

**Compositional analyses of corn forage and grain collected from
MON89034 grown in 2003 U.S. field trials**

**Study No.
MSL-20403**

Study Title

Amended Report for MSL-20097: Compositional Analyses of Corn Forage and Grain Collected from MON 89034 Grown in 2004 U.S. Field Trials

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Study Completed On

**Amendment 1
September 15, 2006**

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Laboratory Project ID

MSL-20403

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Amendment 1

The text below applies only to use of the data by the United States Environmental Protection Agency (US EPA) in connection with the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

Statement of No Data Confidentiality Claim

No claim of confidentiality is made for any information contained in this study on the basis of its falling within the scope of FIFRA10 (d), (1) (A), (B) or (C).

"We submit this material to the United States Environmental Protection Agency specifically under the requirements set forth in FIFRA as amended, and consent to the use and disclosure of this material by EPA strictly in accordance with FIFRA. By submitting this material to EPA in accordance with the method and format requirements contained in PR Notice 86-5, we reserve and do not waive any rights involving this material that are or can be claimed by the company notwithstanding this submission to EPA."

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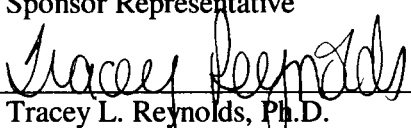
Date

Statement of Compliance

This study meets the requirements under GLP as specified in 40 CFR Part 160 (U.S. EPA) with the following exceptions:

- The reference standards used for compositional analysis were not characterized according to GLP standards and reserve samples from each batch of the reference standards were not retained. These exceptions had no effect on the integrity or quality of the study because the reference standards were accompanied by Certificates of Analysis.
- Stability of the compositional analytes in the test, control, and reference substances was not determined. This exception had no effect on the integrity or quality of the study because the samples were maintained at approximately -20°C throughout the duration of the study.

Although not specifically required for product characterization studies as defined by 160.135(b), this study fully complied with sections 160.35 (Quality Assurance), 160.120 (Protocol), and 160.185 (Reporting of Study Results). These elements were utilized to enhance the quality of this study.

Submitter	Date
	13-Sept-2006
Yong Gao, Ph.D. Sponsor Representative	Date
	Sept 15 / 2006
Tracey L. Reynolds, Ph.D. Study Director	Date

Quality Assurance Statement

Study Title: Amended Report for MSL-20097: Compositional Analyses of Corn Forage and Grain Collected from MON 89034 Grown in 2004 U.S. Field Trials

Study Number: 05-01-50-09

Reviews conducted by the Quality Assurance Unit (QAU) confirm that the final report reflects the raw data for the portion of the study conducted by Monsanto Company, Biotechnology Regulatory Sciences.

Reviews which have been conducted by the Covance Laboratories Inc., are enclosed within the Covance sub-report and are specified on their individual QA Statement (see Appendix 2).

Following is a list of reviews conducted by the Monsanto Regulatory QAU on the study reported herein.

Dates of Inspection/Audit	Phase	Date Reported to Study Director	Date Reported to Management
02/01/2006	Raw Data and Draft Report Review	02/10/2006	02/10/2006
02/01/2006	Statistical Data and Draft Report Review	02/10/2006	02/10/2006
02/01/2006	Sub-Report Review	02/10/2006	02/10/2006
09/05/2006	Amended Report Audit	09/05/2006	09/05/2006


Quality Assurance Specialist
Monsanto Company


Date

Study Information

Study Number: 05-01-50-09

Study Title: Amended Report for MSL-20097: Compositional Analyses of Corn Forage and Grain Collected from MON 89034 Grown in 2004 U.S. Field Trials

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Principal Investigators: William A. Trujillo (Covance Laboratories Inc)
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Contributors: Susan G. Riordan

Study Initiation Date: May 18, 2005

Study Completion Dates:

Original Study January 5, 2006

Amended Study September 15, 2006

Records Retention: All study specific raw data, protocols, final reports and facility records will be retained at Monsanto, St. Louis except for analytical raw data and facility records maintained at Covance Laboratories Inc., Madison facility.


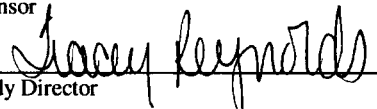
Sample Storage: Any unused study samples will be stored at Covance Laboratories Inc. until their final disposition is directed by the Study Director at a future date.

Study Information (continued)

Amendment to Report MSL-20097

This amendment modifies the final report to reflect modifications to Tables 1 and 14, a discussion of results was added to address biological relevance of data, and both summary and conclusion sections were modified to reflect the results discussion. "Amendment 1" was added to the footer of each amended page and the new MSL # was added to the header of each page. These changes improve the accuracy of the report and had no impact on the study.

Item No.	MSL-20097 Original Report	MSL-20403 Amendment 1 Report	Amendment
1	Title Page	Title Page	Added "Amended Report for MSL-20097" to title, "Amendment 1" after "Study Completed on" and revised report completion date. MSL # changed to 20403
2	Page 2-4, 7	Page 2-4, 7	Added new signatures and dates
3	Page 3, 5	Page 3, 5	Sponsor Representative changes
4	Page 4	Page 4	Added "Amended Report for MSL-20097" to title; added "Amended Report Audit" and appropriate dates to list of phases
5	Page 5	Page 5	Added "Amended Report for MSL-20097" to title; added "Original Study" and "Amended Study" to study completion dates, and added amended study completion date
6	Page 6	Page 6	Added Amendment to Report MSL-20097, added list of changes, and added sponsor and study director with new signatures and appropriate dates
7	Page 7	Page 7	Sponsor Representative removed
8	Page 8-10	Page 8-10	Pagination changes and new title for Tables 1 and 14
9	Page 12-13	Page 12-13	Summary text modified per amended results discussion
10	Page 23-24	Page 23-25	Discussion of biological relevance of data added
11	Page 25	Page 25	Conclusion text modified per amended results discussion
12	Page 32-35	Page 32-35	New title and format change made to Table 1
13	Page 84-86	Page 84-86	New title and format change made to Table 14. ILSI values replaced historical values

Sponsor		Date	13-Sept-2006
Study Director		Date	Sept 15/2006

Intellectual Property Rights Statement

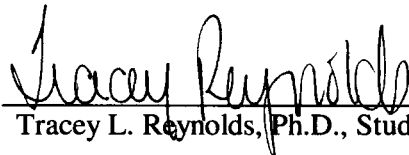
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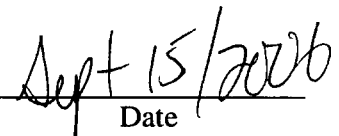
Study Certification

This report is a true and accurate reflection of the work conducted in this study.

Signature of Final Report Approval:



Tracey L. Reynolds, Ph.D., Study Director



Date

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Abbreviations

AA	Amino acid
AACC	American Association of Cereal Chemists
ADF	Acid detergent fiber
AOAC	Association of Official Analytical Chemists
AOCS	American Oil Chemists Society
<i>B.t.</i>	<i>Bacillus thuringiensis</i>
CI	Confidence interval
CRW	Corn rootworm
DW or dw	Dry weight
EPSPS	5-enolpyruvylshikimate-3-phosphate synthase enzyme
FA	Fatty acid
FW or fw	Fresh weight
LOQ	Limit of quantitation
NDF	Neutral detergent fiber
OECD	Organization for Economic Co-operation and Development
PCR	Polymerase chain reaction
ppm	Parts per million
SE	Standard error
SOP	Standard operating procedure
T/C/R	Test/Control/Reference
TDF	Total dietary fiber

1.0 Summary

Monsanto Company has developed corn, MON 89034, that produce the Cry1A.105 and Cry2Ab2 insecticidal proteins and are protected from feeding damage caused by European corn borer (*Ostrinia nubilalis*) and other lepidopteran insect pests. Cry1A.105 is a modified *Bacillus thuringiensis* (*B.t.*) Cry1A protein. Cry2Ab2 is a *B.t.* (subsp. *kurstaki*) protein. The combination of the Cry2Ab2 and Cry1A.105 insecticidal proteins in a single plant provides better insect control and offers an additional insect-resistance management tool.

The purpose of this study was to evaluate the composition of MON 89034 compared to the conventional control corn. The test, control, and reference substances in this study were grown at five replicated field sites across the U.S. during the 2004 field season under Production Plan 04-01-50-02 (Leafgren, 2005). The conventional control substance used in this study, LH198 × LH172, has the genetic background representative of the test substances, MON 89034, but does not contain the Cry1A.105 and Cry2Ab2 proteins. Fifteen different conventional corn substances were included as references to provide data for the development of a 99% tolerance interval for each component analyzed.

Forage and grain samples were harvested from all plots and analyzed for compositional components. Analyzed components were selected based on recommendations specified by the OECD (OECD, 2002). Compositional analyses of the forage samples included proximates (protein, fat, ash, and moisture), acid detergent fiber (ADF), neutral detergent fiber (NDF), minerals (calcium and phosphorus), and carbohydrates by calculation. Compositional analyses of the grain samples included proximates (protein, fat, ash, and moisture), ADF, NDF, total dietary fiber (TDF), amino acids, fatty acids (C8-C22), vitamins (B₁, B₂, B₆, E, niacin, and folic acid), anti-nutrients (phytic acid and raffinose), secondary metabolites (furfural, ferulic acid, and p-coumaric acid), minerals (calcium, copper, iron, magnesium, manganese, phosphorus, potassium, sodium, and zinc), and carbohydrates by calculation. A total of 77 different analytical components (nine in forage and 68 in grain) were measured. Of these components, 16 had more than 50% of the observations below the assay LOQ and, as a result, were excluded from the statistical analysis. Therefore, 61 components were statistically assessed (nine in forage and 52 in grain). Statistical evaluation of the compositional data was conducted using a mixed model analysis of variance on six sets of data: analyses of data from each of the five replicated field trials plus data from a combination of all five field trials, referred to as the combined site in this report. Statistical evaluation of the composition data involved a comparison of the forage and grain from MON 89034 to a conventional control corn substance. Statistically significant differences were determined at the 5% level of significance ($p < 0.05$). There were 366 statistical comparisons conducted between the test substance and the conventional control (61 comparisons in the combined site and 305 comparisons in the individual sites). Using the data for each component obtained from the

15 unique conventional substances, a 99% tolerance interval was calculated to contain, with 95% confidence, 99% of the values contained in the population of conventional corn substances. For those comparisons in which the test was significantly different ($p < 0.05$) from the control, the test range was then compared to the 99% tolerance interval in order to determine if the test range was within the tolerance interval and, therefore, considered to be part of the population of the conventional corn.

Statistical analyses for MON 89034 from the combined site showed statistically significant differences for three analytes. For two of these analytes, there were also statistically significant differences in more than one of the individual sites. For the remaining one analyte, there was a statistical difference in only one of the individual sites. Statistical analyses for MON 89034 from the five individual sites showed that 11 analytes were observed to be statistically different from the control in more than one of the individual sites and 33 analytes were observed to be statistically different from the control in only one of the individual sites. All means and range of values from the test substance were within the range of values obtained from either the 99% tolerance interval, and/or the ILSI Crop Composition Database ranges, therefore these differences were not considered to be biologically relevant.

2.0 Introduction

Monsanto Company has developed corn, MON 89034, that produce the Cry1A.105 and Cry2Ab2 insecticidal proteins and are protected from feeding damage caused by European corn borer (*Ostrinia nubilalis*) and other lepidopteran insect pests. Cry1A.105 is a modified *Bacillus thuringiensis* (*B.t.*) Cry1A protein. Cry2Ab2 is a *B.t.* (subsp. *kurstaki*) protein. The combination of the Cry2Ab2 and Cry1A.105 insecticidal proteins in a single plant provides effective insect control and offers a valuable insect-resistance management tool.

3.0 Purpose

The purpose of this study was to evaluate the composition of the MON 89034 test substance. MON 89034 was compared to the conventional control substance and the conventional reference substances. The test, control, and reference corn substances in this study were grown at five replicated field sites across the U.S. during the 2004 field season under Production Plan 04-01-50-02 (Leafgren, 2005). The conventional control substance used in this study, LH198 × LH172, has the genetic background representative of the test substance, but does not contain the Cry1A.105 and Cry2Ab2 proteins. Fifteen different conventional corn substances were included as references to provide data for the development of a 99% tolerance interval for each component analyzed. Forage and grain samples were harvested from all plots and analyzed for compositional components. The

compositional and statistical results summarized in this report are based on the analytical and statistical data in the final report for MSL # 20402 (Reynolds et al., 2006).

4.0 Test, Control, and Reference (T/C/R) Substances

4.1 Test Substance

The test substance is described below. Forage and grain tissues of the test substance were evaluated in this study.

Description	Starting Seed Lot No.
MON 89034	GLP-0404-14916-S

4.2 Control Substance

The control substance is conventional corn with genetic background representative of the test substance and is described below. The forage and grain tissues of the control substance were evaluated in this study.

Description	Starting Seed Lot No.
LH198 × LH172	GLP-0404-14928-S

4.3 Reference Substances

The reference substances are conventional commercial corn samples and are described below. A single replicate of the forage and grain tissues from each reference substance was evaluated in this study.

Vendor/Hybrid	Starting Seed Lot No.	Field Site
Golden Harvest/ H8751	REF-0404-14931-S	IA
Golden Harvest/ H9231	REF-0404-14932-S	IA
Northrup King/ N60-N2	REF-0404-14933-S	IA
Burrus/ 590	REF-0404-14934-S	IL-1
Mycogen/ 2784	REF-0404-14935-S	IL-1
Dekalb/ DKC62-15	REF-0404-14936-S	IL-1
Pfister/ 2730	REF-0404-14937-S	IL-2
Mycogen/ 2E685	REF-0404-14938-S	IL-2

Dekalb/ DKC61-42	REF-0404-14939-S	IL-2
Dekalb/ DKC60-15	REF-0404-14940-S	NE
Mycogen/ 2P682	REF-0404-14941-S	NE
Mycogen/ 2A791	REF-0404-14942-S	NE
Seed Consultants / SC1124A	REF-0404-14943-S	OH
Crow's/ 4908	REF-0404-14944-S	OH
Asgrow/ RX708	REF-0404-14945-S	OH

4.4 T/C/R Substance Characterization

The identities of the test, control, and reference substances were verified by the Study Director prior to their use in the study by confirming the chain-of-custody documentation supplied with the samples collected from the field. The grain samples from the test, control, and reference substances were further characterized by an event-specific PCR analysis of DNA extracted from grain to confirm the presence or absence of each event. The presence or absence of MON 89034 in respective samples of the grain from the test and control substances were confirmed. All forage samples were characterized by the confirmation of chain-of-custody records. Characterization data were archived under Production Plan 04-01-50-02.

5.0 Field Trial Description

Forage and grain of the test, control, and reference substances were collected at five replicated field sites in the U.S. as detailed in Production Plan 04-01-50-02. Seed was planted in a randomized complete block design with three replicates per block of each test, control, and reference substance. All the samples at the field sites were grown under normal agronomic field conditions for their respective geographic regions. The five U.S. sites were: Site 1-Jefferson County, IA; Site 2-Jersey County, IL; Site 3-Warren County, IL; Site 4-York County, NE; and Site 5-Fayette County, OH. Forage and grain samples were harvested from all plots and shipped on dry ice (forage) or ambient temperature (grain) to Monsanto Company, St. Louis, MO, USA. A sub-sample for use in compositional analysis was obtained from each bulk forage and grain sample generated in the field. Each sub-sample was ground, stored in a -20°C freezer located at Monsanto Company (St. Louis, MO), and then shipped, overnight, on dry ice to Covance Laboratories, Inc. (Madison, WI) for analyses. The labels on the samples shipped to Covance Laboratories, Inc. listed the composition protocol number, a unique sample number, line/event number, tissue type, and storage conditions.

6.0 Analytical Methods

A total of 90 ground forage and grain samples were analyzed by Covance Laboratories Inc. Compositional analyses of the forage samples included proximates (protein, fat, ash, and moisture), ADF, NDF, minerals (calcium and phosphorus), and carbohydrates by calculation. Compositional analyses of the grain samples included proximates (protein, fat, ash, and moisture), ADF, NDF, TDF, amino acids, fatty acids, vitamins (B₁, B₂, B₆, E, niacin, and folic acid), anti-nutrients (phytic acid and raffinose), secondary metabolites (furfural, ferulic acid, and p-coumaric acid), minerals (calcium, copper, iron, magnesium, manganese, phosphorus, potassium, sodium, and zinc), and carbohydrates by calculation. The methods used for compositional analyses are summarized below. The analytical data generated by Covance Laboratories, Inc., including a summary of the methods used, Covance SOP or method mnemonics, literature references, limits of quantitation, and the reference standards used, can be found in the final report of MSL # 20402 (Reynolds et al., 2006). The Study Director approved all methods utilized in this study.

- 6.1 Acid Detergent Fiber.** The method used was based on an USDA Agriculture Handbook No. 379 (1970) method. The sample was placed in a fritted vessel and washed with an acidic boiling detergent solution that dissolved the protein, carbohydrate, and ash. An acetone wash was used to remove the fats and pigments. The lignocellulose fraction was collected on the frit and determined gravimetrically. The limit of quantitation of this method was 0.1% fw.
- 6.2 Amino Acid Composition.** The method used was based on AOAC International (2000) method 982.30 that estimates the levels of 18 amino acids in the sample: alanine, arginine, aspartic acid (including asparagine), cystine (including cysteine), glutamic acid (including glutamine), glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, and valine. The sample was assayed by three methods to obtain the full profile. Tryptophan required a base hydrolysis using sodium hydroxide. Sulfur-containing amino acids required an oxidation using performic acid prior to hydrolysis with hydrochloric acid. Analysis of the remaining amino acids was accomplished through direct hydrolysis with hydrochloric acid. The individual amino acids were quantitated using an automated amino acid analyzer. The limit of quantitation of this method was 0.1 mg/g fw. The reference standards were Beckman K18, 2.5 µmol/mL per constituent except cystine (1.25 µmol/mL), lot number S407158; Sigma L-Tryptophan, 100%, lot number 063K0382; Fluka L-Cysteic Acid Monohydrate, 100%, lot number 1157629; Sigma L-Methionine Sulfone, 100%, lot number 12H3349.
- 6.3 Ash.** The method used was based on AOAC International (2000) method 923.03. The sample was placed in an electric furnace at 550 °C and ignited to drive off volatile organic compounds. The nonvolatile matter remaining was quantitated

gravimetrically and the percent ash was determined by calculation. The limit of quantitation of this method was 0.1% fw.

- 6.4 Carbohydrates.** The method used was based on an USDA Agriculture Handbook No. 74 (1973) method. The limit of quantitation of this method was 0.1% fw. Carbohydrate values were calculated by difference using the fresh weight-derived data and the following equation:

$$\% \text{ carbohydrates} = 100\% - (\% \text{ protein} + \% \text{ fat} + \% \text{ ash} + \% \text{ moisture})$$

- 6.5 Fat by Acid Hydrolysis.** The method used was based on AOAC International (2000) methods 922.06 and 954.02. The forage sample was hydrolyzed with hydrochloric acid at an elevated temperature. The fat was extracted using diethyl ether followed by hexane. The extract was evaporated under nitrogen, re-dissolved in hexane and filtered through a sodium sulfate column. The hexane extract was then evaporated again under nitrogen, dried, and weighed. The limit of quantitation of this method was 0.1% fw.

- 6.6 Fat by Soxhlet Extraction.** The method used was based on AOAC International (2000) method 960.39. The grain sample was weighed into a cellulose thimble containing sodium sulfate and dried to remove excess moisture. Pentane was dripped through the sample to remove the fat. The extract was evaporated, dried, and weighed. The limit of quantitation of this method was 0.1% fw.

- 6.7 Fatty Acids.** The method used was based on AOCS (1997) method Ce 1-62 that estimates the levels of 22 fatty acids in the sample: 8:0 caprylic acid, 10:0 capric acid, 12:0 lauric acid, 14:0 myristic acid, 14:1 myristoleic acid, 15:0 pentadecanoic acid, 15:1 pentadecenoic acid, 16:0 palmitic acid, 16:1 palmitoleic acid, 17:0 heptadecanoic acid, 17:1 heptadecenoic acid, 18:0 stearic acid, 18:1 oleic acid, 18:2 linoleic acid, 18:3 linolenic, 18:3 gamma linolenic acid, 20:0 arachidic acid, 20:1 eicosenoic acid, 20:2 eicosadienoic acid, 20:3 eicosatrienoic acid, 20:4 arachidonic acid, and 22:0 behenic acid. Lipid in grain samples was extracted and saponified with 0.5 N sodium hydroxide in methanol. The saponification mixture was methylated with 14% (weight/volume) boron trifluoride:methanol. The resulting methyl esters were extracted with heptane containing an internal standard. The methyl esters of the fatty acids were analyzed by gas chromatography using external standards for quantitation. The limit of quantitation of this method was 0.003% fw. The reference standards were Nu Chek Prep GLC reference standard Hazelton no. 1, used as 100%, lot number D13-0; Nu Chek Prep GLC reference standard Hazelton no. 2, used as 100%, lot number M13-0; Nu Chek Prep GLC reference standard Hazelton no. 3, used as 100%, lot number MA13-0; Nu Chek Prep GLC reference standard Hazelton no. 4, used as 100%, lot number D13-0; Nu Chek Prep methyl gamma linolenate, used as 100%, lot number U-63M-MA19-0; and Sigma methyl tridecanoate, used as 100%, lot number 035K1392.

