

## Certificate of Analysis

|                   |                 |
|-------------------|-----------------|
| <b>Product</b>    | CASTOR OIL, USP |
| <b>LOT #</b>      | 10729           |
| <b>Shelf Life</b> | 3 years         |

| Properties             | Specifications   | Results  |
|------------------------|--|----------|
| Free Fatty Acid        | 1.5 Max  | 0.26     |
| Saponification Value   | 176 – 185  | 180.29   |
| Hydroxyl Value         | 160 – 168  | 167.71   |
| Iodine Value           | 82 – 90  | 85.30    |
| Specific Gravity @30°C |  | 0.9590   |
| Heavy metals           | 0.001 Max  | 0.0      |
| Distinction            | Partly soluble in solvent hexane.<br>Yields a clear liquid with an equal<br>volume of alcohol. | Comforms |

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| <b>Product</b>    | CASTOR OIL, USP |
| <b>LOT #</b>      | PH/38/E/20      |
| <b>Shelf Life</b> | 2 years         |

| Properties  | Specifications  | Results  |
|---|---|----------|
| Distinction from most other fixed oils                    | It is only slightly soluble in solvent hexane, Yields a clear liquid with an equal volume of alcohol. | Pass     |
| Identification, UV absorption                             | 0.7 – 1.5   | 1.14     |
| Fats and fixed oils (AV)                                  | NMT 2.0   | 0.68     |
| Hydroxyl Value  | 160 – 168   | 161.42   |
| Peroxide value  | NMT 10.0  | 2.15     |
| Unsaponifiable matter                                     | NMT 0.8   | 0.39     |
| Water   | NMT 0.3   | 0.21     |
| Specific Gravity @25°C                                    | 0.957 – 0.961   | 0.958    |
| <b>Triglyceride Composition</b>                           |   |          |
| RRR   | ≥ 90  | Conforms |
| RRL   | 2.0 - 4.0   | Conforms |
| RRO   | 2.5 - 5.0   | Conforms |
| RRS   | 0.2 - 0.8   | Conforms |
| <b>Fatty Acid Composition</b>                             |   |          |
| Palmitic Acid (C16:0)                                     | < 2.0   | 1.28     |
| Stearic Acid (C18:0)                                      | < 2.5   | 1.34     |
| Oleic Acid (C18:1)  | 2.5 - 6.0   | 4.43     |
| Linoleic Acid (C18:2)                                     | 2.5 – 7.0   | 4.64     |
| Linolenic Acid (C18:3)                                    | < 1.0   | 0.48     |
| Cis-11-Eicosenoic Acid (C20:1)                            | < 1.0   | 0.16     |
| Ricinoleic Acid   | 85 – 92   | 87.14    |
| Cis-11-Octadecenoic acid or other unidentified fatty acid | < 1.0   | 0.53     |

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| <b>Product</b>    | CASTOR OIL, USP |
| <b>LOT #</b>      | PH/13/C/20      |
| <b>Shelf Life</b> | 2 years         |

| Properties                                      | Specifications | Results                                       |
|---|----------------|---|
| Acid value                                      | ≤ 2.0          | 0.86  |
| Unsaponifiable matter                           | ≤ 0.8          | 0.36  |
| Peroxide value                                  | ≤ 10           | 1.71  |
| Water By KF                                     | ≤ 3            | 0.14  |
| Ultraviolet Absorbance<br>(Specific Absorption) | 0.7 – 1.5      | 268 nm=1.325<br>269 nm =1.336<br>270nm =1.313 |
| <b>Fatty Acid Composition</b>                   |                |   |
| Palmitic Acid (C16:0)                           | ≤ 2            | 1.05  |
| Stearic Acid (C18:0)                            | ≤ 2.5          | 1.26  |
| Oleic Acid (C18:1)                              | 2.5 – 6.0      | 3.42  |
| Linoleic Acid (C18:2)                           | 2.5 – 7.0      | 4.38  |
| Linolenic Acid (C18:3)                          | ≤10            | 0.54  |
| Cis-11-Eicosenoic Acid (C20:1)                  | ≤1.0           | 0.26  |
| Ricinoleic Acid                                 | 85 – 92        | 88.46   |
| Others  | ≤1.0           | 0.63  |

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| <b>Product</b>    | CASTOR OIL, USP |
| <b>Lot #</b>      | 1121109         |
| <b>Shelf Life</b> | 2 years         |

| Properties              | Specifications | Results  |
|-------------------------|----------------|----------|
| Flavor/Aroma            | Typical        | Complies |
| Acid Value MG KOH/G     | 0 – 2          | 0.88     |
| Unsaponifiable matter   | 0.0 – 0.80     | 0        |
| Peroxide Value (MEQ/KG) | 0 - 10         | 2.40     |
| Palmitic Acid C 16:0    | 0.0 – 2.0      | 1.22     |
| Stearic Acid C18:0      | 0.0 – 2.5      | 1.48     |
| Oleic Acid C18:1        | 2.5 – 6.0      | 4.65     |
| Linoleic Acid C18:2     | 2.5 – 7.0      | 5.32     |
| Linolenic Acid C18:3    | 0.0 – 1.0      | 0.57     |
| Eicosenoic Acid C20:1   | 0 - 1          | 0.30     |
| Ricinoleic Acid         | 85 - 92        | 87.18    |
| Moisture Content        | 0 – 0.3        | 0.110    |
| Uv Absorption           | 0.7 – 1.5      | 1.126    |

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