

# YOUR TRUSTED ASTAXANTHIN SOURCE



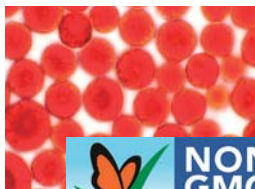
25 years of scientific research

## No. 1 for Safety and Clinical Efficacy

Where and how your source of Astaxanthin is grown affects product quality and safety

AstaReal are the trusted Astaxanthin leader with over 25 years scientific research and the first to commercially produce this incredible molecule. As the largest producers globally we continue as the world leader in scientific research, product development, quality and supply of natural algae Astaxanthin.

### *Haematococcus pluvialis*: Nature's Richest Source of Astaxanthin



AstaReal® astaxanthin is derived from the richest natural source from the microalgae *Haematococcus pluvialis* (*H. pluvialis*).



**AstaReal® Astaxanthin is Natural Plant Source GMO Free**

Suitable for vegetarian consumers

Comparison of Astaxanthin sources contents in 100g		
Animal source	Salmon	3 mg
	Krill	4 mg
Plant source	<b><i>H. pluvialis</i></b> (AstaReal® source)	<b>6000 mg</b>

*H. Pluvialis* contains 1500 x more Astaxanthin than Krill

### Mechanism for Algae Survival

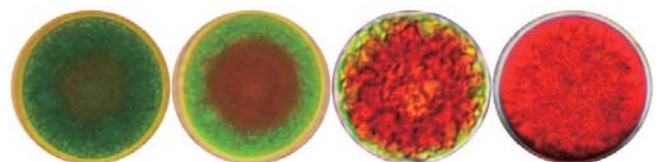
*H. pluvialis* is a single cell, fresh water algae which generates astaxanthin as its natural process of protection and mechanism for long life. The algae begins in the 'Green' stage developing to the 'Red' stage by generating astaxanthin in response to specific changes in the surrounding environment such as depleted water, reduced nutrients and intense sunlight.

A key to pure, highly concentrated astaxanthin is emulating perfect, optimum conditions (including light and temperature levels) for the algae to progress and mature fully into the 'Red' stage without compromise. If conditions aren't properly controlled 24 hours a day *H. pluvialis* can revert back to the green stage where you risk the integrity and purity of astaxanthin generated.

Clean air and water at the location of growing are essential because algae are susceptible to accumulate pollutants.

Do you know where and how your astaxanthin is grown?

**GREEN STAGE** **RED STAGE**



**Algae generates Astaxanthin according to its environmental conditions.**

**Light and temperature need to be perfectly optimised**

**AstaReal's ultra clean, indoor photobioreactor cultivation technology answers these challenges with advanced controlled conditions**

**Not All Natural Algae Astaxanthin is Created Equal.  
AstaReal Indoor Cultivation Technology Defines Quality & Safety.**

#### What is the difference to you?

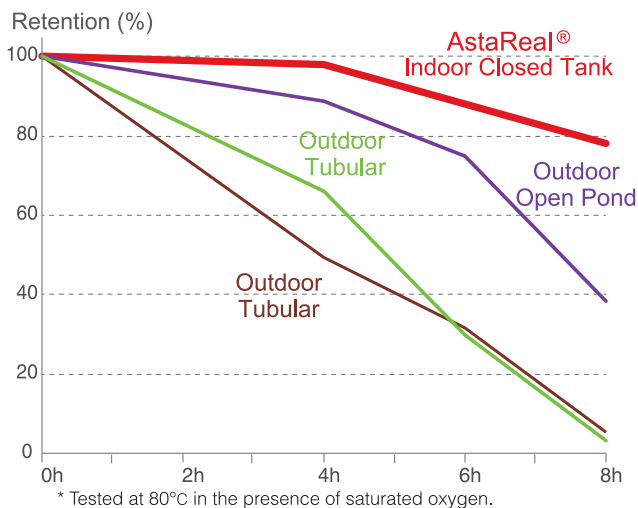
- **Purity -** Contaminants and pollutants found in products harvested in outdoor environments can carry into your product.
- **Odor & Taste -** Outdoor grown products have complex odorous compounds leading to more noticeable smell and taste. Consumer compliance is increased with acceptable taste and odor.
- **Stability -** Comparison accelerated high heat stability testing demonstrates poor quality of outdoor grown products.
- **Supply Capacity -** Outdoor methods are limited by seasonal forces and daylight cultivation hours.

**Consider the integrity of your product and brand. Choose No.1 in safety, efficacy and quality.**

Read on for more information

## QUALITY

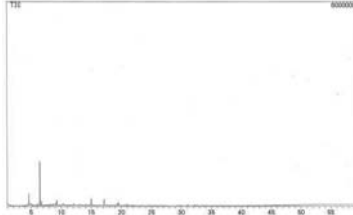
### AstaReal® Accelerated High Heat Stability Performance



AstaReal® is more stable due to higher purity. High heat stability during transport is important with globalised markets. Product integrity in various temperatures can make a difference to your customer receiving high quality product or not.

