



**AAFCO**  
Proficiency Testing Program



**Animal Feed Scheme**

**Llama Feed**

**Test Material Code # 201931**

**Analyte Summary Report**

**# Labs Reporting: 184**

**# Analytes Reported: 109**

**Issue Date : 12/31/2019**

| Analyte Group Code | Analyte and Method           | Total # Tests Submitted | # Tests in Robust Calcs | Raw Mean | Raw SD | Assigned Value Robust Mean | AAFCO #fp Robust SD | Uncertainty (U) - Robust | % RSD - Robust | Average Range (R-bar) | Howitz %RSD |
|--------------------|------------------------------|-------------------------|-------------------------|----------|--------|----------------------------|---------------------|--------------------------|----------------|-----------------------|-------------|
| 000                | Urea (%)                     | 1                       | 1                       | 6.150    |        |                            |                     |                          |                |                       |             |
| 001                | Loss on Drying (%)           | 81                      | 78                      | 7.780    | 0.4037 | 7.800                      | 0.2765              | 0.0391                   | 3.54%          | 0.0848                | 2.94%       |
| 002                | Protein, Crude (%)           | 187                     | 185                     | 23.98    | 0.8441 | 23.90                      | 0.4052              | 0.0372                   | 1.70%          | 0.1802                | 2.05%       |
| 003                | Fat, Crude (%)               | 142                     | 137                     | 2.403    | 0.2982 | 2.394                      | 0.2295              | 0.0245                   | 9.59%          | 0.0937                | 3.51%       |
| 004                | Fiber, Crude (%)             | 123                     | 122                     | 16.81    | 2.773  | 17.19                      | 1.293               | 0.1464                   | 7.52%          | 0.2386                | 2.41%       |
| 005                | Ash (%)                      | 141                     | 136                     | 16.67    | 1.031  | 16.74                      | 0.2562              | 0.0275                   | 1.53%          | 0.1185                | 2.44%       |
| 006                | Total Sugars (%)             | 5                       | 4                       | 3.723    | 2.409  | 3.723                      | 2.409               | 1.205                    | 64.71%         | 0.0450                | 3.28%       |
| 008                | Fiber, Acid Detergent (%)    | 62                      | 60                      | 22.98    | 1.716  | 22.94                      | 1.716               | 0.2770                   | 7.48%          | 0.3778                | 2.09%       |
| 009                | Fiber, Neutral Detergent (%) | 59                      | 58                      | 34.02    | 2.829  | 34.14                      | 1.993               | 0.3271                   | 5.84%          | 0.4819                | 1.71%       |
| 010                | Moisture (%)                 | 23                      | 22                      | 7.977    | 0.6530 | 7.919                      | 0.5069              | 0.1351                   | 6.40%          | 0.1068                | 2.93%       |
| 011                | Loss on Drying (%)           | 69                      | 68                      | 8.866    | 0.3928 | 8.884                      | 0.4025              | 0.0610                   | 4.53%          | 0.1263                | 2.88%       |
| 012                | Starch (%)                   | 36                      | 35                      | 6.663    | 1.383  | 6.717                      | 0.9968              | 0.2106                   | 14.84%         | 0.1760                | 3.00%       |
| 013                | Fat, Acid Pretreat (%)       | 51                      | 50                      | 3.508    | 0.6306 | 3.509                      | 0.5971              | 0.1055                   | 17.02%         | 0.1834                | 3.31%       |
| 015                | Aluminum (mg / kg (ppm))     | 16                      | 16                      | 1,524    | 478.5  | 1,579                      | 413.2               | 129.1                    | 26.17%         | 36.37                 | 5.28%       |
| 017                | Boron (mg / kg (ppm))        | 17                      | 16                      | 21.70    | 2.278  | 21.64                      | 2.312               | 0.7226                   | 10.68%         | 1.266                 | 10.07%      |
| 019                | Calcium (%)                  | 141                     | 139                     | 2.132    | 0.1676 | 2.141                      | 0.1129              | 0.0120                   | 5.27%          | 0.0545                | 3.57%       |
| 021                | Cobalt (mg / kg (ppm))       | 28                      | 28                      | 5.828    | 2.219  | 5.559                      | 1.351               | 0.3191                   | 24.30%         | 0.2675                | 12.36%      |
| 022                | Copper (mg / kg (ppm))       | 95                      | 93                      | 52.69    | 7.579  | 52.66                      | 6.264               | 0.8119                   | 11.90%         | 1.828                 | 8.81%       |
| 025                | Iron (mg / kg (ppm))         | 91                      | 89                      | 1,187    | 252.1  | 1,217                      | 204.1               | 27.04                    | 16.77%         | 44.46                 | 5.49%       |
| 027                | Magnesium (%)                | 101                     | 99                      | 0.4112   | 0.0451 | 0.4114                     | 0.0242              | 0.0030                   | 5.89%          | 0.0103                | 4.57%       |
| 028                | Manganese (mg / kg (ppm))    | 97                      | 95                      | 475.4    | 39.43  | 477.9                      | 32.24               | 4.134                    | 6.75%          | 16.26                 | 6.32%       |
| 031                | Phosphorus (%)               | 134                     | 132                     | 1.217    | 0.0934 | 1.222                      | 0.0613              | 0.0067                   | 5.02%          | 0.0294                | 3.88%       |
| 032                | Potassium (%)                | 100                     | 96                      | 1.707    | 0.1569 | 1.708                      | 0.0911              | 0.0116                   | 5.33%          | 0.0423                | 3.69%       |
| 033                | Salt as chloride (%)         | 74                      | 73                      | 3.626    | 0.2668 | 3.658                      | 0.1841              | 0.0269                   | 5.03%          | 0.0603                | 3.29%       |
| 034                | Selenium (mg / kg (ppm))     | 30                      | 28                      | 10.60    | 1.906  | 10.65                      | 1.782               | 0.4209                   | 16.74%         | 0.3369                | 11.21%      |
| 035                | Sodium (%)                   | 97                      | 94                      | 1.231    | 0.1351 | 1.235                      | 0.0846              | 0.0109                   | 6.85%          | 0.0327                | 3.87%       |
| 036                | Sulfur (%)                   | 42                      | 41                      | 0.5503   | 0.0654 | 0.5523                     | 0.0362              | 0.0071                   | 6.56%          | 0.0138                | 4.37%       |
| 037                | Zinc (mg / kg (ppm))         | 101                     | 100                     | 1,591    | 287.9  | 1,611                      | 154.1               | 19.27                    | 9.57%          | 52.04                 | 5.26%       |
| 038                | Molybdenum (mg / kg (ppm))   | 22                      | 21                      | 19.07    | 2.119  | 19.13                      | 2.279               | 0.6218                   | 11.92%         | 1.108                 | 10.26%      |
| 040                | Barium (mg / kg (ppm))       | 1                       | 1                       | 37.77    |        |                            |                     |                          |                |                       |             |