- 6.8 Folic acid.** The method used was based on AOAC International (2000) methods 960.46 and 992.05 and Methods of Analysis for Infant Formulas (1973), Section C-2. The grain sample was hydrolyzed in potassium phosphate buffer with the addition of ascorbic acid to protect the folic acid during autoclaving. Following hydrolysis, the sample was treated with a chicken-pancreas enzyme and incubated approximately 18 hours to liberate the bound folic acid. The amount of folic acid was turbidimetrically determined by comparing the growth response of the bacteria *Lactobacillus casei* in the sample versus the growth response in folic acid standard. The limit of quantitation of this method was 0.06 µg/g fw. The reference standard was USP folic acid 98%, lot number P.
- 6.9 Furaldehyde.** The method used was based on a literature method (Albala-Hurtado et al., 1997). The ground grain sample was extracted with 4% trichloroacetic acid. The level of 2-furaldehyde (furfural) in the extract was determined by HPLC with UV quantitation. The reference standard was ACROS 2-furaldehyde, 99%, lot number A018806701. The quantitation limit of this method was calculated to be 0.5 ppm.
- 6.10 Minerals/ICP emission spectrometry.** The method used was based on AOAC International (2000) methods 984.27 and 985.01 and a literature method (Dahlquist and Knoll, 1978). Samples were dried, precharred, and ashed overnight at 500°. Ashed samples were treated with hydrochloric acid, dried, and dissolved in 5% (v/v) hydrochloric acid. The amount of each element was determined at appropriate wavelengths by comparing the emission of the unknown sample, using inductively coupled plasma, with the emission of the standard solutions. The limits of quantitation of this method and Spex CertiPrep reference standards are listed in the table below.

Mineral	Lot Numbers	Concentration (µg/ml)	Limit of Quantitation (ppm)
Calcium	SC5179247, SC5179249	201.0, 1001	20.0
Copper	SC5179247, SC5179248	2.01, 10.04	0.50
Iron	SC5179247, SC5179250	9.99, 50.2	2.00
Magnesium	SC5179247, SC5179248	49.93, 250.0	20.0
Manganese	SC5179247, SC5179248	2.01, 10.06	0.30
Phosphorus	SC5179247, SC5179249	200.7, 1005	20.0
Potassium	SC5179247, SC5179249	199.9, 1007	100
Sodium	SC5179247, SC5179249	201.7, 1007	100
Zinc	SC5179247, SC5179248	9.92, 49.82	0.40

- 6.11 Moisture.** The method used was based on AOAC International (2000) methods 926.08 and 925.09. Samples were dried in a vacuum oven at 100°C to a constant

weight. The moisture loss was determined and converted to percent moisture. The limit of quantitation of this method was 0.1% fw.

- 6.12 Neutral Detergent Fiber.** The method used was based on AACC (1998) method 32.20 and an USDA Agriculture Handbook No. 379 (1970) method. Samples were placed in a fritted vessel and washed with a neutral boiling detergent solution to dissolve the protein, carbohydrate, enzyme, and ash. Fats and pigments were removed using an acetone wash. The hemicellulose, cellulose, and lignin fractions were collected on a frit and determined gravimetrically. The limit of quantitation of this method was 0.1% fw.
- 6.13 Niacin.** The method used was based on AOAC International (2000) method 944.13. The grain sample was hydrolyzed with sulfuric acid and the pH was adjusted to remove interferences. The amount of niacin was turbidimetrically determined by comparing the growth response of the bacteria *Lactobacillus plantarum* in the samples versus the growth response in niacin standard. The limit of quantitation of this method was 0.3 µg/g fw. The reference standard was USP, niacin, 100%, lot number H2C121.
- 6.14 p-Coumaric and Ferulic Acids.** The method was based on a literature method (Hagerman and Nicholson, 1982). The grain samples were extracted with methanol using ultrasonication, and the extracts were then hydrolyzed using 4N sodium hydroxide, buffered using acetic acid/sodium hydroxide, acidified with 3N hydrochloric acid, and filtered. The levels of p-coumaric and ferulic acids in the extracts were determined by RP-HPLC with UV quantitation. The reference standards were ACROS p-Hydroxycinnamic acid (p-coumaric acid), 97.9%, lot number A018661301 and ACROS 4-Hydroxy-3-methoxycinnamic acid (ferulic acid), 100%, lot number A014010401. The limit of quantitation for both analytes was calculated to be approximately 50.0 ppm using the following equation:
- $$(\text{conc. of lowest standard}) \times (\text{vol}) \times (\text{dil}) / (\text{sample weight}) = \text{quantitation limit (ppm)}$$
- 6.15 Phytic Acid.** The method used was based on two literature methods (Lehrfeld 1989; 1994). Grain samples were extracted using 0.5M HCl with ultrasonication. Purification and concentration was performed using a silica-based anion exchange (SAX) column. Sample analysis was conducted using a macroporous polymer HPLC column [PRP-1, 5µm (150 × 4.1 mm)] connected to a refractive index detector. The limit of quantitation of this method was approximately 0.1% fw. The reference standard was Aldrich phytic acid, dodecasodium salt hydrate, 95%, lot number 01913EC.
- 6.16 Protein.** The method used was based on AOAC International (2000) methods 955.04 and 979.09 and two literature methods (Bradstreet, 1965; Kalthoff and Sandell, 1948). Protein and other nitrogenous compounds in the sample were

reduced to ammonia by digestion of the sample with sulfuric acid containing a mercury catalyst mixture. The acid digest was made alkaline, and the ammonia was distilled and titrated with a standard acid. The percent nitrogen was determined and converted to percent protein by multiplication with 6.25. The limit of quantitation of this method was 0.1% fw.

- 6.17 Pyridoxine/Vitamin B₆.** The method used was based on AOAC International (2000) method 961.15. The grain sample was hydrolyzed with dilute sulfuric acid. The amount of pyridoxine was turbidimetrically determined by comparing the growth response of the yeast *Saccharomyces carlsbergensis* in the sample with the growth response in a pyridoxine standard. The limit of quantitation of this method was 0.07 µg/g fw. The reference standard was USP pyridoxine, 100%, lot number P.
- 6.18 Raffinose.** This method was based on two literature methods (Mason and Slover, 1971; Brobst, 1972). The grain samples were extracted with deionized water and the extracts treated with an hydroxylamine hydrochloride solution in pyridine containing phenyl-β-D-glucoside as an internal standard. The resulting oximes were converted to silyl derivatives by treatment with hexamethyldisilazane and trifluoroacetic acid and analyzed by gas chromatography using a flame ionization detector. The reference standard was Sigma, D(+)-Raffinose Pentahydrate Sigma Ultra, 99%, lot number 073K0938. The limit of quantitation of this method: The acceptable range for an 8/2.5 dilution was 0.05-0.9%.
- 6.19 Riboflavin/Vitamin B₂.** The method used was based on AOAC International (2000) method 940.33. The grain sample was hydrolyzed with dilute HCl and pH adjusted to remove interferences. The amount of riboflavin was determined by comparing the growth response of the bacteria, *Lactobacillus casei*, in the sample hydrolysate with the bacterial growth response in varying amounts of riboflavin standard. The bacterial growth response was measured turbidimetrically. The limit of quantitation of this method was 0.2 µg/g fw. The reference standard was USP riboflavin, 100%, lot number N0C021.
- 6.20 Thiamin/Vitamin B₁.** The method used was based on AOAC International (2000) methods 942.23, 953.17, and 957.17. The grain sample was autoclaved under weak acid conditions to extract the thiamin. The resulting solution was incubated with a buffered enzyme solution to release any bound thiamin. The solution was purified on an ion-exchange column. An aliquot was taken and reacted with potassium ferricyanide to convert thiamin to thiochrome. The thiochrome was extracted into isobutyl alcohol and read on a fluorometer against a known standard. The limit of quantitation of this method was 0.01 mg/100g fw. The reference standard was USP, thiamin, 100%, lot number O.

6.21 Total Dietary Fiber. The method used was based on AOAC International (2000) method 985.29. Duplicate grain samples were gelatinized with alpha-amylase and digested with enzymes to break down starch and protein. Ethanol was added to each sample to precipitate the soluble fiber. The samples were filtered and the residue was rinsed with ethanol and acetone to remove starch and protein degradation products and moisture. Protein content was determined for one of the duplicates; ash content was determined for the other. The total dietary fiber in the sample was calculated using the protein and ash values. The limit of quantitation of this method was approximately 1.0% fw.

6.22 Vitamin E. The method used was based on three literature methods (Cort et al., 1983; McMurray et al., 1980; Speek et al., 1985). Grain samples were saponified to break down fat and release vitamin E. The saponified mixture was extracted with ethyl ether and quantitated directly by HPLC on a silica column. The limit of quantitation of this method was approximately 0.005 mg/g fw. The reference standard was USP alpha tocopherol, 100%, lot number M.

7.0 Control of Bias

The test, control, and reference substances from each respective plot within the Production Plan 04-01-50-02 field sites were produced under similar agronomic conditions. To control and/or minimize bias, the samples were analyzed in the order specified by a computer-generated randomized sample list. The Study Director generated the randomized sample list and forwarded it to Covance Laboratories Inc. prior to analysis.

8.0 Statistical Analysis

8.1 Data Processing

After compositional analyses were performed at Covance Laboratories Inc., data spreadsheets were sent to Monsanto Company. The data were reviewed, formatted, and sent to Certus International, Inc. for statistical analysis. A statistical sub-report was generated by Certus and sent to Monsanto Company (Reynolds et al., 2006).

The following formulas were used for re-expression of the data for statistical analysis:

Component	From (X)	To	Formula
Proximates (excluding moisture), Fiber, Raffinose, Phytic Acid	% FW	% DW	X/d
Furfural, p-Coumaric Acid, Ferulic Acid	ppm FW	ug/g DW	X/d
Calcium, Phosphorus, Magnesium, Potassium, Sodium	ppm FW	% DW	(X/d) × 10 ⁻⁴
Copper, Iron, Manganese, Zinc	ppm FW	mg/kg DW	X/d
Vitamin B1	mg/100g FW	mg/kg DW	10 (X/d)
Vitamin E	mg/g FW	mg/kg DW	10 ³ (X/d)
Niacin, Folic Acid, Vitamin B2, Vitamin B6	ug/g FW	mg/kg DW	X/d
Amino Acids (AA)	mg/g FW	% DW	X/(10*d)
Fatty Acids (FA)	% FW	% Total FA	(100)X _j /Σ X _j , for each FA j
'd' is the fraction of the sample that is dry matter.			

The following 16 compositional analytes with >50% of observations below the LOQ of the assay were excluded from statistical analysis: sodium, furfural, raffinose, 8:0 caprylic acid, 10:0 capric acid, 12:0 lauric acid, 14:0 myristic acid, 14:1 myristoleic acid, 15:0 pentadecanoic acid, 15:1 pentadecenoic acid, 17:0 heptadecanoic acid, 17:1 heptadecenoic acid, 18:3 gamma linolenic acid, 20:2 eicosadienoic acid, 20:3 eicosatrienoic acid, and 20:4 arachidonic acid.

The following additional seven observations for forage and grain tissue samples were below the LOQ: 16:1 palmitoleic acid (five values in grain); and vitamin E (two values in grain). To include a complete data set for these analytes in the statistical analysis, a value equal to half the quantitation limit was assigned for these seven data points.

The data was assessed for potential outliers using a studentized PRESS residuals calculation. Two outliers were identified in the data set: copper (Site 4, Test MON 89034, Rep 1), and iron (Site 1, Reference H8751, Rep 2). The identified copper and iron values were considered outliers and were removed from further analysis. The outlier test procedure was reapplied to all remaining copper and iron data to detect potential outliers that were masked in the first analysis. Only one iron value (Site 1, Test MON 89034, Rep 1) identified in the second analysis was considered an outlier and removed from further analysis.

8.2 Statistical Methodology

At the field sites, the test, control, and reference substances were grown in single plots randomly assigned within each of three replication blocks. The

compositional components for the test and control substances were statistically analyzed using a mixed model analysis of variance. The data from the five replicated sites were analyzed separately and as a combined data set. Individual replicated site analyses used the model:

$$Y_{ij} = U + T_i + B_j + e_{ij} ,$$

where Y_{ij} = unique individual observation, U = overall mean, T_i = hybrid effect, B_j = random block effect, and e_{ij} = residual error.

Combined site analyses used the model:

$$Y_{ijk} = U + T_i + L_j + B(L)_{jk} + LT_{ij} + e_{ijk} ,$$

where Y_{ijk} = unique individual observation, U = overall mean, T_i = hybrid effect, L_j = random location effect, $B(L)_{jk}$ = random block within location effect, LT_{ij} = random location by hybrid interaction effect, and e_{ijk} = residual error. For each compositional component, the forage and grain from the test substance was compared to the conventional control.

A range of observed values from the reference substances was determined for each analytical component. Additionally, the reference substances data were used to develop population tolerance intervals. A tolerance interval is an interval that one can claim, with a specified degree of confidence, contains at least a specified proportion, p , of an entire sampled population for the parameter measured. For each compositional component, 99% tolerance intervals were calculated that are expected to contain, with 95% confidence, 99% of the quantities expressed in the population of conventional references (George et al., 2004; Ridley et al., 2002c). Each tolerance interval estimate was based upon one observation per unique reference substance. Individual substances with multiple observations were summarized within sites to obtain a single estimate for inclusion in tolerance interval calculations. Because negative quantities are not possible, calculated negative lower tolerance bounds were set to zero. SAS[®] software was used to generate all summary statistics and perform all analyses (SAS Software Release 9.1, 2002-2003). Report tables present p-values from SAS[®] as either <0.001 or the actual value truncated to three decimal places.

9.0 Results and Discussion

The composition of forage and grain from MON 89034 was analyzed and compared to conventional control corn and to the tolerance interval calculated from the conventional references. The compositional profile of each test, control, and reference substance was determined by evaluating 61 different analytes (nine in forage and 52 in grain). The compositional analyses of the test, control, and reference substances are found in the final

report of MSL # 20402 (Reynolds et al., 2006) and all of the data present in Tables 1-13 was obtained from the final report from MSL # 20402 (Reynolds et al., 2006). A statistical analysis summary was generated for each compositional analyte at each site and across all sites. A summary of the statistically significant differences ($p < 0.05$) can be found in Table 1. Each test value that had a statistically significant difference from the comparator (i.e., $p < 0.05$) was compared to the 99% tolerance interval generated from the reference substances in this study. For each component, least-square means, standard errors, and the range of observed values are presented for the test and control substances. In addition, mean differences between the test and control, standard errors for the mean differences, the range of observed differences, 95% confidence intervals of the differences and the significance probabilities are presented for each comparison in Tables 2-13. Reported literature and ILSI Crop Composition Database ranges for the analytical components found in corn forage and grain are in Table 14.

9.1 Composition Comparisons Between MON 89034 and Conventional Control

Statistical analyses for MON 89034 from the combined site showed statistically significant differences for three analytes. For two of these analytes, there were also statistically significant differences in more than one of the individual sites. For the remaining one analyte, there was a statistical difference in only one of the individual sites. Statistical analyses for MON 89034 from the five individual sites showed that 11 analytes were observed to be statistically different from the control in more than one of the individual sites and 33 analytes were observed to be statistically different from the control in only one of the individual sites (Table 1). Details of the statistical observations are as follows:

In the grain of the test substance, 20:0 arachidic acid was found to be statistically different from the control in the combined site. Statistical differences for 20:0 arachidic acid were also observed in three individual sites. Stearic acid (18:0) was found to be statistically different from the control in the combined site and in two individual sites. Phosphorus from the forage of the test substance was found to be statistically different from the control in the combined site and one of the five individual sites. Since statistical differences for 20:0 arachidic acid, 18:0 stearic acid, and phosphorus were observed in one to three of the five individual sites and the combined site, and the mean and range of values from the test substances were within the calculated 99% tolerance interval for the population of conventional reference substances, these differences were not considered to be biologically relevant.

Six comparisons (3 analytes) for MON 89034 were found to be statistically different from the control in more than one individual site and not in the combined site. Carbohydrate, iron, and copper values from the grain of MON 89034 were observed to be statistically different from the control at each of two individual field sites. Since the direction of change was not consistently observed across sites (for 2 of 3 analytes), and the mean and

range of values from the test substances were all within the calculated 99% tolerance interval for the population of conventional reference substances, these differences were not considered to be biologically relevant.

Thirty two comparisons for MON 89034 were found to be statistically different from the control in only one of the five individual sites and not in the combined site. For 31 of these comparisons, the mean and range of values for MON 89034 were within the calculated 99% tolerance interval for the population of conventional reference substances. The exceptions were calcium and methionine levels in grain grown in IA. The range of calcium and methionine values at this site fell within the values reported in the ILSI Crop Composition Database. Since these differences were observed at only one individual site, and all means and range of values from the test substance were within the range of values obtained from either the calculated 99% tolerance interval, and/or the ILSI Crop Composition Database, these differences were not considered to be biologically relevant.

Based on statistical analyses of the combined site data and the individual site data, it is concluded that the forage and grain from MON 89034 are compositionally equivalent to conventional corn forage and grain.

10.0 Conclusions

In conclusion, data were generated and statistical analyses performed on forage and grain from MON 89034, a conventional control corn, and 15 conventional corn reference varieties. The statistical analyses showed that all of the 366 comparisons made between the test substance, MON 89034, and the conventional control corn substance, LH198 × LH172, were either: a) not significantly different, b) were significantly different ($p < 0.05$) but the composition values for the test substances were within the calculated 99% tolerance interval for the population of conventional reference substances and not considered biologically relevant, or c) were significantly different ($p < 0.05$) but the composition values for the test substances were within the range of values obtained from the ILSI Crop Composition Database and not considered biologically relevant. Thus, the forage and grain from MON 89034 are compositionally equivalent to conventional corn forage and grain.

