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STABILITY DATA

Astaxanthin Powder 5%

This document presents the stability profile of Astaxanthin Powder 5% supplied by Chengdu PNP Biotech Co., Ltd. Samples were packed in the normal commercial package and stored under the conditions stated for each study, and the product was tested at every time point shown below. The programme covers a long-term study and an accelerated study, conducted in accordance with the ICH Q1A methodology (and the corresponding pharmacopeial stability guideline for drug substances), each performed on three separate, non-consecutive production batches, with the analytical results from testing actually carried out at each time point.

Product Name	Astaxanthin Powder 5%	**Country of Origin**	China
Biological Source	*Haematococcus pluvialis*	**Part Used**	Whole algae

Long-Term Stability

Condition: 25 ± 2 °C / 60 ± 5 % RH. Time points are expressed in months. Each batch is identified in the merged row above its results; all batches were stored through the final time point, and every listed result is from testing performed at that time point.

The shelf life stated for this product is confirmed by these real-time long-term stability studies.

Test Item	Specification	0 m	3 m	6 m	9 m	12 m	18 m	24 m
Batch LT-1 | Manufacture 2023-11-08 | Study start 2023-11-15								
Appearance / color	Dark-red powder	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms
Odor & taste	Characteristic	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms
Astaxanthin	≥ 5.0%	5.26%	5.22%	5.24%	5.19%	5.12%	5.13%	5.09%
Loss on Drying	≤ 7.0%	3.01%	3.18%	3.39%	3.51%	3.64%	4.14%	4.41%
Standard Plate Count	≤ 10,000 cfu/g	535 cfu/g	1,064 cfu/g	419 cfu/g	1,280 cfu/g	1,007 cfu/g	1,660 cfu/g	754 cfu/g
Total Yeast & Mold	≤ 1,000 cfu/g	27 cfu/g	33 cfu/g	71 cfu/g	41 cfu/g	142 cfu/g	82 cfu/g	92 cfu/g
Batch LT-2 | Manufacture 2024-04-03 | Study start 2024-04-10								
Appearance / color	Dark-red powder	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms
Odor & taste	Characteristic	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms
Astaxanthin	≥ 5.0%	5.25%	5.23%	5.20%	5.20%	5.13%	5.11%	5.09%
Loss on Drying	≤ 7.0%	2.87%	2.92%	3.18%	3.47%	3.45%	4.05%	4.28%
Standard Plate Count	≤ 10,000 cfu/g	676 cfu/g	838 cfu/g	642 cfu/g	916 cfu/g	1,638 cfu/g	1,480 cfu/g	728 cfu/g
Total Yeast & Mold	≤ 1,000 cfu/g	81 cfu/g	61 cfu/g	43 cfu/g	118 cfu/g	103 cfu/g	176 cfu/g	218 cfu/g
Batch LT-3 | Manufacture 2024-09-11 | Study start 2024-09-18								
Appearance / color	Dark-red powder	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms
Odor & taste	Characteristic	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms	Conforms
Astaxanthin	≥ 5.0%	5.37%	5.32%	5.31%	5.28%	5.23%	5.17%	5.06%
Loss on Drying	≤ 7.0%	2.97%	3.13%	3.36%	3.58%	3.72%	4.20%	4.59%
Standard Plate Count	≤ 10,000 cfu/g	777 cfu/g	969 cfu/g	570 cfu/g	745 cfu/g	1,218 cfu/g	1,699 cfu/g	1,883 cfu/g
Total Yeast & Mold	≤ 1,000 cfu/g	25 cfu/g	66 cfu/g	53 cfu/g	74 cfu/g	154 cfu/g	171 cfu/g	177 cfu/g

Accelerated Stability

Condition: 40 ± 2 °C / 75 ± 5 % RH. Time points are expressed in months.

Accelerated data are supportive only; the shelf life is ultimately confirmed by the real-time long-term studies above.

Test Item	Specification	0 m	1 m	2 m	3 m	6 m
Batch ACC-1 | Manufacture 2023-10-24 | Study start 2023-10-31						
Appearance / color	Dark-red powder	Conforms	Conforms	Conforms	Conforms	Conforms
Odor & taste	Characteristic	Conforms	Conforms	Conforms	Conforms	Conforms

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Test Item	Specification	0 m	1 m	2 m	3 m	6 m
Batch ACC-1 | Manufacture 2023-10-24 | Study start 2023-10-31						
Astaxanthin	≥ 5.0%	5.28%	5.26%	5.17%	5.20%	5.09%
Loss on Drying	≤ 7.0%	2.96%	3.21%	3.47%	3.65%	4.33%
Standard Plate Count	≤ 10,000 cfu/g	884 cfu/g	1,058 cfu/g	1,233 cfu/g	1,073 cfu/g	1,066 cfu/g
Total Yeast & Mold	≤ 1,000 cfu/g	55 cfu/g	94 cfu/g	69 cfu/g	100 cfu/g	218 cfu/g
Batch ACC-2 | Manufacture 2023-12-06 | Study start 2023-12-13						
Appearance / color	Dark-red powder	Conforms	Conforms	Conforms	Conforms	Conforms
Odor & taste	Characteristic	Conforms	Conforms	Conforms	Conforms	Conforms
Astaxanthin	≥ 5.0%	5.30%	5.32%	5.27%	5.16%	5.10%
Loss on Drying	≤ 7.0%	2.68%	3.01%	3.32%	3.57%	4.31%
Standard Plate Count	≤ 10,000 cfu/g	382 cfu/g	782 cfu/g	1,067 cfu/g	884 cfu/g	1,179 cfu/g
Total Yeast & Mold	≤ 1,000 cfu/g	25 cfu/g	76 cfu/g	46 cfu/g	119 cfu/g	195 cfu/g
Batch ACC-3 | Manufacture 2024-01-17 | Study start 2024-01-24						
Appearance / color	Dark-red powder	Conforms	Conforms	Conforms	Conforms	Conforms
Odor & taste	Characteristic	Conforms	Conforms	Conforms	Conforms	Conforms
Astaxanthin	≥ 5.0%	5.23%	5.26%	5.15%	5.17%	5.05%
Loss on Drying	≤ 7.0%	2.81%	3.14%	3.31%	3.66%	4.25%
Standard Plate Count	≤ 10,000 cfu/g	452 cfu/g	497 cfu/g	1,355 cfu/g	1,071 cfu/g	1,711 cfu/g
Total Yeast & Mold	≤ 1,000 cfu/g	73 cfu/g	47 cfu/g	75 cfu/g	102 cfu/g	183 cfu/g

Legend: “Conforms” means the attribute is consistent with the initial (0-month) value and meets the specification.

Prepared by: Mia Yu Approved by: Charlie Wang Date: Nov. 02, 2026