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|--------------------|----------------------------------|-------------------------|-------------------------|----------|--------|----------------------------|---------------------|--------------------------|----------------|-----------------------|--------------|
| 041                | Vanadium (mg / kg (ppm))         | 1                       | 1                       | 4.355    |        |                            |                     |                          |                |                       |              |
| 042                | Chloride (%)                     | 6                       | 6                       | 2.179    | 0.0958 | 2.179                      | 0.1086              | 0.0554                   | 4.99%          | 0.0452                | 3.56%        |
| 101                | Choline Chloride (mg / kg (ppm)) | 1                       | 1                       | 1,020    |        |                            |                     |                          |                |                       |              |
| 102                | Niacin (mg / kg (ppm))           | 1                       | 1                       | 66.25    |        |                            |                     |                          |                |                       |              |
| 103                | Pantothenic Acid (mg / kg (ppm)) | 1                       | 1                       | 22.05    |        |                            |                     |                          |                |                       |              |
| 104                | Riboflavin (mg / kg (ppm))       | 4                       | 4                       | 4.859    | 1.191  | 4.859                      | 1.191               | 0.5956                   | 24.51%         | 0.3775                | 12.61%       |
| 105                | Thiamine (mg / kg (ppm))         | 3                       | 3                       | 142.5    | 56.97  | 142.5                      | 56.97               | 32.89                    | 39.98%         | 5.160                 | 7.58%        |
| 106                | Vitamin A (KU / kg)              | 22                      | 21                      | 73.09    | 13.84  | 72.86                      | 13.28               | 3.623                    | 18.23%         | 5.875                 |              |
| 107                | Vitamin B12 (µg / kg (ppb))      | 1                       | 1                       | 22.55    |        |                            |                     |                          |                |                       |              |
| 108                | Vitamin D3 (KU / kg)             | 8                       | 7                       | 18.92    | 3.731  | 18.99                      | 4.074               | 1.925                    | 21.45%         | 1.112                 |              |
| 109                | Vitamin E (IU / kg)              | 18                      | 18                      | 3,133    | 556.9  | 3,219                      | 405.6               | 119.5                    | 12.60%         | 78.00                 |              |
| 112                | Pyridoxine (µg / g)              | 1                       | 1                       | 4.585    |        |                            |                     |                          |                |                       |              |
| 113                | Folic Acid (mg / kg (ppm))       | 1                       | 1                       | 4.465    |        |                            |                     |                          |                |                       |              |
| 114                | Biotin (mg / kg (ppm))           | 1                       | 1                       | 0.8140   |        |                            |                     |                          |                |                       |              |
| 115                | Non Protein N (NPN) (%)          | 7                       | 7                       | 4.690    | 3.522  | 4.690                      | 3.994               | 1.887                    | 85.15%         | 0.1029                | 3.17%        |
| 118                | Peroxide value (meq/kg)          | 1                       | 1                       | 5.215    |        |                            |                     |                          |                |                       |              |
| 120                | Alanine (%)                      | 34                      | 34                      | 0.8242   | 0.2069 | 0.7971                     | 0.0605              | 0.0130                   | 7.59%          | 0.0181                | 4.14%        |
| 121                | Arginine (%)                     | 33                      | 32                      | 1.078    | 0.1779 | 1.044                      | 0.0622              | 0.0137                   | 5.96%          | 0.0191                | 3.97%        |
| 122                | Aspartic (%)                     | 33                      | 33                      | 1.708    | 0.2618 | 1.665                      | 0.0928              | 0.0202                   | 5.57%          | 0.0469                | 3.70%        |