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Table 1. Summary of Differences (p<0.05) for the Comparison of Maize Component Levels for Test (MON 89034) vs. the Conventional Control (LH198 x LH172) and Commercial Reference Substances

Analytical Component (Units) ¹	MON 89034 Mean	LH198 x LH172 Mean	Mean Difference (Test minus Comparator)		MON 89034 (Range)	Commercial Tolerance Int. ²
			% of LH198 x LH172	Signif. (p-Value)		
Statistical Differences Observed in Combined Site Analyses						
Mineral						
Forage Phosphorus (% DW)	0.25	0.21	19.24	0.010	(0.22 - 0.32)	[0.071,0.32]
Fatty Acid						
Grain 18:0 Stearic (% Total FA)	1.89	1.82	3.97	0.002	(1.79 - 2.03)	[0.86,2.98]
Grain 20:0 Arachidic (% Total FA)	0.39	0.38	3.43	<0.001	(0.36 - 0.42)	[0.23,0.54]
Statistical Differences Observed in More Than One Individual Site						
Proximate						
Site IA Grain Carbohydrates (% DW)	83.38	84.52	-1.34	0.008	(83.29 - 83.55)	[81.08,88.80]
Site OH Grain Carbohydrates (% DW)	84.26	83.80	0.55	0.009	(83.99 - 84.59)	[81.08,88.80]
Mineral						
Site IL-1 Grain Copper (mg/kg DW)	1.76	1.36	29.35	0.023	(1.51 - 2.21)	[0,4.20]
Site NE Grain Copper (mg/kg DW)	2.15	1.67	28.66	0.023	(1.92 - 2.38)	[0,4.20]
Site IL-1 Grain Iron (mg/kg DW)	20.86	19.48	7.11	0.048	(19.23 - 21.79)	[8.88,34.51]
Site OH Grain Iron (mg/kg DW)	21.37	25.74	-17.00	0.006	(20.59 - 21.76)	[8.88,34.51]
Fatty Acid						
Site IL-1 Grain 18:0 Stearic (% Total FA)	1.96	1.82	7.94	<0.001	(1.89 - 2.02)	[0.86,2.98]
Site IL-2 Grain 18:0 Stearic (% Total FA)	1.98	1.82	9.05	<0.001	(1.93 - 2.03)	[0.86,2.98]
Site IL-1 Grain 20:0 Arachidic (% Total FA)	0.41	0.39	5.23	0.007	(0.40 - 0.42)	[0.23,0.54]

Table 1. Summary of Differences (p<0.05) for the Comparison of Maize Component Levels for Test (MON 89034) vs. the Conventional Control (LH198 x LH172) and Commercial Reference Substances

Analytical Component (Units) ¹	MON 89034 Mean	LH198 x LH172 Mean	Mean Difference (Test minus Comparator)		MON 89034 (Range)	Commercial Tolerance Int. ²
			% of LH198 x LH172	Signif. (p-Value)		
Site IL-2 Grain 20:0 Arachidic (% Total FA)	0.39	0.37	6.83	0.021	(0.38 - 0.40)	[0.23,0.54]
Site OH Grain 20:0 Arachidic (% Total FA)	0.38	0.37	3.12	0.035	(0.38 - 0.39)	[0.23,0.54]
Statistical Differences Observed in One Individual Site Only						
Amino Acid						
Site IA Grain Alanine (% DW)	0.88	0.81	7.83	0.030	(0.87 - 0.88)	[0.48,1.08]
Site IA Grain Arginine (% DW)	0.51	0.46	10.83	0.005	(0.50 - 0.52)	[0.33,0.56]
Site IA Grain Aspartic acid (% DW)	0.77	0.71	8.66	0.003	(0.77 - 0.78)	[0.43,0.90]
Site IA Grain Cystine (% DW)	0.25	0.23	7.54	0.014	(0.24 - 0.26)	[0.18,0.27]
Site IA Grain Glutamic acid (% DW)	2.27	2.09	8.66	0.011	(2.26 - 2.28)	[1.25,2.75]
Site IA Grain Glycine (% DW)	0.41	0.38	6.94	0.020	(0.40 - 0.41)	[0.28,0.46]
Site IA Grain Histidine (% DW)	0.34	0.32	7.16	0.022	(0.34 - 0.34)	[0.22,0.38]
Site IA Grain Leucine (% DW)	1.49	1.37	8.96	0.032	(1.48 - 1.51)	[0.77,1.92]
Site IA Grain Lysine (% DW)	0.35	0.32	6.66	0.028	(0.33 - 0.36)	[0.20,0.40]
Site IA Grain Methionine (% DW)	0.25	0.23	11.20	0.003	(0.25 - 0.27)	[0.14,0.25]
Site IA Grain Phenylalanine (% DW)	0.58	0.53	9.45	0.028	(0.57 - 0.59)	[0.32,0.73]

Table 1. Summary of Differences (p<0.05) for the Comparison of Maize Component Levels for Test (MON 89034) vs. the Conventional Control (LH198 x LH172) and Commercial Reference Substances

Analytical Component (Units) ¹	MON 89034 Mean	LH198 x LH172 Mean	Mean Difference (Test minus Comparator)		MON 89034 (Range)	Commercial Tolerance Int. ²
			% of LH198 x LH172	Signif. (p-Value)		
Site IA Grain Proline (% DW)	1.05	0.98	7.29	0.028	(1.04 - 1.05)	[0.68,1.21]
Site IA Grain Serine (% DW)	0.60	0.56	8.28	0.004	(0.60 - 0.61)	[0.34,0.71]
Site IA Grain Threonine (% DW)	0.37	0.34	8.45	0.004	(0.37 - 0.37)	[0.24,0.41]
Proximate						
Site IA Grain Protein (% DW)	11.89	10.85	9.59	0.005	(11.73 - 11.98)	[7.54,13.13]
Site IL-1 Forage Moisture (% FW)	69.03	66.53	3.76	0.031	(68.50 - 69.40)	[57.62,86.45]
Site NE Forage Ash (% DW)	3.20	4.39	-27.12	0.021	(2.93 - 3.38)	[1.93,6.31]
Site NE Forage Carbohydrates (% DW)	88.16	84.98	3.74	0.004	(86.86 - 88.84)	[83.05,90.74]
Fiber						
Site NE Grain Neutral Detergent Fiber (% DW)	10.52	9.05	16.27	0.028	(10.43 - 10.69)	[5.93,13.63]
Site OH Forage Acid Detergent Fiber (% DW)	31.31	23.58	32.78	0.012	(26.92 - 34.93)	[16.76,43.76]
Site OH Forage Neutral Detergent Fiber (% DW)	43.21	37.87	14.11	0.027	(40.07 - 46.82)	[25.94,55.67]
Site IA Grain Tyrosine (% DW)	0.43	0.36	17.50	0.006	(0.42 - 0.43)	[0.17,0.52]

Table 1. Summary of Differences (p<0.05) for the Comparison of Maize Component Levels for Test (MON 89034) vs. the Conventional Control (LH198 x LH172) and Commercial Reference Substances

Analytical Component (Units) ¹	Test Mean	Comparator Mean	Mean Difference (Test minus Comparator)		Test (Range)	Commercial Tolerance Int. ²
			% of Comparator	Signif. (p-Value)		
Fatty Acid						
Site IA Grain 18:3 Linolenic (% Total FA)	1.21	1.34	-9.40	0.009	(1.20 - 1.23)	[0.63,1.77]
Site IL-1 Grain 16:1 Palmitoleic (% Total FA)	0.13	0.14	-6.87	0.012	(0.12 - 0.13)	[0,0.28]
Site IL-2 Grain 18:1 Oleic (% Total FA)	24.75	23.82	3.93	0.003	(24.14 - 25.25)	[7.51,46.46]
Site IL-2 Grain 18:2 Linoleic (% Total FA)	61.87	63.17	-2.07	0.001	(61.19 - 62.42)	[39.41,76.74]
Site NE Grain 20:1 Eicosenoic (% Total FA)	0.28	0.29	-1.50	0.030	(0.28 - 0.28)	[0.15,0.39]
Mineral						
Site IA Grain Calcium (% DW)	0.0064	0.0058	10.96	0.012	(0.0062 - 0.0066)	[0.0016,0.0059]
Site IA Grain Manganese (mg/kg DW)	8.34	6.99	19.32	0.017	(7.62 - 9.32)	[3.17,9.99]
Site IA Forage Calcium (% DW)	0.24	0.26	-8.77	0.033	(0.24 - 0.24)	[0.016,0.38]
Site NE Forage Phosphorus (% DW)	0.25	0.17	46.95	0.036	(0.23 - 0.28)	[0.071,0.32]
Vitamin						
Site IL-2 Grain Folic Acid (mg/kg DW)	0.37	0.32	13.81	<0.001	(0.35 - 0.38)	[0.012,0.69]
Secondary Metabolite						
Site OH Grain p-Coumaric Acid (µg/g DW)	218.38	185.63	17.64	0.032	(187.79 - 253.04)	[0,378.57]

¹DW = dry weight; FW = fresh weight; FA = fatty acid; Combined Site = analyses of the combined data from each of the five replicated field trials.

²With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 2. Statistical Summary of Site 1 Maize Forage Fiber, Calcium, Phosphorus, and Proximate Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fiber						
Acid Detergent Fiber (% DW)	33.94 ± 2.44 (32.27 - 35.85)	32.16 ± 2.44 (30.00 - 35.59)	1.78 ± 3.06 (0.27 - 2.79)	-5.28,8.83	0.577	(26.72 - 38.94) [16.76,43.76]
Neutral Detergent Fiber (% DW)	41.26 ± 0.80 (39.51 - 42.46)	42.26 ± 0.80 (40.23 - 43.96)	-1.00 ± 1.13 (-2.16 - -0.12)	-3.59,1.59	0.400	(33.70 - 46.74) [25.94,55.67]
Mineral						
Calcium (% DW)	0.24 ± 0.0065 (0.24 - 0.24)	0.26 ± 0.0065 (0.25 - 0.28)	-0.023 ± 0.0090 (-0.036 - -0.014)	-0.044,-0.0024	0.033	(0.11 - 0.29) [0.016,0.38]
Phosphorus (% DW)	0.24 ± 0.0048 (0.24 - 0.25)	0.24 ± 0.0048 (0.23 - 0.25)	0.0018 ± 0.0039 (-0.0019 - 0.0041)	-0.0072,0.011	0.654	(0.14 - 0.25) [0.071,0.32]
Proximate						
Ash (% DW)	4.21 ± 0.26 (3.32 - 4.67)	4.46 ± 0.26 (4.22 - 4.65)	-0.25 ± 0.36 (-1.19 - 0.42)	-1.08,0.59	0.515	(3.40 - 5.45) [1.93,6.31]
Carbohydrates (% DW)	85.50 ± 0.47 (85.20 - 85.68)	85.51 ± 0.47 (84.51 - 86.46)	-0.013 ± 0.60 (-0.85 - 1.18)	-1.40,1.38	0.983	(84.88 - 88.39) [83.05,90.74]
Moisture (% FW)	74.87 ± 0.44 (74.40 - 75.40)	73.83 ± 0.44 (72.70 - 74.40)	1.03 ± 0.51 (0.40 - 1.70)	-0.13,2.20	0.075	(64.90 - 77.40) [57.62,86.45]
Protein (% DW)	8.90 ± 0.16 (8.85 - 8.98)	8.49 ± 0.16 (8.24 - 8.87)	0.41 ± 0.21 (0.12 - 0.63)	-0.085,0.91	0.092	(6.58 - 8.82) [4.78,10.38]
Total Fat (% DW)	1.39 ± 0.60 (0.89 - 2.13)	1.54 ± 0.60 (0.92 - 2.75)	-0.15 ± 0.66 (-0.61 - 0.23)	-1.66,1.36	0.823	(0.58 - 3.11) [0,4.54]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 3. Statistical Summary of Site 1 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Alanine (% DW)	0.88 ± 0.017 (0.87 - 0.88)	0.81 ± 0.017 (0.79 - 0.84)	0.064 ± 0.024 (0.037 - 0.089)	0.0078,0.12	0.030	(0.67 - 0.96) [0.48,1.08]
Arginine (% DW)	0.51 ± 0.0095 (0.50 - 0.52)	0.46 ± 0.0095 (0.46 - 0.47)	0.050 ± 0.013 (0.036 - 0.062)	0.020,0.081	0.005	(0.37 - 0.49) [0.33,0.56]
Aspartic acid (% DW)	0.77 ± 0.011 (0.77 - 0.78)	0.71 ± 0.011 (0.70 - 0.73)	0.061 ± 0.015 (0.038 - 0.078)	0.026,0.097	0.003	(0.57 - 0.77) [0.43,0.90]
Cystine (% DW)	0.25 ± 0.0039 (0.24 - 0.26)	0.23 ± 0.0039 (0.23 - 0.23)	0.017 ± 0.0056 (0.011 - 0.023)	0.0045,0.030	0.014	(0.20 - 0.24) [0.18,0.27]
Glutamic acid (% DW)	2.27 ± 0.039 (2.26 - 2.28)	2.09 ± 0.039 (2.03 - 2.16)	0.18 ± 0.055 (0.12 - 0.24)	0.054,0.31	0.011	(1.71 - 2.41) [1.25,2.75]
Glycine (% DW)	0.41 ± 0.0065 (0.40 - 0.41)	0.38 ± 0.0065 (0.37 - 0.39)	0.026 ± 0.0091 (0.012 - 0.035)	0.0052,0.047	0.020	(0.32 - 0.40) [0.28,0.46]
Histidine (% DW)	0.34 ± 0.0057 (0.34 - 0.34)	0.32 ± 0.0057 (0.31 - 0.32)	0.023 ± 0.0081 (0.015 - 0.030)	0.0041,0.041	0.022	(0.26 - 0.33) [0.22,0.38]
Isoleucine (% DW)	0.39 ± 0.0099 (0.39 - 0.40)	0.37 ± 0.0099 (0.36 - 0.38)	0.025 ± 0.014 (0.016 - 0.041)	-0.0075,0.057	0.114	(0.32 - 0.45) [0.23,0.51]

Table 3. Statistical Summary of Site 1 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Leucine (% DW)	1.49 ± 0.034 (1.48 - 1.51)	1.37 ± 0.034 (1.33 - 1.41)	0.12 ± 0.047 (0.098 - 0.16)	0.013,0.23	0.032	(1.14 - 1.68) [0.77,1.92]
Lysine (% DW)	0.35 ± 0.0062 (0.33 - 0.36)	0.32 ± 0.0062 (0.32 - 0.33)	0.022 ± 0.0081 (0.0042 - 0.033)	0.0029,0.040	0.028	(0.24 - 0.34) [0.20,0.40]
Methionine (% DW)	0.25 ± 0.0043 (0.25 - 0.27)	0.23 ± 0.0043 (0.22 - 0.24)	0.026 ± 0.0061 (0.024 - 0.028)	0.012,0.040	0.003	(0.17 - 0.22) [0.14,0.25]
Phenylalanine (% DW)	0.58 ± 0.013 (0.57 - 0.59)	0.53 ± 0.013 (0.52 - 0.54)	0.050 ± 0.019 (0.041 - 0.067)	0.0066,0.094	0.028	(0.45 - 0.65) [0.32,0.73]
Proline (% DW)	1.05 ± 0.019 (1.04 - 1.05)	0.98 ± 0.019 (0.95 - 1.01)	0.071 ± 0.027 (0.041 - 0.10)	0.0097,0.13	0.028	(0.83 - 1.11) [0.68,1.21]
Serine (% DW)	0.60 ± 0.0085 (0.60 - 0.61)	0.56 ± 0.0085 (0.55 - 0.57)	0.046 ± 0.012 (0.034 - 0.058)	0.019,0.074	0.004	(0.45 - 0.62) [0.34,0.71]
Threonine (% DW)	0.37 ± 0.0051 (0.37 - 0.37)	0.34 ± 0.0051 (0.33 - 0.36)	0.029 ± 0.0072 (0.016 - 0.039)	0.012,0.046	0.004	(0.29 - 0.37) [0.24,0.41]
Tryptophan (% DW)	0.062 ± 0.0011 (0.061 - 0.063)	0.061 ± 0.0011 (0.058 - 0.063)	0.0016 ± 0.0015 (-0.0015 - 0.0050)	-0.0018,0.0051	0.311	(0.043 - 0.059) [0.032,0.072]

Table 3. Statistical Summary of Site 1 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Tyrosine (% DW)	0.43 ± 0.012 (0.42 - 0.43)	0.36 ± 0.012 (0.35 - 0.37)	0.063 ± 0.018 (0.052 - 0.072)	0.023,0.10	0.006	(0.25 - 0.40) [0.17,0.52]
Valine (% DW)	0.53 ± 0.012 (0.53 - 0.54)	0.50 ± 0.012 (0.48 - 0.51)	0.035 ± 0.016 (0.020 - 0.055)	-0.0026,0.073	0.063	(0.42 - 0.55) [0.35,0.62]
Fatty Acid (% Total FA)						
16:0 Palmitic (% Total FA)	9.21 ± 0.043 (9.12 - 9.31)	9.23 ± 0.043 (9.15 - 9.34)	-0.023 ± 0.060 (-0.14 - 0.16)	-0.16,0.11	0.706	(9.10 - 12.55) [6.12,15.67]
16:1 Palmitoleic (% Total FA)	0.11 ± 0.0081 (0.11 - 0.11)	0.11 ± 0.0081 (0.11 - 0.12)	-0.0017 ± 0.011 (-0.0034 - 0.00039)	-0.028,0.025	0.889	(0.050 - 0.19) [0,0.28]
18:0 Stearic (% Total FA)	1.80 ± 0.016 (1.79 - 1.83)	1.81 ± 0.016 (1.77 - 1.85)	-0.0070 ± 0.023 (-0.055 - 0.063)	-0.061,0.047	0.772	(1.57 - 2.45) [0.86,2.98]
18:1 Oleic (% Total FA)	25.08 ± 0.12 (24.87 - 25.36)	24.75 ± 0.12 (24.55 - 24.92)	0.34 ± 0.17 (0.099 - 0.81)	-0.057,0.73	0.083	(21.17 - 35.33) [7.51,46.46]
18:2 Linoleic (% Total FA)	61.79 ± 0.12 (61.56 - 62.00)	61.98 ± 0.12 (61.74 - 62.18)	-0.19 ± 0.17 (-0.45 - 0.25)	-0.58,0.20	0.298	(50.33 - 63.59) [39.41,76.74]
18:3 Linolenic (% Total FA)	1.21 ± 0.026 (1.20 - 1.23)	1.34 ± 0.026 (1.25 - 1.43)	-0.13 ± 0.037 (-0.23 - -0.022)	-0.21,-0.040	0.009	(0.93 - 1.52) [0.63,1.77]

Table 3. Statistical Summary of Site 1 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int.¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fatty Acid (% Total FA)						
20:0 Arachidic (% Total FA)	0.37 ± 0.0057 (0.36 - 0.39)	0.37 ± 0.0057 (0.36 - 0.38)	0.0036 ± 0.0081 (-0.019 - 0.032)	-0.015,0.022	0.670	(0.32 - 0.47) [0.23,0.54]
20:1 Eicosenoic (% Total FA)	0.27 ± 0.0050 (0.26 - 0.28)	0.27 ± 0.0050 (0.25 - 0.28)	0.0018 ± 0.0064 (-0.014 - 0.011)	-0.013,0.016	0.784	(0.23 - 0.32) [0.15,0.39]
22:0 Behenic (% Total FA)	0.15 ± 0.0035 (0.14 - 0.16)	0.14 ± 0.0035 (0.14 - 0.15)	0.0030 ± 0.0049 (-0.0071 - 0.017)	-0.0083,0.014	0.562	(0.12 - 0.19) [0.081,0.23]
Fiber						
Acid Detergent Fiber (% DW)	5.39 ± 0.30 (4.76 - 5.80)	5.19 ± 0.30 (4.76 - 5.68)	0.20 ± 0.42 (-0.92 - 1.04)	-0.76,1.17	0.641	(4.11 - 6.33) [2.77,7.56]
Neutral Detergent Fiber (% DW)	11.31 ± 0.28 (10.78 - 12.08)	10.68 ± 0.28 (9.93 - 11.22)	0.63 ± 0.38 (-0.44 - 1.20)	-0.25,1.52	0.136	(8.20 - 11.30) [5.93,13.63]
Total Dietary Fiber (% DW)	15.37 ± 0.46 (14.70 - 16.28)	14.22 ± 0.46 (13.62 - 15.25)	1.15 ± 0.65 (-0.55 - 2.50)	-0.34,2.65	0.112	(12.99 - 18.03) [9.20,20.27]
Mineral						
Calcium (% DW)	0.0064 ± 0.00014 (0.0062 - 0.0066)	0.0058 ± 0.00014 (0.0056 - 0.0059)	0.00063 ± 0.00020 (0.00043 - 0.00090)	0.00018,0.0011	0.012	(0.0031 - 0.0049) [0.0016,0.0059]
Copper (mg/kg DW)	1.89 ± 0.69 (1.86 - 1.95)	2.82 ± 0.69 (1.68 - 4.54)	-0.92 ± 0.98 (-2.59 - 0.18)	-3.17,1.33	0.372	(1.15 - 3.56) [0,4.20]

Table 3. Statistical Summary of Site 1 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)		p-Value	Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)		
Mineral						
Iron (mg/kg DW)	23.54 ± 1.22 (23.02 - 24.06)	25.49 ± 1.00 (24.07 - 27.02)	-1.96 ± 1.58 (-4.01 - -1.33)	-5.69,1.77	0.254	(18.04 - 29.22) [8.88,34.51]
Magnesium (% DW)	0.13 ± 0.0021 (0.13 - 0.13)	0.12 ± 0.0021 (0.12 - 0.13)	0.0036 ± 0.0030 (-0.0012 - 0.0087)	-0.0034,0.011	0.269	(0.099 - 0.14) [0.075,0.17]
Manganese (mg/kg DW)	8.34 ± 0.34 (7.62 - 9.32)	6.99 ± 0.34 (6.84 - 7.17)	1.35 ± 0.45 (0.78 - 2.36)	0.30,2.40	0.017	(5.56 - 8.64) [3.17,9.99]
Phosphorus (% DW)	0.34 ± 0.0049 (0.34 - 0.35)	0.34 ± 0.0049 (0.33 - 0.35)	0.0050 ± 0.0070 (-0.0068 - 0.015)	-0.011,0.021	0.496	(0.25 - 0.37) [0.18,0.45]
Potassium (% DW)	0.37 ± 0.0060 (0.36 - 0.38)	0.37 ± 0.0060 (0.36 - 0.38)	-0.00086 ± 0.0084 (-0.010 - 0.0055)	-0.020,0.019	0.921	(0.32 - 0.40) [0.26,0.46]
Zinc (mg/kg DW)	26.50 ± 0.58 (25.91 - 26.89)	25.46 ± 0.58 (24.53 - 26.04)	1.04 ± 0.82 (0.098 - 2.18)	-0.85,2.93	0.239	(16.72 - 34.04) [7.16,38.55]
Proximate						
Ash (% DW)	1.48 ± 0.056 (1.38 - 1.56)	1.44 ± 0.056 (1.35 - 1.49)	0.043 ± 0.063 (0.021 - 0.076)	-0.10,0.19	0.513	(1.12 - 1.62) [0.74,1.96]
Carbohydrates (% DW)	83.38 ± 0.23 (83.29 - 83.55)	84.52 ± 0.23 (84.28 - 84.74)	-1.13 ± 0.32 (-1.42 - -0.98)	-1.88,-0.39	0.008	(82.91 - 86.78) [81.08,88.80]

