

# AJINOMOTO®

Ajinomoto AminoScience LLC • 4020 Ajinomoto Drive • Raleigh, North Carolina 27610 • Ph: (919) 325-1400 (919) 231-0100

## Certificate of Analysis

Date: 06/20/2008

|                    |  |                    |            |
|--------------------|--|--------------------|------------|
| Item Name          | L-Tryptophan (20060)                   | Delivery Number    |            |
| Lot Number         | CAS # 73-22-3                          | Customer PO #      |            |
| Manufacturing Loc. | Ajinomoto Co, Tokai Plant, Mie, Japan  | Customer Product # |            |
| Manufacturing Date | 12/16/2007      Retest Date 12/14/2011 | Quantity           | 350.000 KG |

| Characteristic           | Unit   | Value         | LowerLimit | UpperLimit |
|--------------------------|--------|---------------|------------|------------|
| Appearance               |        | Pass          |            |            |
| Identification           |        | Pass          |            |            |
| pH                       |        | 6.0           | 5.5        | 6.4        |
| Specific Rotation at 20C | Degree | -31.7         | -32.5      | -30.5      |
| Specific Rotation at 25C | Degree | -31.4         | -32.8      | -29.4      |
| State of Soln, clear     | %      | NLT 95.0      | 95.0       |            |
| Chloride (Cl)            | %      | NMT 0.020     |            | 0.020      |
| Ammonium (NH4)           | %      | NMT 0.02      |            | 0.02       |
| Sulfate (SO4)            | %      | NMT 0.020     |            | 0.020      |
| Iron (Fe)                | ppm    | NMT 10        |            | 10         |
| Heavy Metals (Pb)        | ppm    | NMT 10        |            | 10         |
| Related Substances       |        | Conforms      |            |            |
| Loss on Drying           | %      | 0.01          |            | 0.20       |
| Residue on Ignition      | %      | 0.00          |            | 0.10       |
| Assay                    | %      | 100.1         | 99.0       | 101.0      |
| Total Microorganism      | CFU/g  | NMT 100       |            | 100        |
| Mold                     | CFU/g  | NMT 10        |            | 10         |
| Coliform                 |        | Negative      |            |            |
| EBT                      |        | Not Detected  |            |            |
| Other Impurities 1       | ppm    | NMT 100       |            | 100        |
| Other Impurities 2       | ppm    | NMT 100       |            | 100        |
| Endotoxin                | EU/g   | Less than 5.0 |            | 5.0        |
| Product Grade            |        | Nonpyrogenic  |            |            |

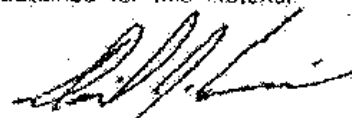
We certify the quality of this product conforms to USP Residual Solvents requirements and OVI.

This material is certified for Arsenic not more than 1 ppm.

This material conforms to USP, EP, and JP specifications. This is in compliance with Kosher standards.

This material conforms to FCC (5th ed.) specifications (Lead NMT 5 ppm).

This is to certify that the information listed above is a true and accurate copy of the data obtained for this material.



David J. Ennis  
Quality Assurance Manager, NC Plant

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## Certificate of Analysis

Date: 07/21/2008

|                    |   |                    |            |
|--------------------|---|--------------------|------------|
| Item Name          | L-Tryptophan (20060)                    | Delivery Number    |            |
| Lot Number         | CAS # 73-22-3                           | Customer PO #      |            |
| Manufacturing Loc. | Ajinomoto Co. Tokai Plant, Mie, Japan   | Customer Product # |            |
| Manufacturing Date | 02/10/2008      Release Date 02/06/2012 | Quantity           | 500.000 KG |