| 124                | Cysteine/Cystine (%)             | 35                      | 34                      | 0.2561   | 0.0592 | 0.2578                     | 0.0333              | 0.0071                   | 12.92%         | 0.0125                | 4.90%        |
| 125                | Glutamic (%)                     | 34                      | 34                      | 2.760    | 0.3807 | 2.704                      | 0.2564              | 0.0550                   | 9.48%          | 0.0742                | 3.44%        |
| 126                | Glycine (%)                      | 34                      | 34                      | 0.8330   | 0.1754 | 0.8104                     | 0.0434              | 0.0093                   | 5.36%          | 0.0191                | 4.13%        |
| 127                | Histidine (%)                    | 34                      | 33                      | 0.4097   | 0.0725 | 0.3986                     | 0.0301              | 0.0065                   | 7.54%          | 0.0101                | 4.59%        |
| 128                | Isoleucine (%)                   | 35                      | 34                      | 0.6498   | 0.1130 | 0.6403                     | 0.0597              | 0.0128                   | 9.32%          | 0.0161                | 4.28%        |
| 129                | Leucine (%)                      | 35                      | 34                      | 1.184    | 0.2277 | 1.136                      | 0.0603              | 0.0129                   | 5.31%          | 0.0203                | 3.92%        |
| 130                | L-Lysine (%)                     | 36                      | 36                      | 0.8808   | 0.1467 | 0.8588                     | 0.0581              | 0.0121                   | 6.76%          | 0.0286                | 4.09%        |
| 131                | Methionine (%)                   | 35                      | 33                      | 0.3561   | 0.0759 | 0.3609                     | 0.0348              | 0.0076                   | 9.65%          | 0.0154                | 4.66%        |
| 132                | Phenylalanine (%)                | 35                      | 35                      | 0.7734   | 0.1173 | 0.7521                     | 0.0499              | 0.0106                   | 6.64%          | 0.0193                | 4.17%        |
| 133                | Proline (%)                      | 33                      | 32                      | 0.9825   | 0.3220 | 0.9100                     | 0.0551              | 0.0122                   | 6.06%          | 0.0191                | 4.06%        |
| 134                | Serine (%)                       | 34                      | 34                      | 0.8169   | 0.1193 | 0.7903                     | 0.0584              | 0.0125                   | 7.39%          | 0.0231                | 4.14%        |
| 135                | Threonine (%)                    | 34                      | 34                      | 0.6600   | 0.1212 | 0.6326                     | 0.0386              | 0.0083                   | 6.10%          | 0.0163                | 4.29%        |
| 136                | Tryptophan (%)                   | 23                      | 22                      | 0.2289   | 0.0794 | 0.2211                     | 0.0358              | 0.0095                   | 16.19%         | 0.0054                | 5.02%        |
| 137                | Tyrosine (%)                     | 28                      | 27                      | 0.5325   | 0.1422 | 0.5168                     | 0.0943              | 0.0227                   | 18.25%         | 0.0269                | 4.42%        |
| 138                | Valine (%)                       | 35                      | 35                      | 0.8051   | 0.1563 | 0.7780                     | 0.0725              | 0.0153                   | 9.32%          | 0.0224                | 4.15%        |
| 139                | Taurine (%)                      | 5                       | 3                       | 0.0418   | 0.0435 | 0.0418                     | 0.0435              | 0.0251                   | 103.94%        | 0.0003                | 6.45%        |
| 140                | Lysine Free (%)                  | 1                       | 1                       | 0.8166   |        |                            |                     |                          |                |                       |              |
| 141                | Methionine Free (%)              | 1                       | 1                       | 0.4123   |        |                            |                     |                          |                |                       |              |
| 160                | Fructose (%)                     | 2                       | 2                       | 0.3938   | 0.4048 |                            |                     |                          |                |                       |              |
| 161                | Galactose (%)                    | 1                       |                         | 0.0000   |        |                            |                     |                          |                |                       |              |
| 162                | Glucose (%)                      | 2                       | 2                       | 0.1965   | 0.1464 |                            |                     |                          |                |                       |              |