Table 3. Statistical Summary of Site 1 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Proximate						
Moisture (% FW)	8.06 ± 0.096 (7.89 - 8.16)	8.09 ± 0.096 (7.86 - 8.21)	-0.030 ± 0.14 (-0.080 - 0.030)	-0.34,0.28	0.830	(7.60 - 15.30) [0.45,19.52]
Protein (% DW)	11.89 ± 0.19 (11.73 - 11.98)	10.85 ± 0.19 (10.70 - 11.00)	1.04 ± 0.27 (0.87 - 1.28)	0.41,1.67	0.005	(9.33 - 11.82) [7.54,13.13]
Total Fat (% DW)	3.24 ± 0.047 (3.16 - 3.33)	3.19 ± 0.047 (3.13 - 3.24)	0.050 ± 0.067 (-0.0014 - 0.12)	-0.10,0.20	0.479	(2.66 - 3.71) [2.20,4.55]
Vitamin						
Folic Acid (mg/kg DW)	0.41 ± 0.048 (0.39 - 0.43)	0.51 ± 0.048 (0.49 - 0.53)	-0.10 ± 0.059 (-0.11 - -0.098)	-0.24,0.034	0.121	(0.13 - 0.45) [0.012,0.69]
Niacin (mg/kg DW)	28.14 ± 0.74 (26.27 - 30.05)	29.01 ± 0.74 (27.34 - 29.85)	-0.88 ± 1.04 (-3.57 - 2.71)	-3.28,1.52	0.424	(16.17 - 29.19) [6.97,37.83]
Vitamin B1 (mg/kg DW)	3.05 ± 0.16 (2.39 - 3.38)	3.23 ± 0.16 (3.05 - 3.36)	-0.18 ± 0.21 (-0.66 - 0.11)	-0.67,0.30	0.411	(2.19 - 5.60) [0.37,6.35]
Vitamin B2 (mg/kg DW)	1.45 ± 0.11 (1.37 - 1.52)	1.45 ± 0.11 (1.36 - 1.51)	-0.0076 ± 0.15 (-0.12 - 0.16)	-0.36,0.34	0.961	(1.34 - 1.91) [0.91,2.30]
Vitamin B6 (mg/kg DW)	6.74 ± 0.11 (6.49 - 6.99)	6.73 ± 0.11 (6.67 - 6.80)	0.016 ± 0.16 (-0.31 - 0.32)	-0.35,0.38	0.922	(5.08 - 7.47) [3.12,9.30]

Table 3. Statistical Summary of Site 1 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Vitamin						
Vitamin E (mg/kg DW)	6.33 ± 0.71 (5.73 - 6.70)	4.87 ± 0.71 (2.72 - 6.00)	1.46 ± 1.01 (-0.27 - 3.83)	-0.86,3.78	0.185	(2.71 - 13.94) [0,20.49]
Antinutrient						
Phytic Acid (% DW)	0.78 ± 0.039 (0.77 - 0.80)	0.75 ± 0.039 (0.70 - 0.83)	0.028 ± 0.055 (-0.037 - 0.073)	-0.099,0.15	0.629	(0.50 - 0.94) [0.21,1.22]
Secondary Metabolite						
Ferulic Acid (µg/g DW)	2458.21 ± 53.43 (2366.74 - 2525.31)	2571.23 ± 53.43 (2472.77 - 2669.85)	-113.03 ± 75.57 (-303.11 - 9.81)	-287.29,61.23	0.173	(1412.68 - 2297.36) [1136.69,2806.24]
p-Coumaric Acid (µg/g DW)	172.95 ± 6.96 (166.11-177.48)	172.63 ± 6.96 (167.76-176.90)	0.32 ± 9.63 (-10.80 - 9.73)	-21.89,22.53	0.974	(99.30 - 285.75) [0,378.57]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 4. Statistical Summary of Site 2 Maize Forage Fiber, Calcium, Phosphorus, and Proximate Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fiber						
Acid Detergent Fiber (% DW)	25.53 ± 1.39 (24.18 - 26.38)	27.40 ± 1.39 (24.53 - 32.26)	-1.87 ± 1.97 (-6.22 - 1.85)	-6.42,2.68	0.371	(26.72 - 38.94) [16.76,43.76]
Neutral Detergent Fiber (% DW)	36.81 ± 1.89 (33.99 - 39.94)	36.96 ± 1.89 (35.78 - 37.65)	-0.15 ± 2.67 (-3.47 - 4.16)	-6.32,6.02	0.956	(33.70 - 46.74) [25.94,55.67]
Mineral						
Calcium (% DW)	0.17 ± 0.0093 (0.16 - 0.18)	0.17 ± 0.0093 (0.15 - 0.19)	0.0044 ± 0.012 (-0.017 - 0.017)	-0.023,0.031	0.716	(0.11 - 0.29) [0.016,0.38]
Phosphorus (% DW)	0.24 ± 0.014 (0.23 - 0.24)	0.20 ± 0.014 (0.18 - 0.24)	0.041 ± 0.019 (0.0048 - 0.064)	-0.0036,0.085	0.066	(0.14 - 0.25) [0.071,0.32]
Proximate						
Ash (% DW)	3.55 ± 0.30 (3.30 - 3.93)	3.57 ± 0.30 (2.96 - 4.24)	-0.015 ± 0.43 (-0.94 - 0.97)	-1.00,0.97	0.972	(3.40 - 5.45) [1.93,6.31]
Carbohydrates (% DW)	86.92 ± 0.87 (84.98 - 88.60)	88.22 ± 0.87 (85.87 - 89.57)	-1.30 ± 1.23 (-4.23 - 2.73)	-4.13,1.53	0.320	(84.88 - 88.39) [83.05,90.74]
Moisture (% FW)	69.03 ± 0.68 (68.50 - 69.40)	66.53 ± 0.68 (65.90 - 67.70)	2.50 ± 0.96 (1.70 - 3.30)	0.29,4.71	0.031	(64.90 - 77.40) [57.62,86.45]
Protein (% DW)	7.53 ± 0.39 (6.95 - 8.41)	6.63 ± 0.39 (6.06 - 7.52)	0.90 ± 0.56 (-0.30 - 2.35)	-0.38,2.18	0.144	(6.58 - 8.82) [4.78,10.38]
Total Fat (% DW)	2.00 ± 0.45 (0.88 - 3.17)	1.58 ± 0.45 (1.16 - 2.37)	0.42 ± 0.64 (-1.49 - 1.95)	-1.05,1.88	0.528	(0.58 - 3.11) [0,4.54]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 5. Statistical Summary of Site 2 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Alanine (% DW)	0.70 ± 0.027 (0.66 - 0.76)	0.71 ± 0.027 (0.67 - 0.78)	-0.0092 ± 0.033 (-0.012 - -0.0057)	-0.084,0.066	0.785	(0.67 - 0.96) [0.48,1.08]
Arginine (% DW)	0.45 ± 0.011 (0.43 - 0.47)	0.45 ± 0.011 (0.44 - 0.47)	0.0049 ± 0.015 (-0.0068 - 0.015)	-0.031,0.040	0.760	(0.37 - 0.49) [0.33,0.56]
Aspartic acid (% DW)	0.62 ± 0.019 (0.60 - 0.66)	0.62 ± 0.019 (0.60 - 0.67)	0.0013 ± 0.023 (-0.0033 - 0.0070)	-0.052,0.054	0.956	(0.57 - 0.77) [0.43,0.90]
Cystine (% DW)	0.22 ± 0.0058 (0.22 - 0.23)	0.22 ± 0.0058 (0.21 - 0.23)	0.0044 ± 0.0069 (-0.0022 - 0.014)	-0.011,0.020	0.538	(0.20 - 0.24) [0.18,0.27]
Glutamic acid (% DW)	1.78 ± 0.073 (1.69 - 1.95)	1.81 ± 0.073 (1.70 - 2.00)	-0.025 ± 0.085 (-0.051 - -0.0056)	-0.22,0.17	0.779	(1.71 - 2.41) [1.25,2.75]
Glycine (% DW)	0.37 ± 0.0084 (0.36 - 0.39)	0.37 ± 0.0084 (0.36 - 0.38)	0.0048 ± 0.011 (0.0023 - 0.0062)	-0.020,0.030	0.665	(0.32 - 0.40) [0.28,0.46]
Histidine (% DW)	0.29 ± 0.0082 (0.27 - 0.31)	0.29 ± 0.0082 (0.28 - 0.30)	0.0011 ± 0.0087 (-0.012 - 0.011)	-0.019,0.021	0.898	(0.26 - 0.33) [0.22,0.38]
Isoleucine (% DW)	0.32 ± 0.014 (0.30 - 0.36)	0.32 ± 0.014 (0.30 - 0.36)	0.00013 ± 0.017 (-0.0070 - 0.010)	-0.038,0.038	0.993	(0.32 - 0.45) [0.23,0.51]

Table 5. Statistical Summary of Site 2 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Leucine (% DW)	1.15 ± 0.055 (1.09 - 1.27)	1.17 ± 0.055 (1.08 - 1.33)	-0.017 ± 0.064 (-0.052 - 0.0032)	-0.16,0.13	0.803	(1.14 - 1.68) [0.77,1.92]
Lysine (% DW)	0.32 ± 0.0090 (0.29 - 0.33)	0.30 ± 0.0090 (0.29 - 0.31)	0.017 ± 0.012 (0.0028 - 0.031)	-0.0093,0.044	0.170	(0.24 - 0.34) [0.20,0.40]
Methionine (% DW)	0.22 ± 0.0056 (0.21 - 0.23)	0.22 ± 0.0056 (0.20 - 0.23)	0.0033 ± 0.0079 (-0.0066 - 0.014)	-0.015,0.021	0.682	(0.17 - 0.22) [0.14,0.25]
Phenylalanine (% DW)	0.46 ± 0.019 (0.44 - 0.50)	0.46 ± 0.019 (0.43 - 0.52)	-0.0020 ± 0.022 (-0.018 - 0.0087)	-0.052,0.048	0.929	(0.45 - 0.65) [0.32,0.73]
Proline (% DW)	0.89 ± 0.031 (0.84 - 0.96)	0.88 ± 0.031 (0.84 - 0.95)	0.0040 ± 0.037 (-0.0064 - 0.011)	-0.082,0.090	0.917	(0.83 - 1.11) [0.68,1.21]
Serine (% DW)	0.48 ± 0.014 (0.46 - 0.50)	0.49 ± 0.014 (0.46 - 0.52)	-0.0096 ± 0.018 (-0.021 - 0.0088)	-0.051,0.032	0.607	(0.45 - 0.62) [0.34,0.71]
Threonine (% DW)	0.31 ± 0.0081 (0.30 - 0.33)	0.31 ± 0.0081 (0.29 - 0.32)	0.0067 ± 0.0091 (-0.00043 - 0.011)	-0.014,0.028	0.484	(0.29 - 0.37) [0.24,0.41]
Tryptophan (% DW)	0.054 ± 0.0024 (0.053 - 0.056)	0.055 ± 0.0024 (0.052 - 0.061)	-0.00092 ± 0.0026 (-0.0055 - 0.0014)	-0.0070,0.0051	0.735	(0.043 - 0.059) [0.032,0.072]

Table 5. Statistical Summary of Site 2 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Tyrosine (% DW)	0.34 ± 0.012 (0.33 - 0.36)	0.35 ± 0.012 (0.32 - 0.38)	-0.0023 ± 0.013 (-0.024 - 0.015)	-0.033,0.028	0.863	(0.25 - 0.40) [0.17,0.52]
Valine (% DW)	0.45 ± 0.016 (0.42 - 0.50)	0.45 ± 0.016 (0.43 - 0.49)	0.0016 ± 0.020 (-0.011 - 0.0084)	-0.045,0.048	0.938	(0.42 - 0.55) [0.35,0.62]
Fatty Acid (% Total FA)						
16:0 Palmitic (% Total FA)	9.21 ± 0.065 (9.17 - 9.24)	9.08 ± 0.065 (8.91 - 9.23)	0.12 ± 0.089 (-0.013 - 0.33)	-0.080,0.33	0.199	(9.10 - 12.55) [6.12,15.67]
16:1 Palmitoleic (% Total FA)	0.13 ± 0.0022 (0.12 - 0.13)	0.14 ± 0.0022 (0.13 - 0.14)	-0.0093 ± 0.0029 (-0.011 - -0.0071)	-0.016,-0.0027	0.012	(0.050 - 0.19) [0,0.28]
18:0 Stearic (% Total FA)	1.96 ± 0.027 (1.89 - 2.02)	1.82 ± 0.027 (1.76 - 1.85)	0.14 ± 0.024 (0.12 - 0.18)	0.088,0.20	<0.001	(1.57 - 2.45) [0.86,2.98]
18:1 Oleic (% Total FA)	25.30 ± 0.29 (25.03 - 25.68)	25.78 ± 0.29 (25.34 - 26.66)	-0.48 ± 0.32 (-0.98 - -0.15)	-1.21,0.25	0.168	(21.17 - 35.33) [7.51,46.46]
18:2 Linoleic (% Total FA)	61.34 ± 0.22 (61.02 - 61.54)	61.14 ± 0.22 (60.51 - 61.53)	0.20 ± 0.27 (-0.051 - 0.51)	-0.42,0.82	0.471	(50.33 - 63.59) [39.41,76.74]
18:3 Linolenic (% Total FA)	1.22 ± 0.011 (1.21 - 1.23)	1.21 ± 0.011 (1.19 - 1.23)	0.014 ± 0.016 (-0.014 - 0.036)	-0.022,0.051	0.390	(0.93 - 1.52) [0.63,1.77]

Table 5. Statistical Summary of Site 2 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int.¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fatty Acid (% Total FA)						
20:0 Arachidic (% Total FA)	0.41 ± 0.0055 (0.40 - 0.42)	0.39 ± 0.0055 (0.38 - 0.40)	0.020 ± 0.0057 (0.017 - 0.023)	0.0073,0.034	0.007	(0.32 - 0.47) [0.23,0.54]
20:1 Eicosenoic (% Total FA)	0.29 ± 0.0052 (0.28 - 0.29)	0.29 ± 0.0052 (0.29 - 0.29)	-0.0035 ± 0.0073 (-0.0040 - -0.0029)	-0.020,0.013	0.644	(0.23 - 0.32) [0.15,0.39]
22:0 Behenic (% Total FA)	0.15 ± 0.0042 (0.14 - 0.15)	0.16 ± 0.0042 (0.15 - 0.16)	-0.013 ± 0.0057 (-0.019 - -0.0013)	-0.026,0	0.050	(0.12 - 0.19) [0.081,0.23]
Fiber						
Acid Detergent Fiber (% DW)	4.96 ± 0.51 (3.82 - 6.05)	5.55 ± 0.51 (4.37 - 7.00)	-0.59 ± 0.71 (-3.18 - 1.69)	-2.24,1.06	0.435	(4.11 - 6.33) [2.77,7.56]
Neutral Detergent Fiber (% DW)	10.00 ± 0.53 (9.83 - 10.11)	10.50 ± 0.53 (9.48 - 11.22)	-0.50 ± 0.75 (-1.16 - 0.34)	-2.24,1.24	0.524	(8.20 - 11.30) [5.93,13.63]
Total Dietary Fiber (% DW)	14.49 ± 0.70 (13.39 - 15.06)	14.93 ± 0.70 (13.17 - 15.84)	-0.43 ± 0.99 (-2.45 - 1.88)	-2.71,1.84	0.671	(12.99 - 18.03) [9.20,20.27]
Mineral						
Calcium (% DW)	0.0048 ± 0.00018 (0.0046 - 0.0049)	0.0048 ± 0.00018 (0.0046 - 0.0050)	-0.00004 ± 0.00021 (-0.00006 - -0.00003)	-0.00054,0.00045	0.845	(0.0031 - 0.0049) [0.0016,0.0059]
Copper (mg/kg DW)	1.76 ± 0.11 (1.51 - 2.21)	1.36 ± 0.11 (1.26 - 1.43)	0.40 ± 0.14 (0.16 - 0.78)	0.071,0.73	0.023	(1.15 - 3.56) [0,4.20]

Table 5. Statistical Summary of Site 2 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Mineral						
Iron (mg/kg DW)	20.86 ± 0.42 (19.23 - 21.79)	19.48 ± 0.42 (19.03 - 19.71)	1.38 ± 0.60 (-0.47 - 2.75)	0.012,2.76	0.048	(18.04 - 29.22) [8.88,34.51]
Magnesium (% DW)	0.12 ± 0.0022 (0.11 - 0.12)	0.11 ± 0.0022 (0.11 - 0.12)	0.0044 ± 0.0029 (-0.0066 - 0.011)	-0.0023,0.011	0.170	(0.099 - 0.14) [0.075,0.17]
Manganese (mg/kg DW)	6.54 ± 0.17 (6.11 - 6.78)	6.19 ± 0.17 (6.03 - 6.47)	0.35 ± 0.24 (-0.36 - 0.71)	-0.20,0.89	0.180	(5.56 - 8.64) [3.17,9.99]
Phosphorus (% DW)	0.33 ± 0.0062 (0.31 - 0.35)	0.33 ± 0.0062 (0.32 - 0.35)	0.0070 ± 0.0088 (-0.031 - 0.026)	-0.013,0.027	0.449	(0.25 - 0.37) [0.18,0.45]
Potassium (% DW)	0.38 ± 0.0084 (0.37 - 0.40)	0.37 ± 0.0084 (0.36 - 0.40)	0.011 ± 0.011 (-0.030 - 0.035)	-0.014,0.035	0.345	(0.32 - 0.40) [0.26,0.46]
Zinc (mg/kg DW)	20.50 ± 0.52 (18.91 - 22.12)	19.26 ± 0.52 (18.81 - 20.03)	1.24 ± 0.74 (-1.13 - 3.19)	-0.46,2.94	0.131	(16.72 - 34.04) [7.16,38.55]
Proximate						
Ash (% DW)	1.40 ± 0.038 (1.35 - 1.47)	1.43 ± 0.038 (1.34 - 1.48)	-0.025 ± 0.053 (-0.11 - 0.046)	-0.15,0.097	0.648	(1.12 - 1.62) [0.74,1.96]
Carbohydrates (% DW)	85.63 ± 0.27 (84.90 - 86.11)	85.67 ± 0.27 (84.94 - 86.22)	-0.044 ± 0.27 (-0.11 - 0.012)	-0.68,0.59	0.875	(82.91 - 86.78) [81.08,88.80]

Table 5. Statistical Summary of Site 2 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Proximate						
Moisture (% FW)	8.46 ± 0.22 (8.15 - 9.02)	8.43 ± 0.22 (8.06 - 9.08)	0.030 ± 0.31 (-0.93 - 0.87)	-0.69,0.75	0.925	(7.60 - 15.30) [0.45,19.52]
Protein (% DW)	9.67 ± 0.29 (9.14 - 10.35)	9.67 ± 0.29 (9.22 - 10.50)	0.0034 ± 0.23 (-0.15 - 0.30)	-0.53,0.53	0.988	(9.33 - 11.82) [7.54,13.13]
Total Fat (% DW)	3.30 ± 0.093 (3.26 - 3.36)	3.23 ± 0.093 (3.09 - 3.45)	0.066 ± 0.11 (-0.20 - 0.21)	-0.18,0.31	0.553	(2.66 - 3.71) [2.20,4.55]
Vitamin						
Folic Acid (mg/kg DW)	0.30 ± 0.017 (0.27 - 0.33)	0.33 ± 0.017 (0.30 - 0.36)	-0.030 ± 0.024 (-0.058 - 0.0038)	-0.086,0.026	0.249	(0.13 - 0.45) [0.012,0.69]
Niacin (mg/kg DW)	32.34 ± 1.44 (30.61 - 34.84)	32.70 ± 1.44 (31.03 - 35.75)	-0.36 ± 2.04 (-4.17 - 3.81)	-5.06,4.34	0.865	(16.17 - 29.19) [6.97,37.83]
Vitamin B1 (mg/kg DW)	3.17 ± 0.18 (3.05 - 3.27)	2.84 ± 0.18 (2.39 - 3.16)	0.33 ± 0.26 (0.030 - 0.66)	-0.27,0.93	0.242	(2.19 - 5.60) [0.37,6.35]
Vitamin B2 (mg/kg DW)	1.46 ± 0.069 (1.35 - 1.65)	1.53 ± 0.069 (1.45 - 1.61)	-0.072 ± 0.098 (-0.22 - 0.20)	-0.30,0.15	0.484	(1.34 - 1.91) [0.91,2.30]
Vitamin B6 (mg/kg DW)	6.49 ± 0.14 (6.27 - 6.64)	6.53 ± 0.14 (6.45 - 6.63)	-0.042 ± 0.16 (-0.37 - 0.20)	-0.41,0.33	0.800	(5.08 - 7.47) [3.12,9.30]