| Characteristic           | Unit   | Value         | LowerLimit | UpperLimit |
|--------------------------|--------|---------------|------------|------------|
| Appearance               |        | Pass          |            |            |
| Identification           |        | Pass          |            |            |
| pH                       |        | 6.0           | 5.5        | 6.4        |
| Specific Rotation at 20C | Degree | -31.5         | -32.5      | -30.5      |
| Specific Rotation at 25C | Degree | -31.2         | -32.8      | -29.4      |
| State of Soln. clear     | %      | NLT 95.0      | 95.0       |            |
| Chloride (Cl)            | %      | NMT 0.020     |            | 0.020      |
| Ammonium (NH4)           | %      | NMT 0.02      |            | 0.02       |
| Sulfate (SO4)            | %      | NMT 0.020     |            | 0.020      |
| Iron (Fe)                | ppm    | NMT 10        |            | 10         |
| Heavy Metals (Pb)        | ppm    | NMT 10        |            | 10         |
| Related Substances       |        | Conforms      |            |            |
| Loss on Drying           | %      | 0.01          |            | 0.20       |
| Residue on Ignition      | %      | 0.01          |            | 0.10       |
| Assay                    | %      | 99.8          | 99.0       | 101.0      |
| Total Microorganism      | CFU/g  | NMT 100       |            | 100        |
| Mold                     | CFU/g  | NMT 10        |            | 10         |
| Coliform                 |        | Negative      |            |            |
| EBT                      |        | Not Detected  |            |            |
| Other Impurities 1       | ppm    | NMT 100       |            | 100        |
| Other Impurities 2       | ppm    | NMT 100       |            | 100        |
| Endotoxin                | EU/g   | Less than 5.0 |            | 5.0        |
| Product Grade            |        | Nonpyrogenic  |            |            |

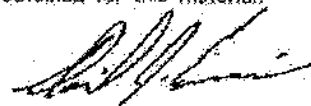
We verify the quality of this product conforms to USP Residual Solvents requirements and OVI.

This material is certified for Arsenic not more than 1 ppm.

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## Certificate of Analysis

Date: 09/10/2008

|                    |                                       |                    |            |
|--------------------|---------------------------------------|--------------------|------------|
| Item Name          | L-Tryptophan 1200501                  | Delivery Number    |            |
| Lot Number         | CAS # 73-22-3                         | Customer PO #      |            |
| Manufacturing Loc. | Ajinomoto Co, Tokai Plant, Mie, Japan | Customer Product # |            |
| Manufacturing Date | 02/13/2008                            | Quantity           | 250.000 KG |
|                    | Retest Date 02/11/2012                |                    |            |

| Characteristic           | Unit   | Value         | LowerLimit | UpperLimit |
|--------------------------|--------|---------------|------------|------------|
| Appearance               |        | Pass          |            |            |
| Identification           |        | Pass          |            |            |
| pH                       |        | 6.0           | 5.5        | 6.4        |
| Specific Rotation at 20C | Degree | -31.8         | -32.5      | -30.5      |
| Specific Rotation at 25C | Degree | -31.5         | -32.8      | -29.4      |
| State of Soln. clear     | %      | NET 95.0      | 95.0       |            |
| Chloride (Cl)            | %      | NMT 0.020     |            | 0.020      |
| Ammonium (NH4)           | %      | NMT 0.02      |            | 0.02       |
| Sulfate (SO4)            | %      | NMT 0.020     |            | 0.020      |
| Iron (Fe)                | ppm    | NMT 10        |            | 10         |
| Heavy Metals (Pb)        | ppm    | NMT 10        |            | 10         |
| Related Substances       |        | Confirms      |            |            |
| Loss on Drying           | %      | 0.01          |            | 0.20       |
| Residue on Ignition      | %      | 0.00          |            | 0.10       |
| Assay                    | %      | 100.1         | 99.0       | 101.0      |
| Total Microorganism      | CFU/g  | NMT 100       |            | 100        |
| Mold                     | CFU/g  | NMT 10        |            | 10         |
| Coliform                 |        | Negative      |            |            |
| EBT                      |        | Not Detected  |            |            |
| Other Impurities 1       | ppm    | NMT 100       |            | 100        |
| Other Impurities 2       | ppm    | NMT 100       |            | 100        |
| Endotoxin                | EU/g   | Less than 6.0 |            | 6.0        |
| Product Grade            |        | Nonpyrogenic  |            |            |

