



InterClinical Laboratories

Newsletter

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Algotene®

InterClinical Laboratories has produced a significant "world first" healthcare product using whole dried *Dunaliella salina* organically grown in Australia¹

Dunaliella salina

Dunaliella salina is a marine microalgae that has high levels of carotenoid anti-oxidants, minerals and trace elements, including selenium, magnesium and manganese.² It is a single-cell, soft walled, edible marine microalgae that evolved over 500 million years ago. It sits at the base of the food chain and has evolved to live in extreme environments in coastal waters, brine rock pools and salt water lakes. It has adapted to cope with these environments by producing very high levels of antioxidants.

InterClinical Laboratories, working in conjunction with AquaCarotene Limited, have developed a new treasure in natural medicine that could prove to be a real gold mine in everyday healthcare and therapy. According to the *Journal of Complementary Medicine* "most of the clinical research on *dunaliella* has been on betacarotene-rich whole organism. Human studies, however, suggest that *dunaliella* can protect against exercise-induced asthma, normalize high LDL oxidation in patients with diabetes and male hyperlipidaemic smokers, as well as protect the skin from sun damage and protect against radiation damage, as demonstrated by its use in children exposed to the Chernobyl disaster."

"Animal studies further suggest that the natural betacarotene-rich *dunaliella* protects against GI inflammation, water-immersion stress, whole-body irradiation and CNS oxygen toxicity".³

Clinically effective phytoplankton

Algotene* is a whole-food, natural multi-nutrient, dietary supplement manufactured with minimal processing and without the use of chemicals or solvents.¹ Minimal processing ensures the levels of carotenoids and minerals remain high and the finished product is just as nature intended. Algotene is particularly high in the carotenoids – beta-carotene, alpha-carotene, lutein, zeaxanthin and cryptoxanthin, and magnesium, manganese, selenium and chlorophyll. It also contains, carbohydrates, fats, omega 3 fatty acids and amino acids making it a truly whole food dietary supplement².

Algotene can be used to:

- Help maintain healthy immune system⁴
- Help maintain healthy skin and eyes⁴
- Help reduce the risk of premature aging⁵
- Help maintain and restore vitality⁶
- Help reduce the risk of chronic disease and sickness⁴
- Improve antioxidant and free radical scavenging activities in the body.⁴

*Patent pending

Algotene is clinically effective in increasing important carotenoid antioxidant levels in the body. Each Algotene capsule contains 500mg whole dried *Dunaliella salina* marine microalgae.

Literary Commentaries

Selenium

Selenium is an essential trace mineral that is required in small amounts by the body. It binds with amino acids to form selenoproteins, which function as antioxidant enzymes. Selenoproteins help prevent cellular damage from reactive oxygen species (ROS), which are a natural by-product of oxygen metabolism. ROS, which include free radicals, may be a contributing factor in many chronic diseases such as cancer and heart-disease.⁷ Selenoproteins also play an important role in supporting the immune system and also assist in regulating thyroid function.^{8,9}

A study conducted by Dr Larry Clark from the University of Arizona and published in the *Journal of the American Medical Association* in December 1996 provided evidence that, "while selenium had no benefit in reducing skin cancer incidence, nutritional supplementation with selenium may reduce the incidence of prostate, lung and colon cancers."¹⁰ Whole dried *Dunaliella salina* contains approx 10mcg of selenium per 1gm.²

Magnesium

Magnesium is the central molecule of chlorophyll, the major pigment found in plants. Algotene is particularly high in chlorophyll as well as magnesium. Magnesium is essential for good health and is the fourth most abundant mineral in the human body. Over 500 reactions require magnesium as a coenzyme including protein, lipid and carbohydrate metabolism and energy production. It is also required for maintaining normal muscle and nerve function, maintaining regular heartbeat and protecting against ischaemia by acting as a vasodilator. It supports the normal function of the immune system, and maintains bone and teeth mineralisation. There has been a lot of interest in magnesium in the prevention and management of disorders such as hypertension, cardiovascular disease, and diabetes.