Table 5. Statistical Summary of Site 2 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Vitamin						
Vitamin E (mg/kg DW)	7.16 ± 0.26 (6.47 - 7.91)	6.96 ± 0.26 (6.65 - 7.40)	0.20 ± 0.35 (-0.93 - 1.08)	-0.62,1.01	0.591	(2.71 - 13.94) [0,20.49]
Antinutrient						
Phytic Acid (% DW)	0.86 ± 0.041 (0.83 - 0.87)	0.78 ± 0.041 (0.69 - 0.85)	0.081 ± 0.059 (-0.013 - 0.18)	-0.055,0.22	0.206	(0.50 - 0.94) [0.21,1.22]
Secondary Metabolite						
Ferulic Acid (µg/g DW)	2057.02 ± 106.60 (1923.50 - 2298.73)	2184.45 ± 106.60 (2033.94 - 2265.73)	-127.43 ± 150.76 (-330.17 - 264.79)	-475.07,220.22	0.422	(1412.68 - 2297.36) [1136.69,2806.24]
p-Coumaric Acid (µg/g DW)	196.97 ± 7.65 (185.76 - 214.62)	195.82 ± 7.65 (188.08 - 210.13)	1.15 ± 10.81 (-24.37 - 25.37)	-23.78,26.08	0.917	(99.30 - 285.75) [0,378.57]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 6. Statistical Summary of Site 3 Maize Forage Fiber, Calcium, Phosphorus, and Proximate Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fiber						
Acid Detergent Fiber (% DW)	29.76 ± 1.78 (26.56 - 33.83)	28.84 ± 1.78 (25.00 - 31.08)	0.92 ± 2.27 (-3.89 - 3.89)	-4.32,6.15	0.696	(26.72 - 38.94) [16.76,43.76]
Neutral Detergent Fiber (% DW)	39.23 ± 2.36 (34.41 - 42.19)	37.97 ± 2.36 (35.41 - 42.21)	1.26 ± 2.13 (-1.11 - 5.89)	-3.66,6.19	0.570	(33.70 - 46.74) [25.94,55.67]
Mineral						
Calcium (% DW)	0.22 ± 0.016 (0.22 - 0.22)	0.21 ± 0.016 (0.19 - 0.23)	0.011 ± 0.022 (-0.014 - 0.034)	-0.038,0.061	0.615	(0.11 - 0.29) [0.016,0.38]
Phosphorus (% DW)	0.22 ± 0.0097 (0.22 - 0.23)	0.20 ± 0.0097 (0.19 - 0.21)	0.026 ± 0.014 (0.016 - 0.033)	-0.0052,0.058	0.090	(0.14 - 0.25) [0.071,0.32]
Proximate						
Ash (% DW)	4.36 ± 0.24 (3.99 - 4.57)	4.13 ± 0.24 (3.78 - 4.47)	0.23 ± 0.34 (-0.48 - 0.74)	-0.55,1.01	0.522	(3.40 - 5.45) [1.93,6.31]
Carbohydrates (% DW)	86.08 ± 0.54 (84.93 - 86.69)	86.94 ± 0.54 (86.69 - 87.13)	-0.85 ± 0.76 (-2.05 - -0.060)	-2.60,0.89	0.292	(84.88 - 88.39) [83.05,90.74]
Moisture (% FW)	74.03 ± 0.82 (73.00 - 74.70)	75.13 ± 0.82 (73.00 - 76.80)	-1.10 ± 0.99 (-2.40 - 0)	-3.38,1.18	0.297	(64.90 - 77.40) [57.62,86.45]
Protein (% DW)	8.15 ± 0.36 (7.59 - 8.75)	7.85 ± 0.36 (7.54 - 8.07)	0.30 ± 0.51 (-0.33 - 1.21)	-0.88,1.48	0.574	(6.58 - 8.82) [4.78,10.38]
Total Fat (% DW)	1.41 ± 0.19 (1.20 - 1.75)	1.08 ± 0.19 (0.77 - 1.31)	0.32 ± 0.27 (0.037 - 0.51)	-0.30,0.95	0.262	(0.58 - 3.11) [0,4.54]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 7. Statistical Summary of Site 3 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Alanine (% DW)	0.69 ± 0.020 (0.67 - 0.71)	0.71 ± 0.020 (0.67 - 0.74)	-0.028 ± 0.025 (-0.070 - 0.0025)	-0.085,0.028	0.282	(0.67 - 0.96) [0.48,1.08]
Arginine (% DW)	0.47 ± 0.012 (0.44 - 0.49)	0.45 ± 0.012 (0.41 - 0.47)	0.017 ± 0.017 (-0.023 - 0.056)	-0.022,0.057	0.342	(0.37 - 0.49) [0.33,0.56]
Aspartic acid (% DW)	0.63 ± 0.014 (0.60 - 0.66)	0.64 ± 0.014 (0.61 - 0.66)	-0.0031 ± 0.019 (-0.040 - 0.028)	-0.047,0.041	0.875	(0.57 - 0.77) [0.43,0.90]
Cystine (% DW)	0.21 ± 0.0055 (0.20 - 0.21)	0.22 ± 0.0055 (0.21 - 0.23)	-0.0091 ± 0.0078 (-0.022 - 0.0052)	-0.027,0.0088	0.274	(0.20 - 0.24) [0.18,0.27]
Glutamic acid (% DW)	1.77 ± 0.053 (1.71 - 1.82)	1.84 ± 0.053 (1.73 - 1.90)	-0.077 ± 0.068 (-0.19 - 0.040)	-0.23,0.079	0.286	(1.71 - 2.41) [1.25,2.75]
Glycine (% DW)	0.38 ± 0.0066 (0.36 - 0.39)	0.37 ± 0.0066 (0.36 - 0.38)	0.0089 ± 0.0094 (-0.0046 - 0.017)	-0.013,0.031	0.372	(0.32 - 0.40) [0.28,0.46]
Histidine (% DW)	0.29 ± 0.0061 (0.28 - 0.30)	0.29 ± 0.0061 (0.28 - 0.30)	0.0017 ± 0.0083 (-0.0026 - 0.0066)	-0.017,0.021	0.841	(0.26 - 0.33) [0.22,0.38]
Isoleucine (% DW)	0.34 ± 0.0097 (0.32 - 0.34)	0.34 ± 0.0097 (0.33 - 0.36)	-0.0078 ± 0.014 (-0.018 - 0.012)	-0.039,0.024	0.587	(0.32 - 0.45) [0.23,0.51]

Table 7. Statistical Summary of Site 3 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)		p-Value	Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)		
Amino Acid (% DW)						
Leucine (% DW)	1.15 ± 0.041 (1.12 - 1.18)	1.21 ± 0.041 (1.13 - 1.26)	-0.064 ± 0.051 (-0.13 - 0.015)	-0.18,0.053	0.243	(1.14 - 1.68) [0.77,1.92]
Lysine (% DW)	0.33 ± 0.0098 (0.31 - 0.35)	0.31 ± 0.0098 (0.29 - 0.32)	0.021 ± 0.014 (0.017 - 0.023)	-0.011,0.053	0.163	(0.24 - 0.34) [0.20,0.40]
Methionine (% DW)	0.20 ± 0.0056 (0.20 - 0.20)	0.21 ± 0.0056 (0.20 - 0.22)	-0.012 ± 0.0071 (-0.017 - -0.0048)	-0.029,0.0039	0.117	(0.17 - 0.22) [0.14,0.25]
Phenylalanine (% DW)	0.46 ± 0.015 (0.45 - 0.48)	0.48 ± 0.015 (0.45 - 0.50)	-0.016 ± 0.019 (-0.039 - 0.016)	-0.060,0.027	0.414	(0.45 - 0.65) [0.32,0.73]
Proline (% DW)	0.88 ± 0.020 (0.87 - 0.91)	0.88 ± 0.020 (0.83 - 0.91)	0.00035 ± 0.025 (-0.035 - 0.035)	-0.057,0.057	0.989	(0.83 - 1.11) [0.68,1.21]
Serine (% DW)	0.46 ± 0.011 (0.45 - 0.49)	0.48 ± 0.011 (0.46 - 0.50)	-0.019 ± 0.014 (-0.053 - 0)	-0.051,0.014	0.227	(0.45 - 0.62) [0.34,0.71]
Threonine (% DW)	0.31 ± 0.0085 (0.30 - 0.32)	0.31 ± 0.0085 (0.30 - 0.32)	0.00064 ± 0.010 (-0.015 - 0.013)	-0.023,0.024	0.951	(0.29 - 0.37) [0.24,0.41]
Tryptophan (% DW)	0.050 ± 0.0025 (0.048 - 0.052)	0.050 ± 0.0025 (0.045 - 0.054)	-0.00022 ± 0.0032 (-0.0051 - 0.0068)	-0.0075,0.0071	0.946	(0.043 - 0.059) [0.032,0.072]

Table 7. Statistical Summary of Site 3 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Tyrosine (% DW)	0.36 ± 0.024 (0.35 - 0.36)	0.32 ± 0.024 (0.24 - 0.38)	0.034 ± 0.021 (-0.014 - 0.11)	-0.015,0.082	0.150	(0.25 - 0.40) [0.17,0.52]
Valine (% DW)	0.46 ± 0.011 (0.45 - 0.48)	0.46 ± 0.011 (0.45 - 0.48)	-0.00051 ± 0.016 (-0.019 - 0.021)	-0.036,0.035	0.974	(0.42 - 0.55) [0.35,0.62]
Fatty Acid (% Total FA)						
16:0 Palmitic (% Total FA)	9.29 ± 0.069 (9.12 - 9.46)	9.10 ± 0.069 (9.06 - 9.16)	0.19 ± 0.092 (0.050 - 0.30)	-0.019,0.41	0.068	(9.10 - 12.55) [6.12,15.67]
16:1 Palmitoleic (% Total FA)	0.12 ± 0.0018 (0.12 - 0.13)	0.13 ± 0.0018 (0.12 - 0.13)	-0.0055 ± 0.0026 (-0.012 - -0.0013)	-0.011,0.00046	0.066	(0.050 - 0.19) [0,0.28]
18:0 Stearic (% Total FA)	1.98 ± 0.024 (1.93 - 2.03)	1.82 ± 0.024 (1.79 - 1.85)	0.16 ± 0.032 (0.13 - 0.18)	0.090,0.24	<0.001	(1.57 - 2.45) [0.86,2.98]
18:1 Oleic (% Total FA)	24.75 ± 0.18 (24.14 - 25.25)	23.82 ± 0.18 (23.62 - 24.11)	0.94 ± 0.23 (0.52 - 1.15)	0.40,1.47	0.003	(21.17 - 35.33) [7.51,46.46]
18:2 Linoleic (% Total FA)	61.87 ± 0.23 (61.19 - 62.42)	63.17 ± 0.23 (62.80 - 63.41)	-1.30 ± 0.28 (-1.62 - -1.00)	-1.95,-0.66	0.001	(50.33 - 63.59) [39.41,76.74]
18:3 Linolenic (% Total FA)	1.17 ± 0.014 (1.12 - 1.22)	1.18 ± 0.014 (1.15 - 1.21)	-0.013 ± 0.018 (-0.033 - 0.024)	-0.054,0.029	0.505	(0.93 - 1.52) [0.63,1.77]

Table 7. Statistical Summary of Site 3 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int.¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fatty Acid (% Total FA)						
20:0 Arachidic (% Total FA)	0.39 ± 0.0063 (0.38 - 0.40)	0.37 ± 0.0063 (0.36 - 0.37)	0.025 ± 0.0088 (0.015 - 0.032)	0.0047,0.045	0.021	(0.32 - 0.47) [0.23,0.54]
20:1 Eicosenoic (% Total FA)	0.28 ± 0.0034 (0.27 - 0.28)	0.27 ± 0.0034 (0.27 - 0.28)	0.0022 ± 0.0046 (-0.0050 - 0.0073)	-0.0083,0.013	0.644	(0.23 - 0.32) [0.15,0.39]
22:0 Behenic (% Total FA)	0.14 ± 0.0053 (0.13 - 0.15)	0.14 ± 0.0053 (0.14 - 0.15)	0.0017 ± 0.0075 (-0.012 - 0.011)	-0.016,0.019	0.830	(0.12 - 0.19) [0.081,0.23]
Fiber						
Acid Detergent Fiber (% DW)	5.53 ± 0.37 (4.53 - 6.10)	4.95 ± 0.37 (4.54 - 5.46)	0.58 ± 0.50 (-0.32 - 1.42)	-0.57,1.73	0.277	(4.11 - 6.33) [2.77,7.56]
Neutral Detergent Fiber (% DW)	8.98 ± 0.84 (8.59 - 9.49)	9.63 ± 0.84 (8.48 - 11.75)	-0.65 ± 1.19 (-2.26 - 0.20)	-3.40,2.10	0.601	(8.20 - 11.30) [5.93,13.63]
Total Dietary Fiber (% DW)	15.11 ± 0.90 (14.02 - 17.02)	14.75 ± 0.90 (12.82 - 17.62)	0.36 ± 1.25 (-3.61 - 4.20)	-2.53,3.24	0.782	(12.99 - 18.03) [9.20,20.27]
Mineral						
Calcium (% DW)	0.0040 ± 0.00009 (0.0038 - 0.0042)	0.0041 ± 0.00009 (0.0040 - 0.0044)	-0.00014 ± 0.00011 (-0.00027 - -0.00001)	-0.00039,0.00010	0.216	(0.0031 - 0.0049) [0.0016,0.0059]
Copper (mg/kg DW)	1.61 ± 0.57 (1.50 - 1.72)	1.81 ± 0.57 (1.61 - 1.93)	-0.19 ± 0.81 (-0.43 - 0.10)	-2.06,1.68	0.818	(1.15 - 3.56) [0,4.20]

Table 7. Statistical Summary of Site 3 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean \pm S.E. (Range)	Control Mean \pm S.E. (Range)	Difference(Test minus Control)		p-Value	Commercial (Range) [99% Tolerance Int. ¹]
			Mean \pm S.E. (Range)	95% CI (Lower,Upper)		
Mineral						
Iron (mg/kg DW)	19.62 \pm 0.27 (19.23 - 19.91)	20.28 \pm 0.27 (19.34 - 20.89)	-0.66 \pm 0.39 (-1.66 - 0.38)	-1.55,0.23	0.126	(18.04 - 29.22) [8.88,34.51]
Magnesium (% DW)	0.11 \pm 0.0026 (0.11 - 0.12)	0.11 \pm 0.0026 (0.11 - 0.12)	-0.00043 \pm 0.0027 (-0.0055 - 0.0051)	-0.0067,0.0058	0.879	(0.099 - 0.14) [0.075,0.17]
Manganese (mg/kg DW)	5.65 \pm 0.14 (5.43 - 5.80)	5.74 \pm 0.14 (5.57 - 5.85)	-0.084 \pm 0.13 (-0.36 - 0.15)	-0.39,0.22	0.540	(5.56 - 8.64) [3.17,9.99]
Phosphorus (% DW)	0.32 \pm 0.0077 (0.31 - 0.32)	0.32 \pm 0.0077 (0.30 - 0.34)	0.0021 \pm 0.0097 (-0.015 - 0.013)	-0.020,0.025	0.831	(0.25 - 0.37) [0.18,0.45]
Potassium (% DW)	0.37 \pm 0.0075 (0.37 - 0.38)	0.36 \pm 0.0075 (0.35 - 0.38)	0.011 \pm 0.011 (-0.0066 - 0.022)	-0.014,0.035	0.342	(0.32 - 0.40) [0.26,0.46]
Zinc (mg/kg DW)	19.73 \pm 0.33 (19.35 - 20.00)	20.13 \pm 0.33 (19.39 - 20.67)	-0.40 \pm 0.44 (-0.66 - -0.040)	-1.42,0.61	0.387	(16.72 - 34.04) [7.16,38.55]
Proximate						
Ash (% DW)	1.38 \pm 0.092 (1.35 - 1.44)	1.31 \pm 0.092 (1.28 - 1.35)	0.069 \pm 0.13 (0.0050 - 0.13)	-0.23,0.37	0.607	(1.12 - 1.62) [0.74,1.96]
Carbohydrates (% DW)	85.86 \pm 0.31 (85.08 - 86.52)	85.68 \pm 0.31 (85.53 - 85.84)	0.18 \pm 0.44 (-0.44 - 0.84)	-0.85,1.20	0.699	(82.91 - 86.78) [81.08,88.80]

Table 7. Statistical Summary of Site 3 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Proximate						
Moisture (% FW)	9.79 ± 0.16 (9.51 - 10.10)	9.60 ± 0.16 (9.51 - 9.77)	0.19 ± 0.23 (0 - 0.33)	-0.34,0.72	0.441	(7.60 - 15.30) [0.45,19.52]
Protein (% DW)	9.11 ± 0.27 (8.54 - 9.67)	9.58 ± 0.27 (9.38 - 9.80)	-0.47 ± 0.38 (-1.26 - 0.29)	-1.34,0.41	0.252	(9.33 - 11.82) [7.54,13.13]
Total Fat (% DW)	3.65 ± 0.099 (3.50 - 3.89)	3.43 ± 0.099 (3.22 - 3.75)	0.22 ± 0.13 (0.15 - 0.29)	-0.079,0.52	0.127	(2.66 - 3.71) [2.20,4.55]
Vitamin						
Folic Acid (mg/kg DW)	0.37 ± 0.0059 (0.35 - 0.38)	0.32 ± 0.0059 (0.32 - 0.33)	0.045 ± 0.0084 (0.028 - 0.057)	0.025,0.064	<0.001	(0.13 - 0.45) [0.012,0.69]
Niacin (mg/kg DW)	31.66 ± 1.26 (27.14 - 34.70)	30.16 ± 1.26 (29.06 - 31.59)	1.49 ± 1.78 (-4.44 - 5.64)	-2.62,5.61	0.426	(16.17 - 29.19) [6.97,37.83]
Vitamin B1 (mg/kg DW)	2.81 ± 0.23 (2.66 - 2.98)	2.65 ± 0.23 (2.55 - 2.76)	0.15 ± 0.33 (-0.10 - 0.33)	-0.63,0.94	0.657	(2.19 - 5.60) [0.37,6.35]
Vitamin B2 (mg/kg DW)	1.43 ± 0.060 (1.38 - 1.51)	1.28 ± 0.060 (1.20 - 1.39)	0.15 ± 0.085 (0.0051 - 0.27)	-0.046,0.35	0.115	(1.34 - 1.91) [0.91,2.30]
Vitamin B6 (mg/kg DW)	5.82 ± 0.17 (5.65 - 6.13)	5.89 ± 0.17 (5.67 - 6.07)	-0.070 ± 0.25 (-0.38 - 0.46)	-0.64,0.50	0.784	(5.08 - 7.47) [3.12,9.30]