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|--------------------|---|-------------------------|-------------------------|----------|--------|----------------------------|---------------------|--------------------------|----------------|-----------------------|--------------|
| 163                | Lactose (%)   | 2                       |                         | 0.0000   |        |                            |                     |                          |                |                       |              |
| 164                | Maltose (%)   | 2                       | 1                       | 0.1055   |        |                            |                     |                          |                |                       |              |
| 165                | Sucrose (%)   | 2                       | 2                       | 1.958    | 0.2570 |                            |                     |                          |                |                       |              |
| 166                | Raffinose (%)   | 2                       | 2                       | 0.5250   | 0.0354 |                            |                     |                          |                |                       |              |
| 167                | Stachyose (%)   | 2                       | 2                       | 0.7475   | 0.0318 |                            |                     |                          |                |                       |              |
| 400                | Water Activity (Units)  | 10                      | 9                       | 0.5095   | 0.0372 | 0.5029                     | 0.0242              | 0.0101                   | 4.82%          | 0.0030                |              |
| 412                | Starch, Dietary (%)   | 1                       | 1                       | 5.925    |        |                            |                     |                          |                |                       |              |
| 516                | Arsenic, Total (mg / kg (ppm))                                    | 9                       | 7                       | 0.4706   | 0.0372 | 0.4716                     | 0.0399              | 0.0189                   | 8.46%          | 0.0133                | 17.91%       |
| 518                | Cadmium (mg / kg (ppm))   | 12                      | 11                      | 0.2914   | 0.0513 | 0.3013                     | 0.0284              | 0.0107                   | 9.44%          | 0.0105                | 19.16%       |
| 520                | Chromium (mg / kg (ppm))  | 12                      | 11                      | 12.99    | 4.009  | 12.99                      | 4.546               | 1.713                    | 35.00%         | 0.3670                | 10.88%       |
| 526                | Lead (mg / kg (ppm))  | 12                      | 11                      | 1.204    | 0.2153 | 1.200                      | 0.2344              | 0.0884                   | 19.54%         | 0.1282                | 15.56%       |
| 529                | Mercury (µg / kg (ppb))   | 4                       | 3                       | 21.74    | 32.70  | 21.74                      | 32.70               | 18.88                    | 150.46%        | 3.102                 | 22.00%       |
| 539                | Nickel (mg / kg (ppm))  | 7                       | 7                       | 5.982    | 1.247  | 6.186                      | 0.8968              | 0.4237                   | 14.50%         | 0.2717                | 12.16%       |
| 710                | Lauric Acid (12:0) (% (w/w))                                      | 3                       | 1                       |          |        |                            |                     |                          |                |                       |              |
| 714                | Myristic Acid (14:0) (% (w/w))                                    | 3                       | 2                       | 0.2725   | 0.3712 | 0.2725                     | 0.3712              | 0.2625                   | 136.23%        | 0.0060                |              |
| 716                | Palmitic Acid (16:0) (% (w/w))                                    | 3                       | 3                       | 6.260    | 10.06  | 6.260                      | 10.06               | 5.810                    | 160.74%        | 0.1467                |              |
| 718                | Palmitoleic Acid (9c-16:1) (% (w/w))                              | 4                       | 3                       | 0.1163   | 0.1764 | 0.1163                     | 0.1764              | 0.1019                   | 151.65%        | 0.0147                |              |
| 720                | Margaric acid (17:0) (% (w/w))                                    | 1                       | 1                       | 0.3200   |        |                            |                     |                          |                |                       |              |
| 722                | Stearic Acid (18:0) (% (w/w))                                     | 3                       | 3                       | 1.944    | 3.158  | 1.944                      | 3.158               | 1.823                    | 162.49%        | 0.0703                |              |
| 724                | Oleic Acid (9c-18:1) (% (w/w))                                    | 3                       | 3                       | 5.852    | 9.499  | 5.852                      | 9.499               | 5.484                    | 162.32%        | 0.0353                |              |
| 726                | Linoleic Acid (9c,12c-18:2) (% (w/w))                             | 5                       | 4                       | 0.9760   | 0.0319 | 0.9760                     | 0.0319              | 0.0159                   | 3.26%          | 0.0210                |              |