There has been much research into the effects of magnesium and cardiovascular disease and prevention. Several studies suggest that magnesium may play an important role in regulating blood pressure. It has been shown that diets which provide plenty of fruits and

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vegetables, good sources of potassium and magnesium, are associated with lower blood pressure.^{11,12,13} It has also been shown that supplementation with magnesium also has a beneficial effect on lowering both diastolic and systolic blood pressure.^{14,15} Whole dried *Dunaliella salina* contains approx. 50mg of elemental magnesium per 1gm.²

Lutein and Zeaxanthin

Age-related macular degeneration (AMD) is a disease that gradually destroys sharp, central vision which is required for seeing objects clearly and for common daily tasks such as reading and driving. AMD is a leading cause of blindness in Australia. One in seven people over the age of 50 are affected by the disease, and this increases to one in three for people over the age of 75.¹⁶

One of the major causes of AMD is believed to be exposure to free radicals, which are produced through oxygen metabolism within the body and by external sources such as cigarette smoke, air pollutants, radiation, environmental toxins and certain drugs. This exposure may lead to a degeneration of the macular of the eye over time. The carotenoids lutein and zeaxanthin have been shown to protect the macular pigment by neutralizing free radicals and absorbing harmful blue light from the sun.¹⁷

In a recent article published online by the American Macular Degeneration Foundation the author spoke of many research projects demonstrating the positive effects of lutein and zeaxanthin on AMD. Two Harvard studies (*the Physicians' and Nurses' Health Studies*) demonstrated a direct correlation between increased dietary intake of lutein and zeaxanthin and the prevention of cataracts.¹⁸ Whole dried *Dunaliella salina* contains between 0.5 and 1mg of lutein and zeaxanthin per 1gm.²

Beta Carotene and immunity

There have been many studies conducted into the effects of beta carotene and immune response. It is believed that beta carotene protects immune cells from oxidative damage caused by free radicals. Immune cell receptors rely heavily on cell-to-cell mediated communication to initiate an immune response and once these receptors are damaged cells are unable to function correctly and this may eventually lead to cell death.¹⁹

One study conducted on non-smoking, middle aged men, given beta carotene supplements of 15mg per day (a dietary achievable intake), showed that even with moderate increases in beta carotene intake there were significant increases in plasma levels of beta carotene and in monocyte production. "Those results suggested that moderate increases in the dietary intake of beta-carotene can enhance cell-mediated immune responses within a relatively brief period".

The authors also stated that in addition to providing oxidative protection, beta carotene "might influence immune cell function by modulating the production of prostaglandin E2. This eicosanoid is the major prostaglandin synthesized by monocytes and macro-phages and it has a number of immunosuppressive properties."¹⁹

In other studies beta carotene supplementation has also been found to enhance natural killer cell activity, increase lymphocyte response and increase the CD4 lymphocyte count.^{20,21,22} Whole dried *Dunaliella salina* contains between 11 -21mg of beta carotene per 1gm.²

Beta carotene and Photo-protection

Research into carotenoids also suggest they may play an important role in protecting light exposed tissues such as the skin and eye from sun damage by absorbing blue and UV light, by protecting vulnerable tissues from free radical damage, repairing UV induced damage and enhancing the skins immune function.

Table 1. Typical analysis of *Dunaliella salina*, spirulina and carrots¹⁶

Nutrient	<i>Dunaliella salina</i> (per 1g)	Spirulina (per 1g)	Carrots (per 1g)
Protein	74mg	570mg	10mg
Fat (total)	70mg	80mg	0.0
Carbohydrates	297mg	240mg	100mg
Fibre	4mg	40mg	30mg
Minerals (ash)	490mg	62mg	10mg
Energy	8.93kj	12.14kj	1.8kj
Beta-carotene	11–21mg	0.00342mg	0.058mg
Alpha-carotene	0.531–1,024mg	0.0mg	0.028mg
Lutein & Zeaxanthin	0.543-0.976mg	0.00mg	0.002mg
Cryptoxanthin	0.234–0.465mg	0.00mg	0.001mg
Chlorophyll	22.1mg	10mg	n/a

Source: *Dunaliella salina* National Measurement Institute (Australia) and Craft Technologies Inc. (USA)
Spirulina and Carrot data, USDA National Nutrient Database for standard references, reference 18 (USA)

Table 2. Comparison of minerals in green and functional foods

Mineral (mg/100g)	Whole dried <i>Dunaliella salina</i>	Spirulina	Kelp
Calcium	213	547	1443
Magnesium	4591	330	796
Potassium	2	5	7
Copper	0.3	1.1	0.2
Zinc	3	2	3
Phosphorus	119	857	106
Iron	40.3	50.5	26.9
Manganese	5.13	2.62	3.87
Chromium	0.29	0.53	0.23
Selenium	1.04	0.03	0.69
Boron	14	0.25	11.13
Molybdenum	0.033	0.105	0.094
Sulfur	2185	<2000	2426
Lithium	0.491	0.093	0.068

Source: Trace Elements Inc. (USA)

NB: Nutrient levels will vary from batch to batch.