Table 7. Statistical Summary of Site 3 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Vitamin						
Vitamin E (mg/kg DW)	6.66 ± 0.18 (6.43 - 6.98)	6.38 ± 0.18 (6.05 - 6.82)	0.28 ± 0.19 (-0.39 - 0.71)	-0.16,0.72	0.182	(2.71 - 13.94) [0,20.49]
Antinutrient						
Phytic Acid (% DW)	0.66 ± 0.046 (0.56 - 0.79)	0.67 ± 0.046 (0.65 - 0.70)	-0.0089 ± 0.066 (-0.14 - 0.13)	-0.16,0.14	0.896	(0.50 - 0.94) [0.21,1.22]
Secondary Metabolite						
Ferulic Acid (µg/g DW)	1995.62 ± 93.94 (1790.25 - 2124.58)	1961.58 ± 93.94 (1878.66 - 2122.02)	34.04 ± 103.91 (-88.41 - 240.51)	-205.59,273.66	0.751	(1412.68 - 2297.36) [1136.69,2806.24]
p-Coumaric Acid (µg/g DW)	186.61 ± 8.59 (172.39 - 195.01)	188.43 ± 8.59 (171.29 - 198.38)	-1.82 ± 9.99 (-5.95 - 1.11)	-24.86,21.22	0.860	(99.30 - 285.75) [0,378.57]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 8. Statistical Summary of Site 4 Maize Forage Fiber, Calcium, Phosphorus, and Proximate Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int.¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fiber						
Acid Detergent Fiber (% DW)	24.19 ± 1.74 (22.60 - 27.08)	24.29 ± 1.74 (19.93 - 26.90)	-0.11 ± 2.47 (-4.03 - 7.15)	-5.80,5.58	0.965	(26.72 - 38.94) [16.76,43.76]
Neutral Detergent Fiber (% DW)	37.93 ± 2.41 (35.64 - 39.24)	32.96 ± 2.41 (31.44 - 34.62)	4.97 ± 3.41 (2.83 - 7.47)	-2.89,12.84	0.182	(33.70 - 46.74) [25.94,55.67]
Mineral						
Calcium (% DW)	0.17 ± 0.0084 (0.16 - 0.18)	0.16 ± 0.0084 (0.13 - 0.17)	0.010 ± 0.012 (-0.017 - 0.049)	-0.017,0.038	0.415	(0.11 - 0.29) [0.016,0.38]
Phosphorus (% DW)	0.25 ± 0.023 (0.23 - 0.28)	0.17 ± 0.023 (0.15 - 0.21)	0.080 ± 0.032 (0.024 - 0.13)	0.0064,0.15	0.036	(0.14 - 0.25) [0.071,0.32]
Proximate						
Ash (% DW)	3.20 ± 0.29 (2.93 - 3.38)	4.39 ± 0.29 (3.30 - 5.10)	-1.19 ± 0.42 (-1.72 - -0.37)	-2.15,-0.23	0.021	(3.40 - 5.45) [1.93,6.31]
Carbohydrates (% DW)	88.16 ± 0.65 (86.86 - 88.84)	84.98 ± 0.65 (84.36 - 85.29)	3.18 ± 0.82 (1.57 - 4.41)	1.29,5.07	0.004	(84.88 - 88.39) [83.05,90.74]
Moisture (% FW)	71.73 ± 1.01 (69.70 - 74.30)	72.23 ± 1.01 (70.10 - 74.70)	-0.50 ± 1.31 (-3.50 - 4.20)	-3.51,2.51	0.711	(64.90 - 77.40) [57.62,86.45]
Protein (% DW)	7.03 ± 0.38 (6.34 - 7.52)	8.02 ± 0.38 (7.63 - 8.66)	-0.99 ± 0.54 (-2.32 - -0.23)	-2.23,0.25	0.104	(6.58 - 8.82) [4.78,10.38]
Total Fat (% DW)	1.61 ± 0.43 (0.63 - 2.33)	2.62 ± 0.43 (2.18 - 2.91)	-1.00 ± 0.46 (-2.28 - 0.15)	-2.05,0.049	0.059	(0.58 - 3.11) [0,4.54]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 9. Statistical Summary of Site 4 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Alanine (% DW)	0.73 ± 0.023 (0.64 - 0.78)	0.77 ± 0.023 (0.76 - 0.78)	-0.043 ± 0.033 (-0.13 - 0.0071)	-0.12,0.032	0.223	(0.67 - 0.96) [0.48,1.08]
Arginine (% DW)	0.44 ± 0.018 (0.38 - 0.48)	0.47 ± 0.018 (0.46 - 0.48)	-0.028 ± 0.025 (-0.090 - 0.010)	-0.085,0.029	0.289	(0.37 - 0.49) [0.33,0.56]
Aspartic acid (% DW)	0.63 ± 0.020 (0.56 - 0.67)	0.67 ± 0.020 (0.66 - 0.68)	-0.041 ± 0.028 (-0.11 - -0.0031)	-0.11,0.024	0.182	(0.57 - 0.77) [0.43,0.90]
Cystine (% DW)	0.24 ± 0.0042 (0.23 - 0.25)	0.24 ± 0.0042 (0.23 - 0.25)	0.00021 ± 0.0060 (-0.012 - 0.012)	-0.014,0.014	0.973	(0.20 - 0.24) [0.18,0.27]
Glutamic acid (% DW)	1.86 ± 0.062 (1.63 - 2.01)	1.99 ± 0.062 (1.96 - 2.00)	-0.12 ± 0.088 (-0.33 - 0.011)	-0.33,0.080	0.200	(1.71 - 2.41) [1.25,2.75]
Glycine (% DW)	0.36 ± 0.012 (0.32 - 0.39)	0.38 ± 0.012 (0.38 - 0.39)	-0.023 ± 0.017 (-0.067 - 0.00013)	-0.061,0.016	0.212	(0.32 - 0.40) [0.28,0.46]
Histidine (% DW)	0.29 ± 0.0094 (0.25 - 0.32)	0.31 ± 0.0094 (0.30 - 0.31)	-0.016 ± 0.013 (-0.050 - 0.0033)	-0.046,0.015	0.266	(0.26 - 0.33) [0.22,0.38]
Isoleucine (% DW)	0.34 ± 0.012 (0.30 - 0.37)	0.36 ± 0.012 (0.36 - 0.36)	-0.019 ± 0.017 (-0.056 - 0.0027)	-0.057,0.020	0.294	(0.32 - 0.45) [0.23,0.51]

Table 9. Statistical Summary of Site 4 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)		p-Value	Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)		
Amino Acid (% DW)						
Leucine (% DW)	1.25 ± 0.040 (1.09 - 1.33)	1.33 ± 0.040 (1.30 - 1.35)	-0.080 ± 0.057 (-0.21 - -0.015)	-0.21,0.051	0.195	(1.14 - 1.68) [0.77,1.92]
Lysine (% DW)	0.30 ± 0.013 (0.26 - 0.32)	0.31 ± 0.013 (0.31 - 0.32)	-0.018 ± 0.018 (-0.056 - 0.0089)	-0.060,0.024	0.349	(0.24 - 0.34) [0.20,0.40]
Methionine (% DW)	0.23 ± 0.0038 (0.22 - 0.24)	0.23 ± 0.0038 (0.22 - 0.24)	-0.0036 ± 0.0054 (-0.014 - 0.0072)	-0.016,0.0090	0.528	(0.17 - 0.22) [0.14,0.25]
Phenylalanine (% DW)	0.49 ± 0.016 (0.43 - 0.52)	0.52 ± 0.016 (0.51 - 0.53)	-0.030 ± 0.023 (-0.080 - -0.0037)	-0.083,0.023	0.231	(0.45 - 0.65) [0.32,0.73]
Proline (% DW)	0.90 ± 0.028 (0.79 - 0.97)	0.94 ± 0.028 (0.93 - 0.96)	-0.043 ± 0.040 (-0.15 - 0.012)	-0.14,0.049	0.314	(0.83 - 1.11) [0.68,1.21]
Serine (% DW)	0.49 ± 0.014 (0.44 - 0.54)	0.52 ± 0.014 (0.52 - 0.53)	-0.031 ± 0.020 (-0.087 - 0.0053)	-0.077,0.015	0.160	(0.45 - 0.62) [0.34,0.71]
Threonine (% DW)	0.31 ± 0.011 (0.27 - 0.34)	0.34 ± 0.011 (0.33 - 0.35)	-0.024 ± 0.015 (-0.052 - -0.00037)	-0.058,0.011	0.155	(0.29 - 0.37) [0.24,0.41]
Tryptophan (% DW)	0.054 ± 0.0020 (0.051 - 0.056)	0.055 ± 0.0020 (0.052 - 0.057)	-0.00057 ± 0.0029 (-0.0032 - 0.0035)	-0.0072,0.0060	0.846	(0.043 - 0.059) [0.032,0.072]

Table 9. Statistical Summary of Site 4 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Tyrosine (% DW)	0.36 ± 0.011 (0.32 - 0.38)	0.39 ± 0.011 (0.38 - 0.40)	-0.029 ± 0.016 (-0.066 - -0.0014)	-0.065,0.0073	0.103	(0.25 - 0.40) [0.17,0.52]
Valine (% DW)	0.46 ± 0.016 (0.40 - 0.49)	0.48 ± 0.016 (0.48 - 0.49)	-0.026 ± 0.022 (-0.084 - 0.0093)	-0.078,0.026	0.277	(0.42 - 0.55) [0.35,0.62]
Fatty Acid (% Total FA)						
16:0 Palmitic (% Total FA)	9.26 ± 0.050 (9.14 - 9.35)	9.23 ± 0.050 (9.19 - 9.29)	0.037 ± 0.071 (-0.051 - 0.14)	-0.13,0.20	0.619	(9.10 - 12.55) [6.12,15.67]
16:1 Palmitoleic (% Total FA)	0.14 ± 0.010 (0.13 - 0.14)	0.14 ± 0.010 (0.13 - 0.14)	0.00086 ± 0.015 (-0.00036 - 0.0019)	-0.033,0.035	0.954	(0.050 - 0.19) [0,0.28]
18:0 Stearic (% Total FA)	1.88 ± 0.019 (1.86 - 1.89)	1.85 ± 0.019 (1.82 - 1.87)	0.029 ± 0.027 (0.021 - 0.034)	-0.033,0.090	0.318	(1.57 - 2.45) [0.86,2.98]
18:1 Oleic (% Total FA)	25.60 ± 0.23 (25.42 - 25.75)	25.59 ± 0.23 (24.96 - 25.98)	0.0060 ± 0.28 (-0.41 - 0.66)	-0.63,0.64	0.983	(21.17 - 35.33) [7.51,46.46]
18:2 Linoleic (% Total FA)	61.12 ± 0.24 (60.85 - 61.27)	61.19 ± 0.24 (60.77 - 61.91)	-0.071 ± 0.32 (-0.64 - 0.35)	-0.82,0.67	0.830	(50.33 - 63.59) [39.41,76.74]
18:3 Linolenic (% Total FA)	1.18 ± 0.020 (1.17 - 1.18)	1.19 ± 0.020 (1.16 - 1.20)	-0.0096 ± 0.022 (-0.031 - 0.019)	-0.059,0.040	0.669	(0.93 - 1.52) [0.63,1.77]

Table 9. Statistical Summary of Site 4 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean \pm S.E. (Range)	Control Mean \pm S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int.¹]
			Mean \pm S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fatty Acid (% Total FA)						
20:0 Arachidic (% Total FA)	0.38 \pm 0.0020 (0.38 - 0.39)	0.38 \pm 0.0020 (0.38 - 0.39)	0.0039 \pm 0.0023 (0.00019 - 0.0078)	-0.0014,0.0091	0.130	(0.32 - 0.47) [0.23,0.54]
20:1 Eicosenoic (% Total FA)	0.28 \pm 0.0012 (0.28 - 0.28)	0.29 \pm 0.0012 (0.28 - 0.29)	-0.0043 \pm 0.0016 (-0.0071 - -0.0018)	-0.0081,-0.00052	0.030	(0.23 - 0.32) [0.15,0.39]
22:0 Behenic (% Total FA)	0.17 \pm 0.016 (0.15 - 0.18)	0.16 \pm 0.016 (0.13 - 0.18)	0.0092 \pm 0.018 (-0.0098 - 0.022)	-0.031,0.050	0.612	(0.12 - 0.19) [0.081,0.23]
Fiber						
Acid Detergent Fiber (% DW)	5.55 \pm 0.41 (5.06 - 5.94)	5.41 \pm 0.41 (5.28 - 5.49)	0.14 \pm 0.58 (-0.43 - 0.49)	-1.19,1.47	0.817	(4.11 - 6.33) [2.77,7.56]
Neutral Detergent Fiber (% DW)	10.52 \pm 0.42 (10.43 - 10.69)	9.05 \pm 0.42 (8.64 - 9.38)	1.47 \pm 0.55 (1.07 - 2.05)	0.20,2.75	0.028	(8.20 - 11.30) [5.93,13.63]
Total Dietary Fiber (% DW)	16.51 \pm 0.66 (16.27 - 16.76)	15.63 \pm 0.66 (15.07 - 16.69)	0.88 \pm 0.93 (-0.17 - 1.63)	-1.26,3.03	0.368	(12.99 - 18.03) [9.20,20.27]
Mineral						
Calcium (% DW)	0.0050 \pm 0.00016 (0.0048 - 0.0054)	0.0050 \pm 0.00016 (0.0047 - 0.0051)	0.00008 \pm 0.00023 (-0.00024 - 0.00064)	-0.00044,0.00061	0.722	(0.0031 - 0.0049) [0.0016,0.0059]
Copper (mg/kg DW)	2.15 \pm 0.13 (1.92 - 2.38)	1.67 \pm 0.11 (1.54 - 1.75)	0.48 \pm 0.17 (0.38 - 0.63)	0.086,0.87	0.023	(1.15 - 3.56) [0,4.20]

Table 9. Statistical Summary of Site 4 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean \pm S.E. (Range)	Control Mean \pm S.E. (Range)	Difference(Test minus Control)		p-Value	Commercial (Range) [99% Tolerance Int. ¹]
			Mean \pm S.E. (Range)	95% CI (Lower,Upper)		
Mineral						
Iron (mg/kg DW)	21.47 \pm 0.93 (19.45 - 25.23)	20.02 \pm 0.93 (19.33 - 20.71)	1.45 \pm 1.32 (-0.98 - 5.90)	-1.60,4.49	0.304	(18.04 - 29.22) [8.88,34.51]
Magnesium (% DW)	0.10 \pm 0.0038 (0.10 - 0.11)	0.11 \pm 0.0038 (0.11 - 0.12)	-0.0075 \pm 0.0047 (-0.018 - 0.0036)	-0.018,0.0032	0.145	(0.099 - 0.14) [0.075,0.17]
Manganese (mg/kg DW)	6.85 \pm 0.33 (6.45 - 7.45)	7.11 \pm 0.33 (6.66 - 8.00)	-0.26 \pm 0.47 (-1.54 - 0.78)	-1.35,0.82	0.590	(5.56 - 8.64) [3.17,9.99]
Phosphorus (% DW)	0.29 \pm 0.010 (0.27 - 0.31)	0.30 \pm 0.010 (0.29 - 0.31)	-0.011 \pm 0.012 (-0.038 - 0.016)	-0.038,0.016	0.357	(0.25 - 0.37) [0.18,0.45]
Potassium (% DW)	0.34 \pm 0.0082 (0.32 - 0.37)	0.35 \pm 0.0082 (0.34 - 0.35)	-0.0086 \pm 0.0087 (-0.029 - 0.014)	-0.029,0.012	0.352	(0.32 - 0.40) [0.26,0.46]
Zinc (mg/kg DW)	21.39 \pm 0.80 (20.07 - 23.74)	22.46 \pm 0.80 (21.75 - 23.44)	-1.07 \pm 1.14 (-3.37 - 1.53)	-3.69,1.54	0.371	(16.72 - 34.04) [7.16,38.55]
Proximate						
Ash (% DW)	1.34 \pm 0.042 (1.25 - 1.38)	1.35 \pm 0.042 (1.30 - 1.40)	-0.013 \pm 0.059 (-0.043 - 0.030)	-0.15,0.12	0.826	(1.12 - 1.62) [0.74,1.96]
Carbohydrates (% DW)	85.11 \pm 0.22 (84.99 - 85.29)	85.11 \pm 0.22 (84.75 - 85.31)	-0.0055 \pm 0.31 (-0.28 - 0.28)	-0.73,0.72	0.986	(82.91 - 86.78) [81.08,88.80]

Table 9. Statistical Summary of Site 4 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Proximate						
Moisture (% FW)	12.40 ± 0.27 (12.10 - 12.80)	12.77 ± 0.27 (12.10 - 13.10)	-0.37 ± 0.38 (-1.00 - 0.20)	-1.23,0.50	0.357	(7.60 - 15.30) [0.45,19.52]
Protein (% DW)	10.31 ± 0.15 (10.26 - 10.35)	10.39 ± 0.15 (10.33 - 10.49)	-0.078 ± 0.21 (-0.19 - 0.019)	-0.57,0.42	0.725	(9.33 - 11.82) [7.54,13.13]
Total Fat (% DW)	3.25 ± 0.12 (3.19 - 3.28)	3.15 ± 0.12 (3.05 - 3.35)	0.097 ± 0.16 (-0.069 - 0.23)	-0.27,0.47	0.562	(2.66 - 3.71) [2.20,4.55]
Vitamin						
Folic Acid (mg/kg DW)	0.27 ± 0.017 (0.26 - 0.28)	0.26 ± 0.017 (0.23 - 0.29)	0.0069 ± 0.020 (-0.012 - 0.045)	-0.040,0.053	0.740	(0.13 - 0.45) [0.012,0.69]
Niacin (mg/kg DW)	31.47 ± 0.86 (30.39 - 33.52)	30.38 ± 0.86 (30.26 - 30.49)	1.09 ± 1.21 (-0.10 - 3.15)	-1.70,3.88	0.394	(16.17 - 29.19) [6.97,37.83]
Vitamin B1 (mg/kg DW)	3.20 ± 0.13 (3.07 - 3.44)	2.98 ± 0.13 (2.76 - 3.22)	0.22 ± 0.18 (-0.15 - 0.68)	-0.21,0.64	0.274	(2.19 - 5.60) [0.37,6.35]
Vitamin B2 (mg/kg DW)	1.25 ± 0.065 (1.24 - 1.26)	1.45 ± 0.065 (1.30 - 1.55)	-0.20 ± 0.092 (-0.30 - -0.049)	-0.41,0.017	0.066	(1.34 - 1.91) [0.91,2.30]
Vitamin B6 (mg/kg DW)	6.36 ± 0.29 (6.15 - 6.47)	6.02 ± 0.29 (5.37 - 6.44)	0.34 ± 0.39 (-0.088 - 1.10)	-0.57,1.25	0.412	(5.08 - 7.47) [3.12,9.30]

Table 9. Statistical Summary of Site 4 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Vitamin						
Vitamin E (mg/kg DW)	6.88 ± 0.55 (6.19 - 7.28)	6.95 ± 0.55 (6.73 - 7.23)	-0.074 ± 0.74 (-1.04 - 0.55)	-1.78,1.63	0.923	(2.71 - 13.94) [0,20.49]
Antinutrient						
Phytic Acid (% DW)	0.60 ± 0.058 (0.53 - 0.73)	0.61 ± 0.058 (0.56 - 0.68)	-0.0070 ± 0.077 (-0.15 - 0.14)	-0.18,0.17	0.929	(0.50 - 0.94) [0.21,1.22]
Secondary Metabolite						
Ferulic Acid (µg/g DW)	2119.34 ± 94.97 (2041.28 - 2200.68)	2090.08 ± 94.97 (2071.35 - 2116.04)	29.26 ± 134.31 (-30.06 - 84.64)	-280.47,338.99	0.833	(1412.68 - 2297.36) [1136.69,2806.24]
p-Coumaric Acid (µg/g DW)	196.33 ± 6.94 (184.63 - 212.09)	177.32 ± 6.94 (172.92 - 180.67)	19.01 ± 9.81 (6.27 - 39.16)	-3.62,41.64	0.088	(99.30 - 285.75) [0,378.57]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 10. Statistical Summary of Site 5 Maize Forage Fiber, Calcium, Phosphorus, and Proximate Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int.¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fiber						
Acid Detergent Fiber (% DW)	31.31 ± 1.70 (26.92 - 34.93)	23.58 ± 1.70 (23.06 - 24.48)	7.73 ± 2.40 (3.72 - 10.45)	2.20,13.26	0.012	(26.72 - 38.94) [16.76,43.76]
Neutral Detergent Fiber (% DW)	43.21 ± 2.11 (40.07 - 46.82)	37.87 ± 2.11 (35.06 - 41.38)	5.34 ± 1.98 (5.00 - 5.58)	0.78,9.90	0.027	(33.70 - 46.74) [25.94,55.67]
Mineral						
Calcium (% DW)	0.18 ± 0.014 (0.17 - 0.21)	0.15 ± 0.014 (0.14 - 0.17)	0.030 ± 0.018 (-0.0023 - 0.063)	-0.011,0.071	0.131	(0.11 - 0.29) [0.016,0.38]
Phosphorus (% DW)	0.27 ± 0.019 (0.24 - 0.32)	0.22 ± 0.019 (0.22 - 0.23)	0.049 ± 0.027 (0.0094 - 0.10)	-0.012,0.11	0.102	(0.14 - 0.25) [0.071,0.32]
Proximate						
Ash (% DW)	3.19 ± 0.29 (2.51 - 3.61)	2.97 ± 0.29 (2.59 - 3.38)	0.22 ± 0.39 (-0.87 - 0.86)	-0.67,1.12	0.582	(3.40 - 5.45) [1.93,6.31]
Carbohydrates (% DW)	87.86 ± 0.91 (85.66 - 89.13)	87.82 ± 0.91 (86.94 - 88.77)	0.037 ± 0.85 (-1.28 - 1.03)	-1.93,2.00	0.966	(84.88 - 88.39) [83.05,90.74]
Moisture (% FW)	71.33 ± 1.21 (70.10 - 73.10)	69.93 ± 1.21 (69.20 - 71.00)	1.40 ± 1.40 (-0.90 - 3.50)	-1.84,4.64	0.348	(64.90 - 77.40) [57.62,86.45]
Protein (% DW)	7.50 ± 0.49 (6.65 - 8.49)	7.50 ± 0.49 (7.30 - 7.79)	0.0046 ± 0.67 (-0.65 - 0.70)	-1.53,1.54	0.994	(6.58 - 8.82) [4.78,10.38]
Total Fat (% DW)	1.45 ± 0.42 (0.77 - 2.23)	1.71 ± 0.42 (1.34 - 2.32)	-0.26 ± 0.38 (-0.57 - -0.093)	-1.14,0.61	0.507	(0.58 - 3.11) [0,4.54]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 11. Statistical Summary of Site 5 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Alanine (% DW)	0.86 ± 0.023 (0.82 - 0.89)	0.87 ± 0.023 (0.86 - 0.89)	-0.018 ± 0.027 (-0.069 - 0.023)	-0.081,0.045	0.534	(0.67 - 0.96) [0.48,1.08]
Arginine (% DW)	0.51 ± 0.010 (0.50 - 0.52)	0.50 ± 0.010 (0.49 - 0.51)	0.011 ± 0.014 (0.0046 - 0.016)	-0.021,0.044	0.443	(0.37 - 0.49) [0.33,0.56]
Aspartic acid (% DW)	0.74 ± 0.019 (0.73 - 0.76)	0.74 ± 0.019 (0.72 - 0.76)	0.00048 ± 0.026 (-0.038 - 0.039)	-0.060,0.061	0.985	(0.57 - 0.77) [0.43,0.90]
Cystine (% DW)	0.24 ± 0.0060 (0.23 - 0.25)	0.24 ± 0.0060 (0.24 - 0.25)	-0.0014 ± 0.0059 (-0.014 - 0.0076)	-0.015,0.012	0.817	(0.20 - 0.24) [0.18,0.27]
Glutamic acid (% DW)	2.20 ± 0.063 (2.10 - 2.29)	2.21 ± 0.063 (2.18 - 2.26)	-0.015 ± 0.078 (-0.16 - 0.10)	-0.19,0.16	0.852	(1.71 - 2.41) [1.25,2.75]
Glycine (% DW)	0.41 ± 0.0072 (0.40 - 0.41)	0.40 ± 0.0072 (0.40 - 0.41)	0.0035 ± 0.010 (-0.0074 - 0.015)	-0.020,0.027	0.741	(0.32 - 0.40) [0.28,0.46]
Histidine (% DW)	0.34 ± 0.0072 (0.33 - 0.35)	0.33 ± 0.0072 (0.33 - 0.34)	0.0036 ± 0.0080 (-0.0083 - 0.014)	-0.015,0.022	0.664	(0.26 - 0.33) [0.22,0.38]
Isoleucine (% DW)	0.42 ± 0.011 (0.41 - 0.43)	0.42 ± 0.011 (0.41 - 0.42)	0.0013 ± 0.014 (-0.0052 - 0.0063)	-0.032,0.035	0.930	(0.32 - 0.45) [0.23,0.51]