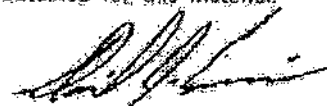
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### Certificate of Analysis

Date: 09/10/2008

|                    |                                       |                    |            |
|--------------------|---------------------------------------|--------------------|------------|
| Item Name          | L-Tryptophan (20060)                  | Delivery Number    |            |
| Lot Number         | CAS # 73-22-8                         | Customer PO #      |            |
| Manufacturing Loc. | Ajinomoto Co. Takai Plant, Mie, Japan | Customer Product # |            |
| Manufacturing Date | 05/04/2008                            | Quantity           | 250.000 KG |
| Release Date       | 05/02/2012                            |                    |            |

| Characteristic              | Unit   | Value         | LowerLimit | UpperLimit |
|-----------------------------|--------|---------------|------------|------------|
| Appearance                  |        | Pass          |            |            |
| Identification              |        | Pass          |            |            |
| pH                          |        | 6.0           | 5.6        | 6.4        |
| Specific Rotation at 20C    | Degree | -31.3         | -32.5      | -30.5      |
| Specific Rotation at 25C    | Degree | -31.0         | -32.8      | -29.4      |
| State of Soln. clear        | %      | NLT 95.0      | 95.0       |            |
| Chloride (Cl)               | %      | NMT 0.020     |            | 0.020      |
| Ammonium (NH <sub>4</sub> ) | %      | NMT 0.02      |            | 0.02       |
| Sulfate (SO <sub>4</sub> )  | %      | NMT 0.020     |            | 0.020      |
| Iron (Fe)                   | ppm    | NMT 10        |            | 10         |
| Heavy Metals (Pb)           | ppm    | NMT 10        |            | 10         |
| Related Substances          |        | Confirms      |            |            |
| Loss on Drying              | %      | 0.01          |            | 0.20       |
| Residue on Ignition         | %      | 0.01          |            | 0.10       |
| Assay                       | %      | 99.8          | 99.0       | 101.0      |
| Total Microorganism         | CFU/g  | NMT 100       |            | 100        |
| Mold                        | CFU/g  | NMT 10        |            | 10         |
| Coliform                    |        | Negative      |            |            |
| EBT                         |        | Not Detected  |            |            |
| Other Impurities 1          | ppm    | NMT 100       |            | 100        |
| Other Impurities 2          | ppm    | NMT 100       |            | 100        |
| Endotoxin                   | EU/g   | less than 6.0 |            | 6.0        |
| Product Grade               |        | Nonpyrogenic  |            |            |

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## Certificate of Analysis

Date: 12/16/2008

|                    |  |                    |           |
|--------------------|--|--------------------|-----------|
| Item Name          | L-Tryptophan (20080)                   | Delivery Number    |           |
| Lot Number         | CAS # 73-22-3                          | Customer PO #      |           |
| Manufacturing Loc: | Ajinomoto Co., Tokai Plant, Mie, Japan | Customer Product # |           |
| Manufacturing Date | 07/15/2008                             | Quantity           | 50.000 KG |
|                    | Retest Date 07/13/2012                 |                    |           |

| Characteristic           | Unit   | Value         | LowerLimit | UpperLimit |
|--------------------------|--------|---------------|------------|------------|
| Appearance               |        | Pass          |            |            |
| Identification           |        | Pass          |            |            |
| pH                       |        | 6.0           | 5.5        | 6.4        |
| Specific Rotation at 20C | Degree | -31.3         | -32.5      | -30.5      |
| Specific Rotation at 25C | Degree | -31.0         | -32.8      | -29.4      |
| State of Soln, clear     | %      | NLT 95.0      | 95.0       |            |
| Chloride (Cl)            | %      | NMT 0.020     |            | 0.020      |
| Ammonium (NH4)           | %      | NMT 0.02      |            | 0.02       |
| Sulfate (SO4)            | %      | NMT 0.020     |            | 0.020      |
| Iron (Fe)                | ppm    | NMT 10        |            | 10         |
| Heavy Metals (Pb)        | ppm    | NMT 10        |            | 10         |
| Related Substances       |        | Conforms      |            |            |
| Loss on Drying           | %      | 0.02          |            | 0.20       |
| Residue on Ignition      | %      | 0.02          |            | 0.10       |
| Assay                    | %      | 99.6          | 99.0       | 101.0      |
| Total Microorganism      | CFU/g  | NMT 100       |            | 100        |
| Mold                     | CFU/g  | NMT 10        |            | 10         |
| Coliform                 |        | Negative      |            |            |
| EBT                      |        | Not Detected  |            |            |
| Other Impurities 1       | ppm    | NMT 100       |            | 100        |
| Other Impurities 2       | ppm    | NMT 100       |            | 100        |
| Endotoxin                | EU/g   | Less than 6.0 |            | 6.0        |
| Product Grade            |        | Nonpyrogenic  |            |            |