| 728                | alpha-Linolenic Acid (9c,12c,15c-18:3) (% (w/w))                  | 4                       | 3                       | 0.1342   | 0.0081 | 0.1342                     | 0.0081              | 0.0047                   | 6.04%          | 0.0030                |              |
| 730                | Arachidic Acid (20:0) (% (w/w))                                   | 3                       | 2                       | 0.2358   | 0.3171 | 0.2358                     | 0.3171              | 0.2243                   | 134.52%        | 0.0305                |              |
| 732                | Gondoic Acid (11c-20:1) (% (w/w))                                 | 2                       | 1                       | 0.0090   |        |                            |                     |                          |                |                       |              |
| 736                | Arachidonic Acid (5c,8c,11c,14c-20:4) (% (w/w))                   | 1                       |                         | 0.0000   |        |                            |                     |                          |                |                       |              |
| 740                | Eicosapentaenoic Acid EPA (5c,8c,11c,14c,17c-20:5) (% (w/w))      | 2                       |                         | 0.0000   |        |                            |                     |                          |                |                       |              |
| 742                | Behenic Acid (22:0) (% (w/w))                                     | 3                       | 2                       | 0.2533   | 0.3348 | 0.2533                     | 0.3348              | 0.2368                   | 132.21%        | 0.0115                |              |
| 744                | Erucic Acid (13c-22:1) (% (w/w))                                  | 1                       |                         | 0.0050   |        |                            |                     |                          |                |                       |              |
| 746                | Docosapentaenoic Acid n-3 DPA (7c,10c,13c,16c,19c-22:5) (% (w/w)) | 1                       |                         | 0.0050   |        |                            |                     |                          |                |                       |              |
| 748                | Lignoceric Acid (24:0) (% (w/w))                                  | 2                       | 2                       | 0.2268   | 0.2874 |                            |                     |                          |                |                       |              |
| 750                | Docosahexaenoic Acid DHA (4c,7c,10c,13c,16c,19c-22:6) (% (w/w))   | 2                       | 1                       | 0.3750   |        |                            |                     |                          |                |                       |              |
| 752                | Nervonic Acid (24:1) isomers (% (w/w))                            | 1                       |                         | 0.0050   |        |                            |                     |                          |                |                       |              |
| 754                | Total n-3 Polyunsaturated (Omega-3) Fatty Acids (% (w/w))         | 3                       | 3                       | 0.1398   | 0.0098 | 0.1398                     | 0.0098              | 0.0056                   | 6.97%          | 0.0010                |              |
| 756                | Total n-6 Polyunsaturated (Omega-6) Fatty Acids (% (w/w))         | 3                       | 3                       | 0.9800   | 0.0427 | 0.9800                     | 0.0427              | 0.0247                   | 4.36%          | 0.0140                |              |
| 758                | Total Saturated Fatty Acids (% (w/w))                             | 1                       | 1                       | 0.7050   |        |                            |                     |                          |                |                       |              |
| 762                | Total Monounsaturated Fatty Acids (% (w/w))                       | 1                       | 1                       | 0.4450   |        |                            |                     |                          |                |                       |              |
| 766                | Total Polyunsaturated Fatty Acids (% (w/w))                       | 1                       | 1                       | 1.090    |        |                            |                     |                          |                |                       |              |
| 770                | Total Fat (equivalent to NLEA) (% (w/w))                          | 1                       | 1                       | 2.370    |        |                            |                     |                          |                |                       |              |
| 772                | Total Fatty Acids (% (w/w))                                       | 2                       | 2                       | 2.138    | 0.1863 |                            |                     |                          |                |                       |              |

Notes: Robust statistics not used if < 6 labs reporting, in this case means and SD's may be reported based on Raw Data with obvious blunders removed.

Test Material Code # 201931

Issue Date : 12/31/2019

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|--------------------|--------------------|-------------------------|-------------------------|----------|--------|----------------------------|---------------------|--------------------------|----------------|-----------------------|--------------|
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