Beta-Carotene and Non-Insulin-Dependent Diabetes Mellitus (NIDDM)

Oxidative stress is high in patients with NIDDM due to excessive production of ROS. "Recent observations suggest that the damage which occurs when plasma and tissue constituents are exposed to hyperglycaemia is mediated by auto-oxidation and glycation which leads to the production of reactive oxygen species (ROS)."²³

In a study published in 1999 on the effect antioxidant supplementation (*Dunaliella salina*) had on patients with NIDDM, specifically if supplemental beta-carotene could reduce the amount of oxidative injury occurring in patients, the authors concluded that "the hypothesis that antioxidants may protect patients with NIDDM against complications is promising and supported by our data showing the augmentation of the glutathione and part of its redox cycle enzyme activity upon beta-carotene supplementation."²³ The supplemental dosage for this study was 60mg/ day for three weeks using beta-carotene extracted from *Dunaliella salina*. (approx. equiv. 3-6gms whole dried *Dunaliella salina* p/day)²³.

Algotene Pilot Study Results

InterClinical Laboratories have completed a number of initial pilot studies using Algotene and whole dried *Dunaliella salina*. One study monitored patients' magnesium, vitamin A and carotenoid levels over 14 weeks of supplementation with Algotene, 3 capsules twice daily. The results showed that Algotene is clinically effective in elevating serum carotenoid levels without negatively affecting vitamin A levels, vitamin A remained within the reference range in all test cases. Whilst the results showed there was no significant change in magnesium levels, all patients started and finished the study within the recommended reference range.

The two smokers within the test group were of interest as both started the study with very low levels of carotenoids and although neither were able to obtain the same increases the other test cases experienced they both achieved a moderate improvement in carotenoid levels. This result suggests that smokers have a much greater and constant need for carotenoids and antioxidants due to their ongoing exposure to the free radicals and other toxins in cigarette smoke.

It is also noted that these were preliminary studies and that not all test subjects were fully compliant for the duration of the studies.

References are available on request.

Table 3. Amino Acid Profile *Dunaliella salina*

Alanine	Methionine
Arginine	Phenylalanine
Aspartic acid	Proline
Cysteine	Serine
Glutamic acid	Threonine
Glycine	Tryptophan
Histidine	Tyrosine
Isoleucine	Valine
Leucine	Lysine

Source: Australian Proteome Analysis Facility Ltd

For full product details please contact:

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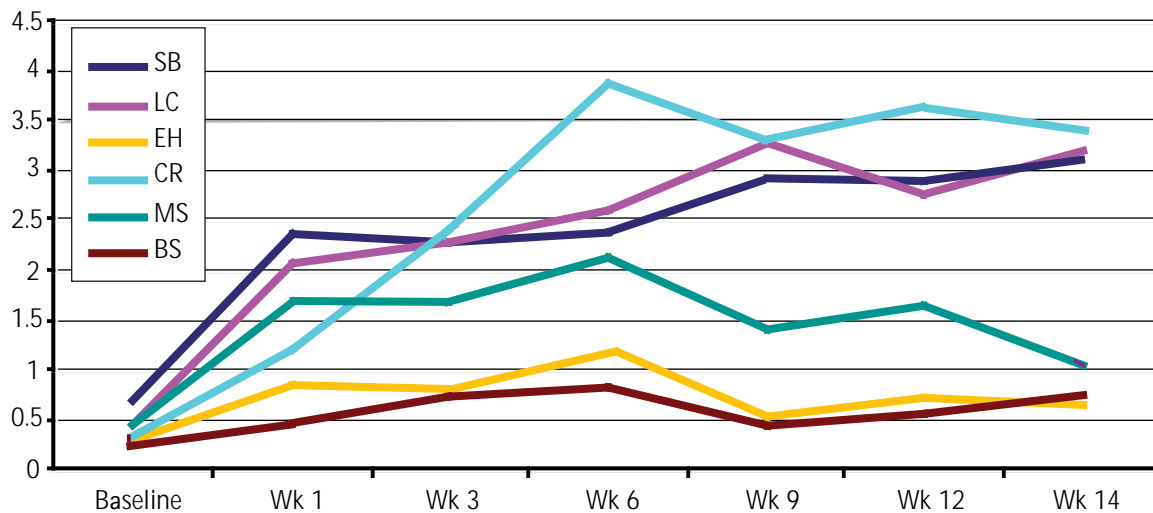
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Algotene Pilot Study Results Carotenoid Level Increases