Table 11. Statistical Summary of Site 5 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean \pm S.E. (Range)	Control Mean \pm S.E. (Range)	Difference(Test minus Control)		p-Value	Commercial (Range) [99% Tolerance Int. ¹]
			Mean \pm S.E. (Range)	95% CI (Lower,Upper)		
Amino Acid (% DW)						
Leucine (% DW)	1.50 \pm 0.050 (1.41 - 1.57)	1.53 \pm 0.050 (1.51 - 1.55)	-0.032 \pm 0.055 (-0.13 - 0.044)	-0.16,0.096	0.582	(1.14 - 1.68) [0.77,1.92]
Lysine (% DW)	0.35 \pm 0.0073 (0.35 - 0.35)	0.35 \pm 0.0073 (0.34 - 0.36)	0.0018 \pm 0.010 (-0.012 - 0.011)	-0.022,0.026	0.864	(0.24 - 0.34) [0.20,0.40]
Methionine (% DW)	0.24 \pm 0.0066 (0.23 - 0.24)	0.23 \pm 0.0066 (0.23 - 0.24)	0.0062 \pm 0.0054 (-0.0037 - 0.017)	-0.0063,0.019	0.284	(0.17 - 0.22) [0.14,0.25]
Phenylalanine (% DW)	0.58 \pm 0.018 (0.55 - 0.61)	0.59 \pm 0.018 (0.58 - 0.60)	-0.0084 \pm 0.020 (-0.054 - 0.032)	-0.055,0.039	0.692	(0.45 - 0.65) [0.32,0.73]
Proline (% DW)	0.95 \pm 0.026 (0.90 - 1.00)	0.97 \pm 0.026 (0.96 - 0.98)	-0.016 \pm 0.028 (-0.064 - 0.026)	-0.081,0.050	0.598	(0.83 - 1.11) [0.68,1.21]
Serine (% DW)	0.56 \pm 0.016 (0.54 - 0.59)	0.57 \pm 0.016 (0.55 - 0.60)	-0.010 \pm 0.023 (-0.052 - 0.034)	-0.063,0.043	0.664	(0.45 - 0.62) [0.34,0.71]
Threonine (% DW)	0.33 \pm 0.012 (0.30 - 0.35)	0.34 \pm 0.012 (0.33 - 0.35)	-0.0095 \pm 0.014 (-0.032 - 0.012)	-0.042,0.023	0.524	(0.29 - 0.37) [0.24,0.41]
Tryptophan (% DW)	0.060 \pm 0.0015 (0.055 - 0.064)	0.058 \pm 0.0015 (0.057 - 0.059)	0.0016 \pm 0.0021 (-0.0038 - 0.0072)	-0.0031,0.0064	0.449	(0.043 - 0.059) [0.032,0.072]

Table 11. Statistical Summary of Site 5 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Tyrosine (% DW)	0.35 ± 0.051 (0.22 - 0.42)	0.37 ± 0.051 (0.25 - 0.42)	-0.022 ± 0.071 (-0.21 - 0.14)	-0.19,0.14	0.764	(0.25 - 0.40) [0.17,0.52]
Valine (% DW)	0.54 ± 0.013 (0.53 - 0.55)	0.54 ± 0.013 (0.53 - 0.55)	0.0068 ± 0.016 (-0.015 - 0.021)	-0.030,0.044	0.682	(0.42 - 0.55) [0.35,0.62]
Fatty Acid (% Total FA)						
16:0 Palmitic (% Total FA)	9.00 ± 0.026 (8.98 - 9.03)	8.97 ± 0.026 (8.94 - 9.01)	0.022 ± 0.037 (-0.032 - 0.064)	-0.065,0.11	0.575	(9.10 - 12.55) [6.12,15.67]
16:1 Palmitoleic (% Total FA)	0.13 ± 0.014 (0.13 - 0.14)	0.11 ± 0.014 (0.048 - 0.14)	0.026 ± 0.018 (-0.0012 - 0.079)	-0.015,0.067	0.177	(0.050 - 0.19) [0,0.28]
18:0 Stearic (% Total FA)	1.84 ± 0.012 (1.82 - 1.86)	1.81 ± 0.012 (1.80 - 1.82)	0.031 ± 0.016 (0.017 - 0.059)	-0.0058,0.068	0.087	(1.57 - 2.45) [0.86,2.98]
18:1 Oleic (% Total FA)	24.07 ± 0.29 (23.38 - 24.53)	24.28 ± 0.29 (23.98 - 24.85)	-0.22 ± 0.38 (-1.48 - 0.51)	-1.10,0.67	0.588	(21.17 - 35.33) [7.51,46.46]
18:2 Linoleic (% Total FA)	62.98 ± 0.30 (62.56 - 63.61)	62.86 ± 0.30 (62.37 - 63.16)	0.12 ± 0.37 (-0.60 - 1.24)	-0.74,0.98	0.762	(50.33 - 63.59) [39.41,76.74]
18:3 Linolenic (% Total FA)	1.15 ± 0.012 (1.13 - 1.17)	1.16 ± 0.012 (1.15 - 1.18)	-0.0082 ± 0.015 (-0.049 - 0.016)	-0.042,0.026	0.596	(0.93 - 1.52) [0.63,1.77]

Table 11. Statistical Summary of Site 5 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int.¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fatty Acid (% Total FA)						
20:0 Arachidic (% Total FA)	0.38 ± 0.0033 (0.38 - 0.39)	0.37 ± 0.0033 (0.37 - 0.38)	0.012 ± 0.0046 (0.0058 - 0.022)	0.00099,0.022	0.035	(0.32 - 0.47) [0.23,0.54]
20:1 Eicosenoic (% Total FA)	0.28 ± 0.0021 (0.28 - 0.28)	0.28 ± 0.0021 (0.27 - 0.28)	0.0038 ± 0.0029 (0.0022 - 0.0049)	-0.0027,0.010	0.215	(0.23 - 0.32) [0.15,0.39]
22:0 Behenic (% Total FA)	0.17 ± 0.012 (0.15 - 0.20)	0.16 ± 0.012 (0.14 - 0.17)	0.013 ± 0.012 (-0.0020 - 0.029)	-0.015,0.040	0.311	(0.12 - 0.19) [0.081,0.23]
Fiber						
Acid Detergent Fiber (% DW)	5.99 ± 0.52 (5.33 - 7.24)	5.27 ± 0.52 (4.17 - 6.22)	0.72 ± 0.74 (-0.84 - 3.07)	-0.98,2.42	0.358	(4.11 - 6.33) [2.77,7.56]
Neutral Detergent Fiber (% DW)	9.48 ± 0.42 (8.87 - 9.79)	8.87 ± 0.42 (8.57 - 9.44)	0.61 ± 0.59 (0.26 - 1.22)	-0.75,1.96	0.334	(8.20 - 11.30) [5.93,13.63]
Total Dietary Fiber (% DW)	14.34 ± 0.34 (13.80 - 14.94)	13.82 ± 0.34 (13.50 - 14.32)	0.52 ± 0.24 (0.30 - 0.65)	-0.035,1.07	0.062	(12.99 - 18.03) [9.20,20.27]
Mineral						
Calcium (% DW)	0.0049 ± 0.00016 (0.0048 - 0.0049)	0.0046 ± 0.00016 (0.0045 - 0.0047)	0.00026 ± 0.00023 (0.00013 - 0.00037)	-0.00027,0.00079	0.288	(0.0031 - 0.0049) [0.0016,0.0059]
Copper (mg/kg DW)	1.35 ± 0.65 (1.33 - 1.39)	2.68 ± 0.65 (1.84 - 4.29)	-1.32 ± 0.86 (-2.96 - -0.51)	-3.31,0.66	0.163	(1.15 - 3.56) [0,4.20]

Table 11. Statistical Summary of Site 5 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)		p-Value	Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)		
Mineral						
Iron (mg/kg DW)	21.37 ± 0.84 (20.59 - 21.76)	25.74 ± 0.84 (22.83 - 28.26)	-4.38 ± 1.19 (-6.50 - -2.24)	-7.12,-1.63	0.006	(18.04 - 29.22) [8.88,34.51]
Magnesium (% DW)	0.13 ± 0.0024 (0.13 - 0.14)	0.13 ± 0.0024 (0.13 - 0.14)	-0.0014 ± 0.0028 (-0.0046 - 0.00096)	-0.0080,0.0052	0.636	(0.099 - 0.14) [0.075,0.17]
Manganese (mg/kg DW)	6.56 ± 0.17 (6.09 - 6.85)	6.52 ± 0.17 (6.38 - 6.66)	0.039 ± 0.17 (-0.29 - 0.32)	-0.34,0.42	0.817	(5.56 - 8.64) [3.17,9.99]
Phosphorus (% DW)	0.35 ± 0.0055 (0.34 - 0.36)	0.35 ± 0.0055 (0.35 - 0.36)	-0.00071 ± 0.0067 (-0.011 - 0.0058)	-0.016,0.015	0.917	(0.25 - 0.37) [0.18,0.45]
Potassium (% DW)	0.36 ± 0.0041 (0.35 - 0.36)	0.35 ± 0.0041 (0.35 - 0.35)	0.0040 ± 0.0058 (-0.0029 - 0.011)	-0.0092,0.017	0.503	(0.32 - 0.40) [0.26,0.46]
Zinc (mg/kg DW)	22.13 ± 0.55 (21.25 - 22.95)	22.25 ± 0.55 (21.76 - 22.92)	-0.11 ± 0.78 (-0.81 - 1.19)	-1.90,1.68	0.889	(16.72 - 34.04) [7.16,38.55]
Proximate						
Ash (% DW)	1.43 ± 0.048 (1.37 - 1.53)	1.44 ± 0.048 (1.31 - 1.51)	-0.0025 ± 0.055 (-0.099 - 0.063)	-0.13,0.12	0.964	(1.12 - 1.62) [0.74,1.96]
Carbohydrates (% DW)	84.26 ± 0.19 (83.99 - 84.59)	83.80 ± 0.19 (83.58 - 84.03)	0.46 ± 0.14 (0.41 - 0.56)	0.15,0.78	0.009	(82.91 - 86.78) [81.08,88.80]

Table 11. Statistical Summary of Site 5 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Proximate						
Moisture (% FW)	8.89 ± 0.10 (8.71 - 9.01)	8.60 ± 0.10 (8.36 - 8.89)	0.29 ± 0.14 (-0.18 - 0.65)	-0.039,0.61	0.076	(7.60 - 15.30) [0.45,19.52]
Protein (% DW)	11.15 ± 0.20 (10.83 - 11.43)	11.31 ± 0.20 (11.15 - 11.52)	-0.15 ± 0.25 (-0.69 - 0.19)	-0.72,0.42	0.558	(9.33 - 11.82) [7.54,13.13]
Total Fat (% DW)	3.15 ± 0.098 (3.05 - 3.21)	3.46 ± 0.098 (3.14 - 3.68)	-0.31 ± 0.14 (-0.50 - 0.070)	-0.63,0.0082	0.054	(2.66 - 3.71) [2.20,4.55]
Vitamin						
Folic Acid (mg/kg DW)	0.39 ± 0.025 (0.32 - 0.48)	0.35 ± 0.025 (0.32 - 0.37)	0.041 ± 0.035 (-0.043 - 0.11)	-0.040,0.12	0.276	(0.13 - 0.45) [0.012,0.69]
Niacin (mg/kg DW)	26.78 ± 0.70 (25.72 - 28.00)	25.71 ± 0.70 (24.93 - 26.19)	1.07 ± 0.90 (-0.47 - 3.07)	-1.00,3.14	0.268	(16.17 - 29.19) [6.97,37.83]
Vitamin B1 (mg/kg DW)	3.11 ± 0.49 (2.96 - 3.40)	2.99 ± 0.49 (2.85 - 3.06)	0.12 ± 0.69 (-0.088 - 0.34)	-1.47,1.71	0.866	(2.19 - 5.60) [0.37,6.35]
Vitamin B2 (mg/kg DW)	1.52 ± 0.089 (1.44 - 1.61)	1.39 ± 0.089 (1.16 - 1.52)	0.13 ± 0.13 (-0.038 - 0.45)	-0.16,0.42	0.322	(1.34 - 1.91) [0.91,2.30]
Vitamin B6 (mg/kg DW)	5.68 ± 0.30 (5.28 - 6.00)	6.11 ± 0.30 (5.95 - 6.38)	-0.43 ± 0.43 (-0.72 - -0.19)	-1.42,0.56	0.348	(5.08 - 7.47) [3.12,9.30]

Table 11. Statistical Summary of Site 5 Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Vitamin						
Vitamin E (mg/kg DW)	6.83 ± 0.81 (5.55 - 8.62)	8.01 ± 0.81 (6.35 - 9.02)	-1.18 ± 1.15 (-2.35 - -0.40)	-3.82,1.46	0.331	(2.71 - 13.94) [0,20.49]
Antinutrient						
Phytic Acid (% DW)	0.85 ± 0.018 (0.85 - 0.86)	0.86 ± 0.018 (0.83 - 0.88)	-0.010 ± 0.023 (-0.031 - 0.025)	-0.064,0.044	0.676	(0.50 - 0.94) [0.21,1.22]
Secondary Metabolite						
Ferulic Acid (µg/g DW)	2026.73 ± 69.44 (1954.76 - 2092.23)	1932.90 ± 69.44 (1898.73 - 1979.22)	93.82 ± 91.31 (-24.47 - 171.48)	-116.73,304.37	0.334	(1412.68 - 2297.36) [1136.69,2806.24]
p-Coumaric Acid (µg/g DW)	218.38 ± 10.54 (187.79 - 253.04)	185.63 ± 10.54 (182.20 - 189.17)	32.75 ± 12.71 (-1.39 - 70.84)	3.44,62.07	0.032	(99.30 - 285.75) [0,378.57]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 12. Statistical Summary of Combined Site Maize Forage Fiber, Calcium, Phosphorus, and Proximate Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int.¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fiber						
Acid Detergent Fiber (% DW)	28.95 ± 1.69 (22.60 - 35.85)	27.26 ± 1.69 (19.93 - 35.59)	1.69 ± 1.18 (-6.22 - 10.45)	-0.81,4.19	0.170	(26.72 - 38.94) [16.76,43.76]
Neutral Detergent Fiber (% DW)	39.69 ± 1.32 (33.99 - 46.82)	37.60 ± 1.32 (31.44 - 43.96)	2.09 ± 1.40 (-3.47 - 7.47)	-0.88,5.05	0.155	(33.70 - 46.74) [25.94,55.67]
Mineral						
Calcium (% DW)	0.20 ± 0.019 (0.16 - 0.24)	0.19 ± 0.019 (0.13 - 0.28)	0.0066 ± 0.011 (-0.036 - 0.063)	-0.017,0.031	0.569	(0.11 - 0.29) [0.016,0.38]
Phosphorus (% DW)	0.25 ± 0.011 (0.22 - 0.32)	0.21 ± 0.011 (0.15 - 0.25)	0.040 ± 0.014 (-0.0019 - 0.13)	0.011,0.069	0.010	(0.14 - 0.25) [0.071,0.32]
Proximate						
Ash (% DW)	3.70 ± 0.27 (2.51 - 4.67)	3.90 ± 0.27 (2.59 - 5.10)	-0.20 ± 0.21 (-1.72 - 0.97)	-0.65,0.25	0.356	(3.40 - 5.45) [1.93,6.31]
Carbohydrates (% DW)	86.90 ± 0.43 (84.93 - 89.13)	86.69 ± 0.43 (84.36 - 89.57)	0.21 ± 0.53 (-4.23 - 4.41)	-0.91,1.33	0.697	(84.88 - 88.39) [83.05,90.74]
Moisture (% FW)	72.20 ± 1.35 (68.50 - 75.40)	71.53 ± 1.35 (65.90 - 76.80)	0.67 ± 0.52 (-3.50 - 4.20)	-0.44,1.77	0.220	(64.90 - 77.40) [57.62,86.45]
Protein (% DW)	7.82 ± 0.27 (6.34 - 8.98)	7.70 ± 0.27 (6.06 - 8.87)	0.13 ± 0.26 (-2.32 - 2.35)	-0.43,0.68	0.635	(6.58 - 8.82) [4.78,10.38]
Total Fat (% DW)	1.57 ± 0.24 (0.63 - 3.17)	1.71 ± 0.24 (0.77 - 2.91)	-0.13 ± 0.23 (-2.28 - 1.95)	-0.59,0.32	0.558	(0.58 - 3.11) [0,4.54]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 13. Statistical Summary of Combined Site Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Alanine (% DW)	0.77 ± 0.039 (0.64 - 0.89)	0.78 ± 0.039 (0.67 - 0.89)	-0.0070 ± 0.019 (-0.13 - 0.089)	-0.046,0.032	0.709	(0.67 - 0.96) [0.48,1.08]
Arginine (% DW)	0.48 ± 0.013 (0.38 - 0.52)	0.47 ± 0.013 (0.41 - 0.51)	0.011 ± 0.012 (-0.090 - 0.062)	-0.014,0.036	0.361	(0.37 - 0.49) [0.33,0.56]
Aspartic acid (% DW)	0.68 ± 0.029 (0.56 - 0.78)	0.67 ± 0.029 (0.60 - 0.76)	0.0038 ± 0.015 (-0.11 - 0.078)	-0.028,0.036	0.804	(0.57 - 0.77) [0.43,0.90]
Cystine (% DW)	0.23 ± 0.0057 (0.20 - 0.26)	0.23 ± 0.0057 (0.21 - 0.25)	0.0023 ± 0.0038 (-0.022 - 0.023)	-0.0057,0.010	0.554	(0.20 - 0.24) [0.18,0.27]
Glutamic acid (% DW)	1.97 ± 0.097 (1.63 - 2.29)	1.99 ± 0.097 (1.70 - 2.26)	-0.012 ± 0.049 (-0.33 - 0.24)	-0.11,0.091	0.809	(1.71 - 2.41) [1.25,2.75]
Glycine (% DW)	0.38 ± 0.0087 (0.32 - 0.41)	0.38 ± 0.0087 (0.36 - 0.41)	0.0042 ± 0.0071 (-0.067 - 0.035)	-0.011,0.019	0.566	(0.32 - 0.40) [0.28,0.46]
Histidine (% DW)	0.31 ± 0.011 (0.25 - 0.35)	0.31 ± 0.011 (0.28 - 0.34)	0.0027 ± 0.0055 (-0.050 - 0.030)	-0.0090,0.014	0.632	(0.26 - 0.33) [0.22,0.38]
Isoleucine (% DW)	0.36 ± 0.018 (0.30 - 0.43)	0.36 ± 0.018 (0.30 - 0.42)	-0.00003 ± 0.0088 (-0.056 - 0.041)	-0.019,0.019	0.997	(0.32 - 0.45) [0.23,0.51]