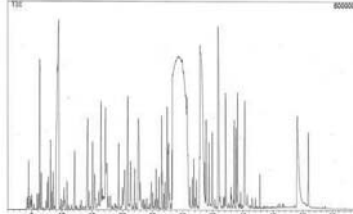
### Superior Taste and Odor Profile of AstaReal®

#### AstaReal® Indoor Closed Tank

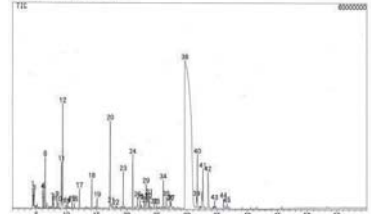


AstaReal® has fewer volatile impurities resulting in superior taste and odor profile

#### Outdoor Open Pond



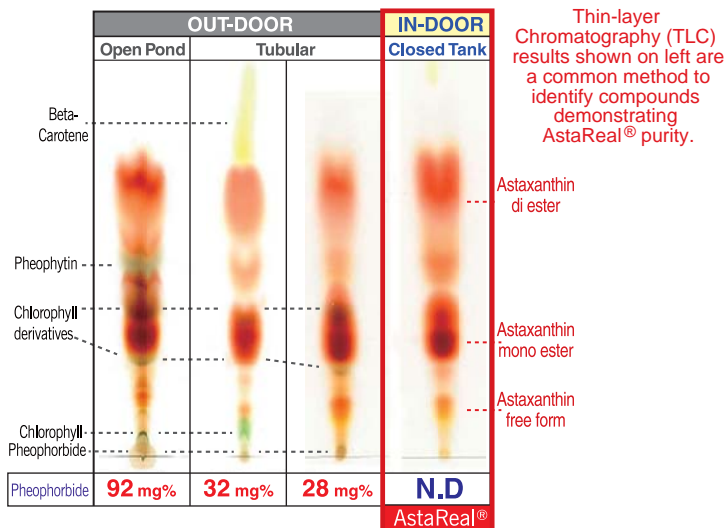
#### Outdoor Tubular



Headspace GC/MS analysis demonstrates the impact impurities have on taste and odor. The more complex the profile means more noticeable smell and taste.

## PURITY & SAFETY

### AstaReal® = The Purest Astaxanthin



The presence of Pheophorbides and other chlorophyll derived contaminants indicate astaxanthin harvested too early which has not matured enough. Higher levels of  $\beta$ -Carotene also indicate lower quality algae astaxanthin. Comparison testing consistently shows that AstaReal® is the purest Astaxanthin available.

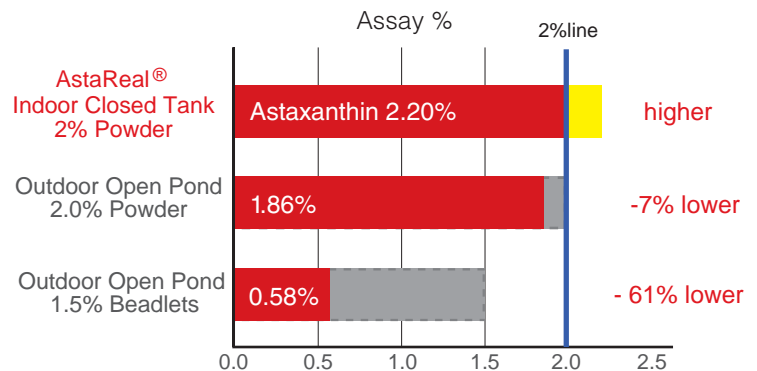
### HPLC Assay Demonstrates True Astaxanthin Content

What test proves astaxanthin purity?

HPLC method quantifies astaxanthin as a single component. Alternate test methods will include other carotenoids in the result and give an incorrect measure.

AstaReal® has a high percentage of astaxanthin content and complies with product specifications. Other manufacturers tested lower astaxanthin content than their specification indicated.

Ensure your astaxanthin content is correct and test by HPLC.



## SUPPLY CAPACITY AND LOCATIONS

### Supply from 3 Production Sites

- Consistent and stable supply as largest manufacturer globally.
- Clean air and pristine water at site locations.

### Made in Sweden, USA and Japan

SWEDEN:  
Cultivation / Product  
manufacturing site

Gustavsberg, Sweden



JAPAN:  
Product manufacturing site  
Toyama, Japan



USA:  
Cultivation / Product  
manufacturing site

Moses Lake, USA



## Q. What causes these differences?

### A. Cultivation system defines safety and quality

These results demonstrate how different methods for growing *Haematococcus pluvialis* and the process of astaxanthin generation lead to different results for final products. Uncontrolled growth conditions and processing methods leave impurities and affect product quality and safety.