Dose: 6 capsules per day

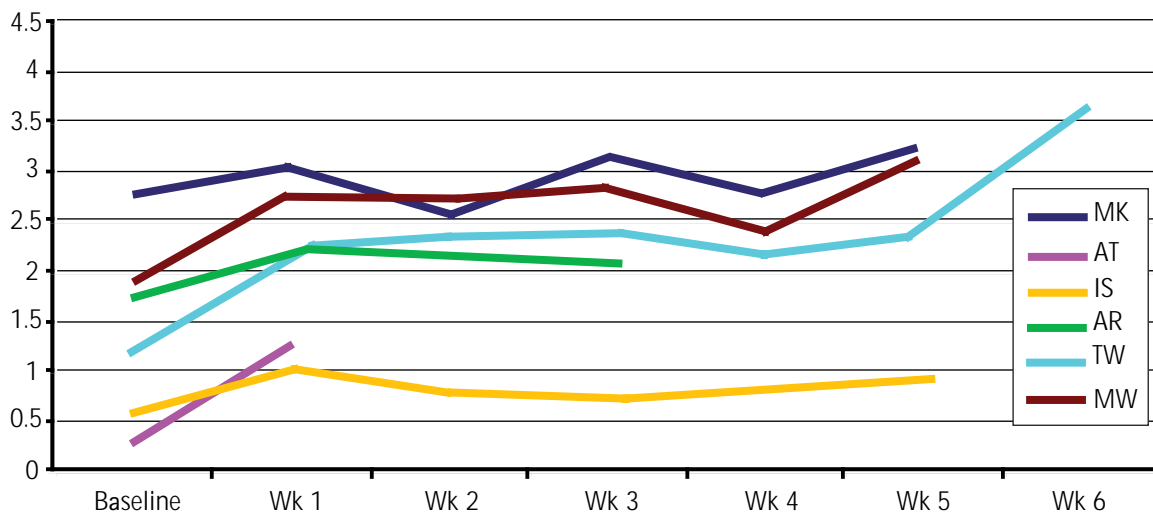


TEST SUBJECTS

SB – 38yr male, non-smoker, high vegetable intake
 LC – 23yr female, non-smoker, low vegetable intake
 EH – 24yr female, smoker, moderate vegetable intake
 CR – 24yr male, non-smoker, moderate vegetable intake
 MS – 22yr female, non-smoker, moderate vegetable intake
 BS – 29yr male, smoker, high vegetable intake

Algotene Pilot Study Results Carotenoid Level Increases

Dose: 3 capsules per day



TEST SUBJECTS

MK – 52yr female, high vegetable intake
 AT – 18yr female, low vegetable intake
 IS – 44yr male, low vegetable intake
 AR – 45yr female, med vegetable intake
 TW – 40yr female, med vegetable intake
 MW – 26yr female, high vegetable intake

Educational Seminar Series 2006

Building immunity, preventing chronic disease and supporting longevity.

Whole dried *Dunaliella salina*, Clinical Applications and General Healthcare & Advanced Mineral and Co-nutrient Therapy

SPEAKERS

Professor Marc Cohen
Professor of Complementary Medicine, RMIT University



Zac Bobrov
Technical Director InterClinical Laboratories



Lecture Dates and Venues

BRISBANE Saturday 28th October
SYDNEY Sunday 29th October
CANBERRA Monday 30th October
HOBART Saturday 4th November
MELBOURNE Sunday 5th November
ADELAIDE Monday 6th November
PERTH Tuesday 7th November

For full seminar details please contact InterClinical Laboratories on 02 9693 2888

Proudly sponsored by InterClinical Laboratories

CPD points applied for
CPE points approved

Breakthrough natural medicine

Whole dried *Dunaliella salina*

- ✓ Helps maintain healthy skin and eyes
- ✓ Helps maintain healthy immune system
- ✓ Helps restore and maintain vitality
- ✓ May help reduce the risk of premature aging
- ✓ May help reduce the risk of chronic disease

Clinically effective source of carotenoid antioxidants
Natural multi-vitamin and mineral supplement

Available from leading healthcare distributors



Algotene®

Dunaliella salina – Marine Microalgae

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MADE IN AUSTRALIA

Use only as directed.
Always read the label.

ICL Health