Table 13. Statistical Summary of Combined Site Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Leucine (% DW)	1.31 ± 0.077 (1.09 - 1.57)	1.32 ± 0.077 (1.08 - 1.55)	-0.014 ± 0.036 (-0.21 - 0.16)	-0.089,0.062	0.700	(1.14 - 1.68) [0.77,1.92]
Lysine (% DW)	0.33 ± 0.0097 (0.26 - 0.36)	0.32 ± 0.0097 (0.29 - 0.36)	0.0088 ± 0.0078 (-0.056 - 0.033)	-0.0077,0.025	0.273	(0.24 - 0.34) [0.20,0.40]
Methionine (% DW)	0.23 ± 0.0064 (0.20 - 0.27)	0.22 ± 0.0064 (0.20 - 0.24)	0.0038 ± 0.0047 (-0.017 - 0.028)	-0.0061,0.014	0.427	(0.17 - 0.22) [0.14,0.25]
Phenylalanine (% DW)	0.51 ± 0.028 (0.43 - 0.61)	0.52 ± 0.028 (0.43 - 0.60)	-0.0012 ± 0.013 (-0.080 - 0.067)	-0.029,0.026	0.925	(0.45 - 0.65) [0.32,0.73]
Proline (% DW)	0.93 ± 0.030 (0.79 - 1.05)	0.93 ± 0.030 (0.83 - 1.01)	0.0034 ± 0.019 (-0.15 - 0.10)	-0.037,0.044	0.861	(0.83 - 1.11) [0.68,1.21]
Serine (% DW)	0.52 ± 0.022 (0.44 - 0.61)	0.52 ± 0.022 (0.46 - 0.60)	-0.0046 ± 0.012 (-0.087 - 0.058)	-0.030,0.021	0.703	(0.45 - 0.62) [0.34,0.71]
Threonine (% DW)	0.33 ± 0.010 (0.27 - 0.37)	0.33 ± 0.010 (0.29 - 0.36)	0.00063 ± 0.0074 (-0.052 - 0.039)	-0.015,0.016	0.933	(0.29 - 0.37) [0.24,0.41]
Tryptophan (% DW)	0.056 ± 0.0018 (0.048 - 0.064)	0.056 ± 0.0018 (0.045 - 0.063)	0.00031 ± 0.0013 (-0.0055 - 0.0072)	-0.0025,0.0031	0.817	(0.043 - 0.059) [0.032,0.072]

Table 13. Statistical Summary of Combined Site Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Amino Acid (% DW)						
Tyrosine (% DW)	0.37 ± 0.015 (0.22 - 0.43)	0.36 ± 0.015 (0.24 - 0.42)	0.0088 ± 0.016 (-0.21 - 0.14)	-0.026,0.043	0.596	(0.25 - 0.40) [0.17,0.52]
Valine (% DW)	0.49 ± 0.020 (0.40 - 0.55)	0.49 ± 0.020 (0.43 - 0.55)	0.0034 ± 0.010 (-0.084 - 0.055)	-0.019,0.026	0.748	(0.42 - 0.55) [0.35,0.62]
Fatty Acid (% Total FA)						
16:0 Palmitic (% Total FA)	9.19 ± 0.060 (8.98 - 9.46)	9.12 ± 0.060 (8.91 - 9.34)	0.071 ± 0.049 (-0.14 - 0.33)	-0.034,0.18	0.171	(9.10 - 12.55) [6.12,15.67]
16:1 Palmitoleic (% Total FA)	0.13 ± 0.0058 (0.11 - 0.14)	0.12 ± 0.0058 (0.048 - 0.14)	0.0022 ± 0.0054 (-0.012 - 0.079)	-0.0093,0.014	0.696	(0.050 - 0.19) [0,0.28]
18:0 Stearic (% Total FA)	1.89 ± 0.021 (1.79 - 2.03)	1.82 ± 0.021 (1.76 - 1.87)	0.072 ± 0.021 (-0.055 - 0.18)	0.028,0.12	0.002	(1.57 - 2.45) [0.86,2.98]
18:1 Oleic (% Total FA)	24.96 ± 0.34 (23.38 - 25.75)	24.84 ± 0.34 (23.62 - 26.66)	0.12 ± 0.20 (-1.48 - 1.15)	-0.32,0.55	0.574	(21.17 - 35.33) [7.51,46.46]
18:2 Linoleic (% Total FA)	61.82 ± 0.40 (60.85 - 63.61)	62.07 ± 0.40 (60.51 - 63.41)	-0.25 ± 0.23 (-1.62 - 1.24)	-0.73,0.24	0.292	(50.33 - 63.59) [39.41,76.74]
18:3 Linolenic (% Total FA)	1.19 ± 0.027 (1.12 - 1.23)	1.22 ± 0.027 (1.15 - 1.43)	-0.028 ± 0.016 (-0.23 - 0.036)	-0.063,0.0061	0.099	(0.93 - 1.52) [0.63,1.77]

Table 13. Statistical Summary of Combined Site Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Fatty Acid (% Total FA)						
20:0 Arachidic (% Total FA)	0.39 ± 0.0062 (0.36 - 0.42)	0.38 ± 0.0062 (0.36 - 0.40)	0.013 ± 0.0031 (-0.019 - 0.032)	0.0063,0.019	<0.001	(0.32 - 0.47) [0.23,0.54]
20:1 Eicosenoic (% Total FA)	0.28 ± 0.0040 (0.26 - 0.29)	0.28 ± 0.0040 (0.25 - 0.29)	0 ± 0.0024 (-0.014 - 0.011)	-0.0051,0.0051	0.999	(0.23 - 0.32) [0.15,0.39]
22:0 Behenic (% Total FA)	0.16 ± 0.0050 (0.13 - 0.20)	0.15 ± 0.0050 (0.13 - 0.18)	0.0027 ± 0.0062 (-0.019 - 0.029)	-0.010,0.016	0.665	(0.12 - 0.19) [0.081,0.23]
Fiber						
Acid Detergent Fiber (% DW)	5.48 ± 0.19 (3.82 - 7.24)	5.27 ± 0.19 (4.17 - 7.00)	0.21 ± 0.25 (-3.18 - 3.07)	-0.30,0.72	0.410	(4.11 - 6.33) [2.77,7.56]
Neutral Detergent Fiber (% DW)	10.06 ± 0.37 (8.59 - 12.08)	9.75 ± 0.37 (8.48 - 11.75)	0.31 ± 0.34 (-2.26 - 2.05)	-0.41,1.03	0.370	(8.20 - 11.30) [5.93,13.63]
Total Dietary Fiber (% DW)	15.17 ± 0.47 (13.39 - 17.02)	14.67 ± 0.47 (12.82 - 17.62)	0.50 ± 0.54 (-3.61 - 4.20)	-0.66,1.65	0.375	(12.99 - 18.03) [9.20,20.27]
Mineral						
Calcium (% DW)	0.0050 ± 0.00034 (0.0038 - 0.0066)	0.0049 ± 0.00034 (0.0040 - 0.0059)	0.00016 ± 0.00011 (-0.00027 - 0.00090)	-0.00008,0.00040	0.180	(0.0031 - 0.0049) [0.0016,0.0059]
Copper (mg/kg DW)	1.74 ± 0.38 (1.33 - 2.38)	2.07 ± 0.37 (1.26 - 4.54)	-0.33 ± 0.53 (-2.96 - 0.78)	-1.45,0.79	0.547	(1.15 - 3.56) [0,4.20]

Table 13. Statistical Summary of Combined Site Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Mineral						
Iron (mg/kg DW)	21.40 ± 1.00 (19.23 - 25.23)	22.20 ± 0.99 (19.03 - 28.26)	-0.80 ± 0.67 (-6.50 - 5.90)	-2.22,0.62	0.250	(18.04 - 29.22) [8.88,34.51]
Magnesium (% DW)	0.12 ± 0.0043 (0.10 - 0.14)	0.12 ± 0.0043 (0.11 - 0.14)	-0.00028 ± 0.0021 (-0.018 - 0.011)	-0.0047,0.0041	0.893	(0.099 - 0.14) [0.075,0.17]
Manganese (mg/kg DW)	6.79 ± 0.29 (5.43 - 9.32)	6.51 ± 0.29 (5.57 - 8.00)	0.28 ± 0.21 (-1.54 - 2.36)	-0.18,0.73	0.213	(5.56 - 8.64) [3.17,9.99]
Phosphorus (% DW)	0.33 ± 0.0095 (0.27 - 0.36)	0.33 ± 0.0095 (0.29 - 0.36)	0.00039 ± 0.0043 (-0.038 - 0.026)	-0.0087,0.0095	0.929	(0.25 - 0.37) [0.18,0.45]
Potassium (% DW)	0.36 ± 0.0065 (0.32 - 0.40)	0.36 ± 0.0065 (0.34 - 0.40)	0.0032 ± 0.0042 (-0.030 - 0.035)	-0.0052,0.012	0.450	(0.32 - 0.40) [0.26,0.46]
Zinc (mg/kg DW)	22.05 ± 1.14 (18.91 - 26.89)	21.91 ± 1.14 (18.81 - 26.04)	0.14 ± 0.51 (-3.37 - 3.19)	-0.94,1.22	0.788	(16.72 - 34.04) [7.16,38.55]
Proximate						
Ash (% DW)	1.41 ± 0.036 (1.25 - 1.56)	1.39 ± 0.036 (1.28 - 1.51)	0.014 ± 0.041 (-0.11 - 0.13)	-0.072,0.10	0.734	(1.12 - 1.62) [0.74,1.96]
Carbohydrates (% DW)	84.85 ± 0.42 (83.29 - 86.52)	84.96 ± 0.42 (83.58 - 86.22)	-0.11 ± 0.18 (-1.42 - 0.84)	-0.50,0.28	0.562	(82.91 - 86.78) [81.08,88.80]

Table 13. Statistical Summary of Combined Site Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean \pm S.E. (Range)	Control Mean \pm S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean \pm S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Proximate						
Moisture (% FW)	9.52 \pm 0.77 (7.89 - 12.80)	9.50 \pm 0.77 (7.86 - 13.10)	0.021 \pm 0.22 (-1.00 - 0.87)	-0.44,0.48	0.923	(7.60 - 15.30) [0.45,19.52]
Protein (% DW)	10.43 \pm 0.42 (8.54 - 11.98)	10.36 \pm 0.42 (9.22 - 11.52)	0.070 \pm 0.19 (-1.26 - 1.28)	-0.34,0.48	0.725	(9.33 - 11.82) [7.54,13.13]
Total Fat (% DW)	3.32 \pm 0.069 (3.05 - 3.89)	3.29 \pm 0.069 (3.05 - 3.75)	0.025 \pm 0.089 (-0.50 - 0.29)	-0.16,0.21	0.784	(2.66 - 3.71) [2.20,4.55]
Vitamin						
Folic Acid (mg/kg DW)	0.35 \pm 0.037 (0.26 - 0.48)	0.36 \pm 0.037 (0.23 - 0.53)	-0.0080 \pm 0.022 (-0.11 - 0.11)	-0.054,0.038	0.717	(0.13 - 0.45) [0.012,0.69]
Niacin (mg/kg DW)	30.08 \pm 1.11 (25.72 - 34.84)	29.59 \pm 1.11 (24.93 - 35.75)	0.48 \pm 0.65 (-4.44 - 5.64)	-0.82,1.79	0.461	(16.17 - 29.19) [6.97,37.83]
Vitamin B1 (mg/kg DW)	3.07 \pm 0.13 (2.39 - 3.44)	2.94 \pm 0.13 (2.39 - 3.36)	0.13 \pm 0.17 (-0.66 - 0.68)	-0.24,0.49	0.474	(2.19 - 5.60) [0.37,6.35]
Vitamin B2 (mg/kg DW)	1.42 \pm 0.046 (1.24 - 1.65)	1.42 \pm 0.046 (1.16 - 1.61)	0.0015 \pm 0.050 (-0.30 - 0.45)	-0.099,0.10	0.976	(1.34 - 1.91) [0.91,2.30]
Vitamin B6 (mg/kg DW)	6.22 \pm 0.23 (5.28 - 6.99)	6.26 \pm 0.23 (5.37 - 6.80)	-0.036 \pm 0.18 (-0.72 - 1.10)	-0.41,0.34	0.838	(5.08 - 7.47) [3.12,9.30]

Table 13. Statistical Summary of Combined Site Maize Grain Amino Acid, Fatty Acid, Fiber, Mineral, Proximate, Vitamin, Antinutrient and Secondary Metabolite Content for Test MON 89034 vs. the Conventional Control LH198 x LH172

Analytical Component	Test Mean ± S.E. (Range)	Control Mean ± S.E. (Range)	Difference(Test minus Control)			Commercial (Range) [99% Tolerance Int. ¹]
			Mean ± S.E. (Range)	95% CI (Lower,Upper)	p-Value	
Vitamin						
Vitamin E (mg/kg DW)	6.77 ± 0.42 (5.55 - 8.62)	6.63 ± 0.42 (2.72 - 9.02)	0.14 ± 0.36 (-2.35 - 3.83)	-0.64,0.91	0.714	(2.71 - 13.94) [0,20.49]
Antinutrient						
Phytic Acid (% DW)	0.75 ± 0.050 (0.53 - 0.87)	0.73 ± 0.050 (0.56 - 0.88)	0.016 ± 0.027 (-0.15 - 0.18)	-0.037,0.069	0.537	(0.50 - 0.94) [0.21,1.22]
Secondary Metabolite						
Ferulic Acid (µg/g DW)	2131.38 ± 108.09 (1790.25 - 2525.31)	2148.05 ± 108.09 (1878.66 - 2669.85)	-16.67 ± 50.08 (-330.17 - 264.79)	-116.98,83.65	0.740	(1412.68 - 2297.36) [1136.69,2806.24]
p-Coumaric Acid (µg/g DW)	194.25 ± 7.12 (166.11 - 253.04)	183.96 ± 7.12 (167.76 - 210.13)	10.28 ± 7.08 (-24.37 - 70.84)	-4.73,25.30	0.165	(99.30 - 285.75) [0,378.57]

¹With 95% confidence, interval contains 99% of the values expressed in the population of commercial lines. Negative limits were set to zero.

Table 14. Literature and ILSI Database Ranges for Components in Corn Forage and Grain

Tissue/ Component¹	Literature Range²	ILSI Range³
<u>Forage</u>		
<u>Proximates (% dw)</u>		
Ash	2.43-9.64 ^a ; 2-6.6 ^b	1.527 – 9.638
Carbohydrates	83.2-91.6 ^b ; 76.5-87.3 ^a	76.4 – 92.1
Fat, total	0.35-3.62 ^b ; 1.42-4.57 ^a	0.296 – 4.570
Moisture (% fw)	56.5-80.4 ^a ; 55.3-75.3 ^b	49.1 – 81.3
Protein	4.98-11.56 ^a	3.14 – 11.57
<u>Fiber (% dw)</u>		
Acid detergent fiber (ADF)	18.3-41.0 ^b ; 17.5-38.3 ^a	16.13 – 47.39
Neutral detergent fiber (NDF)	26.4-54.5 ^b ; 27.9-54.8 ^a	20.29 – 63.71
<u>Minerals (% dw)</u>		
Calcium	0.0969-0.3184 ^b	0.0714 – 0.5768
Phosphorous	0.1367-0.2914 ^b	0.0936 – 0.3704
<u>Grain</u>		
<u>Proximates (% dw)</u>		
Ash	1.1-3.9 ^d ; 0.89-6.28 ^b	0.616 – 6.282
Carbohydrates	77.4-87.2 ^b ; 82.2-88.1 ^a	77.4 – 89.5
Fat, total	3.1-5.7 ^d ; 2.48-4.81 ^b	1.742 – 5.823
Moisture (% fw)	7-23 ^d ; 8.18-26.2 ^b	6.1 – 40.5
Protein	6-12 ^d ; 9.7-16.1 ^c	6.15 – 17.26
<u>Fiber (% dw)</u>		
Acid detergent fiber (ADF)	3.3-4.3 ^d ; 2.46-11.34 ^{a,b}	1.82 – 11.34
Neutral detergent fiber (NDF)	8.3-11.9 ^d ; 7.58-	5.59 – 22.64
Total dietary fiber (TDF)	10.99-91 ^b ; 41 ^h	8.85 – 35.31
<u>Minerals</u>		
Calcium (% dw)	0.01-0.1 ^d	0.00127 – 0.02084
Copper (mg/kg dw)	0.9-10 ^d	0.73 – 18.50
Iron (mg/kg dw)	1-100 ^d	10.42 – 49.07
Magnesium (% dw)	0.09-1 ^d	0.0594 – 0.194
Manganese (mg/kg dw)	0.7-54 ^d	1.69 – 14.30
Phosphorous (% dw)	0.26-0.75 ^d	0.147 – 0.533
Potassium (% dw)	0.32-0.72 ^d	0.181 – 0.603
Zinc (mg/kg dw)	12-30 ^d	6.5 – 37.2

Table 14. Literature and ILSI Database Ranges for Components in Corn Forage and Grain

Tissue/ Component¹	Literature Range²	ILSI Range³
<u>Grain</u>		
<u>Amino Acids</u>		
	(% dw)	(% dw)
Alanine	n/a	0.439 – 1.393
Arginine	n/a	0.119 – 0.639
Aspartic acid	n/a	0.335 – 1.208
Cystine	n/a	0.125 – 0.514
Glutamic acid	n/a	0.965 – 3.536
Glycine	n/a	0.184 – 0.539
Histidine	n/a	0.137 – 0.434
Isoleucine	n/a	0.179 – 0.692
Leucine	n/a	0.642 – 2.492
Lysine	n/a	0.172 – 0.668
Methionine	n/a	0.124 – 0.468
Phenylalanine	n/a	0.244 – 0.930
Proline	n/a	0.462 – 1.632
Serine	n/a	0.235 – 0.769
Threonine	n/a	0.224 – 0.666
Tryptophan	n/a	0.0271 – 0.215
Tyrosine	n/a	0.103 – 0.642
Valine	n/a	0.266 – 0.855
<u>Fatty Acids</u>		
	(% total fat)	(% total fatty acid)
16:0 Palmitic	7-19 ^e	7.94 – 20.71
16:1 Palmitoleic	1 ^e	0.095 – 0.447
18:0 Stearic	1-3 ^e	1.02 – 3.40
18:1 Oleic	20-46 ^e	17.4 – 40.2
18:2 Linoleic	35-70 ^e	36.2 – 66.5
18:3 Linolenic	0.8-2 ^e	0.57 – 2.25
20:0 Arachidic	0.1-2 ^e	0.279 – 0.965
20:1 Eicosenoic	n/a	0.170 – 1.917
22:0 Behenic	n/a	0.110 – 0.349
<u>Vitamins</u>		
	(mg/kg dw)	(mg/kg dw)
Folic acid	0.3 ^d	0.147 – 1.464
Niacin	9.3-70 ^d	10.37 – 46.94
Vitamin B ₁	3-8.6 ^e	1.26 – 40.00
Vitamin B ₂	0.25-5.6 ^e	0.50 – 2.36
Vitamin B ₆	5.3 ^d ; 9.6 ^e	3.68 – 11.32
Vitamin E	3-12.1 ^e ; 17-47 ^d	1.5 – 68.7

Table 14. Literature and ILSI Database Ranges for Components in Corn Forage and Grain

Tissue/ Component¹	Literature Range²	ILSI Range³
<u>Grain</u>		
<u>Anti-Nutrients (% dw)</u>		
Phytic acid	0.48-1.12 ^a	0.111 – 1.570
Raffinose	0.08-0.30 ^e	0.020 – 0.320
<u>Secondary Metabolites</u>		
	(µg/g dw)	(µg/g dw)
Ferulic acid	113-1194 ^f ; 3000 ^g	291.9 – 3885.8
p-Coumaric acid	22-75 ^f	53.4 – 576.2

¹fw=fresh weight; dw=dry weight; Niacin =Vitamin B₃; Vitamin B₁ =Thiamine; Vitamin B₂ =Riboflavin; Vitamin B₆ =Pyridoxine

²Literature range references: ^aRidley *et al.*, 2002a. ^bSidhu *et al.*, 2000a. ^cJugenheimer, 1976.

^dWatson, 1987. ^eWatson, 1982. ^fClassen *et al.*, 1990. ^gDowd and Vega, 1996. ^hChoi *et al.*, 1999.

³ILSI range is from ILSI Crop Composition Database, 2006.

n/a = not available

Conversions: % dw x 10⁴ = µg/g dw; mg/g dw x 10³ = mg/kg dw; mg/100g dw x 10 = mg/kg dw