AstaReal Group is the world's first company to commercially produce natural algae astaxanthin. AstaReal trialed outdoor methods and determined these were insufficient.

To overcome the challenges with outdoor methods and to strive for excellence we developed cutting-edge indoor photobioreactor technology.

### Perfectly Controlled Advanced Indoor System Provides Ideal Conditions for Every Harvest Stage



- High astaxanthin content biomass
- Low contamination risk
- Unlimited light time – day + night cultivation
- Ultra-clean, hygiene controlled
- Controlled temperature
- Pure and mature astaxanthin production

AstaReal Internationally  
Recognised and  
Audited Quality Certifications



### Outdoor Systems Exposed to Uncontrolled Environmental Elements



Uncontrolled system open to contamination

- Low astaxanthin content biomass
- High contamination risk
- Exposure to environmental elements
- Limited light time: day only
- Uncontrolled temperature
- High water usage



Outdoor tubes affected by light and temperature

- Medium astaxanthin content biomass
- Contamination Risk Higher than Closed Tank
- Exposure to environmental elements
- Limited light time: day only
- Uncontrolled temperature
- High water usage



# CLINICAL EVIDENCE

Assurance you are dealing with the experts



## Most studied brand for safety and efficacy

Over 50% of the 142 clinical studies on Astaxanthin have been conducted with AstaReal ingredients. Safety goes hand in hand with being the most clinically studied product. AstaReal® Astaxanthin has been evaluated in over 40 safety studies on various dosages (up to 45mg) and timeframes (up to 6 months.)

### Leading Examples of Safety Studies

Study Type	Daily Dose	Duration	Study Design	No. of Participant	Results	References
Muscle Endurance (Safety Observation)	4 mg	6 months	Double Blind Placebo Controlled	40	NAE reported in treated groups. Increased muscle endurance.	Malmsten CL <i>et al.</i> , Carotenoid Science. 2008; 13: 20-22.
Eye Fatigue Accommodative (Safety Assessment)	9 mg	4 weeks	Double Blind Placebo Controlled	84	NAE reported in treated groups. Reduced eye fatigue and improved eye accommodative function.	Nagaki Y <i>et al.</i> , Folia Japonica de Ophthalmologica Clinica. 2010; 3(5): 461-68.
Functional Dyspepsia (Safety Observation)	16 / 40 mg	4 weeks	Double Blind Placebo Controlled	132	NAE reported in treated groups. Significantly reduced dyspeptic symptoms.	Kupcinskis L <i>et al.</i> , Phytomedicine. 2008; 15(6-7): 391-99.
High-Dose (Safety Assessment)	45 mg	4 weeks	Double Blind Placebo Controlled	22	NAE reported based on haematological, urinalysis and ophthalmological parameters.	Kajita M <i>et al.</i> , Folia Japonica de Ophthalmologica Clinica. 2010; 3(4): 365-70.

Over 40 Safety  
Clinical Studies  
on AstaReal®

### Leader in Astaxanthin patents: Granted Patents of AstaReal® Astaxanthin

AstaReal is the leading holder of patents related to the use of Astaxanthin with over 110 patents registered all over the world. (as of APR 2016)

Approved Patent Description for Human Health	Pat.#
Relieving eye controlling function error	EP 1396264
Oral preparation for the prophylactic and therapeutic treatment of <i>Helicobacter</i> sp. infection	US 6262316
Medicament for improvement of duration of muscle function or treatment of muscle disorders or diseases	US 6245818
Method of increasing the production and improving the quality of semen	US 6410602
Method of the prophylactic treatment of mastitis	US 6335015
Treatment of dyspepsia	US 6923967
Use of xanthophylls, astaxanthin e.g., for treatment of autoimmune diseases, chronic viral and intracellular bacterial infections	US 6773708
Method of inhibiting the expression of inflammatory cytokines and chemokines	US 7078040
Composition for body fat reduction	JP 5165894
Ameliorating agent for metabolic syndrome	EP 1938810
Astaxanthin for improving muscle atrophy	EP 2653157
Approved Patent Description for Animals	Pat.#
Astaxanthin-containing pet foods	US 8623434

## AstaReal® Advantage



A branded ingredient recognised globally by health and scientific professionals.  
Backed by decades of evidence based research which continues today.



AstaReal® Logo  
on Your Products  
Represents  
Quality, Safety, Trust and Innovation

\*Permission, approval and conditions of use apply to AstaReal ingredient logo.

Contact us for more details !

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[www.astareal.com](http://www.astareal.com)