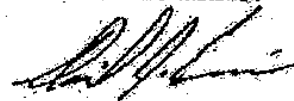
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## Certificate of Analysis

Date: 12/16/2008

|                    |                                       |                    |            |
|--------------------|---------------------------------------|--------------------|------------|
| Item Name          | L-Tryptophan (20060)                  | Delivery Number    |            |
| Lot Number         | CAS # 73-22-3                         | Customer PO #      |            |
| Manufacturing Loc. | Ajinomoto Co, Tokai Plant, Mie, Japan | Customer Product # |            |
| Manufacturing Date | 07/15/2008                            | Quantity           | 450.000 KG |
|                    | Retest Date 07/13/2012                |                    |            |

| Characteristic           | Unit   | Value         | LowerLimit | UpperLimit |
|--------------------------|--------|---------------|------------|------------|
| Appearance               |        | Pass          |            |            |
| Identification           |        | Pass          |            |            |
| pH                       |        | 6.0           | 5.5        | 6.4        |
| Specific Rotation at 20C | Degree | -31.3         | -32.5      | -30.5      |
| Specific Rotation at 25C | Degree | -31.0         | -32.8      | -29.4      |
| State of Soln, clear     | %      | NLT 95.0      | 95.0       |            |
| Chloride (Cl)            | %      | NMT 0.020     |            | 0.020      |
| Ammonium (NH4)           | %      | NMT 0.02      |            | 0.02       |
| Sulfate (SO4)            | %      | NMT 0.020     |            | 0.020      |
| Iron (Fe)                | ppm    | NMT 10        |            | 10         |
| Heavy Metals (Pb)        | ppm    | NMT 10        |            | 10         |
| Related Substances       |        | Conforms      |            |            |
| Loss on Drying           | %      | 0.02          |            | 0.20       |
| Residue on Ignition      | %      | 0.02          |            | 0.10       |
| Assay                    | %      | 99.6          | 99.0       | 101.0      |
| Total Microorganism      | CFU/g  | NMT 100       |            | 100        |
| Mold                     | CFU/g  | NMT 10        |            | 10         |
| Coliform                 |        | Negative      |            |            |
| EBT                      |        | Not Detected  |            |            |
| Other Impurities 1       | ppm    | NMT 100       |            | 100        |
| Other Impurities 2       | ppm    | NMT 100       |            | 100        |
| Endotoxin                | EU/g   | Less than 6.0 |            | 6.0        |
| Product Grade            |        | Nonpyrogenic  |            |            |

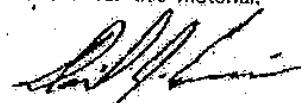
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## Certificate of Analysis

Date: 12/16/2008

|                    |                                       |                    |            |
|--------------------|---------------------------------------|--------------------|------------|
| Item Name          | L-Tryptophan (20060)                  | Delivery Number    |            |
| Lot Number         | CAS # 73-22-3                         | Customer PO #      |            |
| Manufacturing Loc. | Ajinomoto Co, Tokai Plant, Mie, Japan | Customer Product # |            |
| Manufacturing Date | 07/16/2008                            | Quantity           | 500.000 KG |
|                    | Retest Date 07/14/2012                |                    |            |

