold level before accepting a shipment.

To meet the above regulatory requirements for GMO determination, AOCS 0311-A2 was manufactured from soybean according to ISO 17034:2016 and in accordance with EC No 1829/2003. The CRM is available from AOCS.

Material Processing

MON 87708 soybean seeds used to prepare AOCS 0311-A2 were homozygous resulting from several cycles of self-pollination. Monsanto milled ~10 kg of MON 87708 soybean seed. All of the seed powder was passed through a 710 μ m mesh sieve. The seed powder was delivered to AOCS who contracted Illinois Crop Improvement Association for packaging the samples. The powder was aliquoted and bottled in 27-mL glass headspace vials and sealed under a nitrogen gas environment.

Trait Verification to Certify Presence of MON 87708

The presence of the MON 87708 trait was assessed on 10 random vials of AOCS 0311-A2. AOCS used the Random Number Generator function of Microsoft Excel to select samples for verification of trait presence. Sample numbers that were randomly selected were sent to Eurofins-GeneScan, New Orleans, LA (an ISO 17025 accredited

laboratory) for event-specific, qualitative PCR analysis to verify the presence and homogeneity of MON 87708 in the samples (Table 1).

Table 1. Trait verification testing on AOCS 0311-A2 MON 87708 soybean performed by Eurofins-GeneScan, New Orleans, LA (an ISO 17025 accredited laboratory).

AOCS 0311-A2 Sample	Trait MON 87708 Presence
Sample # 0137	Positive
Sample # 0170	Positive
Sample # 0001	Positive
Sample # 0125	Positive
Sample # 0134	Positive
Sample # 0076	Positive
Sample # 0015	Positive
Sample # 0194	Positive
Sample # 0002	Positive
Sample # 0034	Positive

Certified Value and Measurement Uncertainty

The genetic purity of the seed lot used to produce AOCS 0311-A2 was assessed by Monsanto. A total of 720 soybean seeds were subjected to individual seed testing for the presence of MON 87708 by qualitative event-specific PCR. 719 of the 720 seeds tested positive for the presence of MON 87708.

Purity estimation was calculated using SeedCalc8 (Remund *et al.*, 2008) and corresponded to the lower bound of true% purity. The % purity in the sample was 99.9%, when 720 seeds were tested. Using a 95% confidence level, the true % purity of the MON 87708 seed lot was 99.3%. Consequently, with 95% confidence, the true value is ≥ 993 g/kg.

The Measurement Uncertainty was based on the lower bound of the true % purity. The measurement uncertainty is the expanded uncertainty with a coverage factor of 1.65 and

confidence level of 95%. The expanded measurement uncertainty for AOCS 0311-A2 is 3 g/kg.

Homogeneity

The homogeneity of AOCS 0311-A2 is related to the purity of the seeds. 719 out of 720 seeds tested positive for the MON 87708 soybean event by event-specific PCR. Based on the sample purity of 99.9%, as determined using SeedCalc8, the batch was considered to be homogenous.

In addition, the homogeneity of the MON 87708 trait was confirmed when 10 random vials of AOCS 0311-A2 were selected and were sent to Eurofins-GeneScan, New Orleans, LA (an ISO 17025 accredited laboratory) for event-specific, qualitative PCR analysis to verify the presence of MON 87708 in the samples (See Trait Verification section and Table 1).

Stability

Stability of these CRMs has been listed as 1 year from the introduction date. The materials were processed and are stored at ambient temperature, under nitrogen gas, in 27 -mL glass headspace vials. These materials are expected to be stable for longer than the estimated expiration date. The stability of the powder material will be reevaluated at time of expiration. If the samples still test positive for the presence of the intended trait, the certificates will be extended.

References

Eurofins-GeneScan; 2219 Lakeshore Drive, Suite 400, New Orleans, LA 70122;
Telephone: +1 504 297 4330 Toll Free: +1 866 535 2730 Fax: +1 504 297 4335
<https://www.eurofinsus.com/food-testing/testing-services/gmo/>

Illinois Crop Improvement Association, 3105 Research Road, Champaign, IL 61826;
Telephone: +1 217 359 4053 Fax: +1 217 359 4075; <http://www.ilcrop.com/index.htm>

ISO Guide 17034:2016 (E) General requirements for the competence of reference material producers

ISO 17025:2005 and ISO 17025:2017, General Requirements for the Competence of Testing and Calibration Laboratories

International Seed Testing Association, International Rules of Seed Testing: Seed Science and Technology Rules, 2012

Regulation (EC) No 1829/2003 of the European Parliament and of the Council of 22 September 2003 on genetically modified food and feed; <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX%3A32003R1829&from=en>

Remund K, Simpson R, Laffont J-L, Wright D, and Gregoire S. Seedcalc8. 2008.
<https://www.seedtest.org/en/statistical-tools-for-seed-testing-content---1--3449--1102.html>