| Characteristic           | Unit   | Value         | LowerLimit | UpperLimit |
|--------------------------|--------|---------------|------------|------------|
| Appearance               |        | Pass          |            |            |
| Identification           |        | Pass          |            |            |
| pH                       |        | 6.0           | 5.5        | 6.4        |
| Specific Rotation at 20C | Degree | -31.3         | -32.5      | -30.5      |
| Specific Rotation at 25C | Degree | -31.0         | -32.8      | -29.4      |
| State of Soln, clear     | %      | NLT 95.0      | 95.0       |            |
| Chloride (Cl)            | %      | NMT 0.020     |            | 0.020      |
| Ammonium (NH4)           | %      | NMT 0.02      |            | 0.02       |
| Sulfate (SO4)            | %      | NMT 0.020     |            | 0.020      |
| Iron (Fe)                | ppm    | NMT 10        |            | 10         |
| Heavy Metals (Pb)        | ppm    | NMT 10        |            | 10         |
| Related Substances       |        | Conforms      |            |            |
| Loss on Drying           | %      | 0.02          |            | 0.20       |
| Residue on Ignition      | %      | 0.00          |            | 0.10       |
| Assay                    | %      | 99.6          | 99.0       | 101.0      |
| Total Microorganism      | CFU/g  | NMT 100       |            | 100        |
| Mold                     | CFU/g  | NMT 10        |            | 10         |
| Coliform                 |        | Negative      |            |            |
| EBT                      |        | Not Detected  |            |            |
| Other Impurities 1       | ppm    | NMT 100       |            | 100        |
| Other Impurities 2       | ppm    | NMT 100       |            | 100        |
| Endotoxin                | EU/g   | Less than 6.0 |            | 6.0        |
| Product Grade            |        | Nonpyrogenic  |            |            |

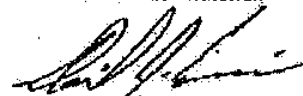
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## Certificate of Analysis

Date: 01/13/2009

|                    |                                     |                    |            |
|--------------------|-------------------------------------|--------------------|------------|
| Item Name          | L-Tryptophan (20717)                | Delivery Number    |            |
| Lot Number         | CAS # 73-22-3                       | Customer PO #      |            |
| Manufacturing Loc. | Ajinomoto AminoScience LLC, NC, USA | Customer Product # |            |
| Manufacturing Date | 12/10/2008                          | Retest Date        | 12/08/2012 |
|                    |                                     | Quantity           | 300.000 KG |

| Characteristic           | Unit   | Value         | LowerLimit | UpperLimit |
|--------------------------|--------|---------------|------------|------------|
| Appearance               |        | Pass          |            |            |
| Identification           |        | Pass          |            |            |
| pH                       |        | 6.0           | 5.5        | 6.4        |
| Specific Rotation at 20C | Degree | -31.7         | -32.5      | -30.5      |
| Specific Rotation at 25C | Degree | -31.4         | -32.8      | -29.4      |
| State of Soln, clear     | %      | 96.4          | 95.0       |            |
| Chloride (Cl)            | %      | NMT 0.020     |            | 0.020      |
| Ammonium (NH4)           | %      | 0.00          |            | 0.02       |
| Sulfate (SO4)            | %      | NMT 0.020     |            | 0.020      |
| Iron (Fe)                | ppm    | NMT 10        |            | 10         |
| Heavy Metals (Pb)        | ppm    | NMT 10        |            | 10         |
| Related Substances       |        | Conforms      |            |            |
| Loss on Drying           | %      | 0.00          |            | 0.20       |
| Residue on Ignition      | %      | 0.02          |            | 0.10       |
| Assay                    | %      | 99.1          | 99.0       | 101.0      |
| Total Microorganism      | CFU/g  | NMT 100       |            | 100        |
| Mold                     | CFU/g  | NMT 10        |            | 10         |
| Coliform                 |        | Negative      |            |            |
| Endotoxin                | EU/g   | Less than 6.0 |            | 6.0        |
| EBT                      |        | Not Detected  |            |            |
| Product Grade            |        | Nonpyrogenic  |            |            |

We certify the quality of this product conforms to USP Residual Solvents requirements.

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