InterClinical Laboratories

Newsletter

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Hair Tissue Mineral Analysis

Nutritional Products

Practitioner Education

Research and Development

Dunaliella salina whole dried marine microalgae

Natural medicine breakthrough

Algotene, proudly researched, developed and manufactured in Australia by InterClinical Laboratories, is the world's first natural dietary supplement made from pure, certified organically grown, whole dried *Dunaliella salina,* an edible marine microalgae rich in important everyday nutrients.

Natural multi-vitamin and mineral supplement

Algotene can be used to:

- Help reduce the risk of premature ageing and chronic diseases
- Help maintain healthy skin and eyes
- Help maintain a healthy immune system
- Help maintain and restore vitality
- Provide a rich source of natural mixed carotenoids and daily nutrients important for long-term health and wellbeing
- Improve antioxidant and free radical scavenging activities in the body

Who may benefit from Algotene?

- People who need to boost their daily nutrient intake
- People who have a low fruit and vegetable diet
- People with low vitality or a poor immune system
- People with poor nutritional diets to support healthy skin and eyes
- Stressed, sports and busy people who need more nutritional support

Clinical Findings

InterClinical Laboratories are currently conducting a number of pilot clinical studies on Algotene. Initial results, taken after one week of supplementation, show that Algotene is clinically effective in elevating serum carotenoid levels, with results indicating much higher percentage increases with increased supplementation, up to 363% (Refer tables 1 and 2). These results also show that Vitamin A levels have not been unduly increased, and remain well within the reference range, even at higher doses. These studies are ongoing and final results will be published in later newsletters.

Each Algotene capsule contains*:
Dunaliella salina whole plant dried
500mg marine microalgae

*Patent Pending

Our *Dunaliella salina* is certified organically grown and not genetically modified. It is proudly grown, harvested and made in Australia.

Dunaliella Salina: A wholefood and medicine 500 million years in the making

Article by
Professor Marc Cohen
President, Australasian Integrative Medicine Association
Professor of Complementary Medicine
School of Health Sciences RMIT University

Doctors, nutritionists and natural health practitioners all agree that we need to increase the amount of plant based foods in our diet. Most would also concur that the best foods are organically produced, 'whole-foods', served with minimal processing. Further recommendations include eating foods that are at the base of the food chain to reduce bioaccumulation of toxins as well as eating foods with lots of colour, as colourful foods are more likely to contain health promoting compounds with antioxidant, anti-inflammatory, anti-carcinogenic and other beneficial properties.

While these recommendations appear simple they are not always easy to implement and anything that can assist in achieving these goals should be warmly welcomed. It is rare however for a new food source to become available that meets all of the above requirements. It is even rarer for such a food source to be so nutritionally dense that it can be sold in capsules as a nutritional supplement. *Dunaliella salina* is one such nutritional food source.

Dunaliella salina

Dunaliella salina may be a new food source, but it is certainly not new, rather it is a primitive, single-celled, micro-marine algae that evolved over 500 million years ago and lives at the base of the food chain in many coastal waters and salt water lakes where it is one of the most productive organisms on the planet using light approximately three times more efficiently than higher plants (Pirt 1980). *Dunaliella salina* has evolved to live in extreme environments and is one of the most salt tolerant life forms known, as well as being adapted to extremely high Ultra Violet (UV) radiation. To cope with these extreme environments *Dunaliella salina* naturally produces very high levels of antioxidant molecules to protect itself. (Ben-Amotz 1995).

Although only a single cell, *Dunaliella salina* is a whole plant that naturally contains a complete range of macro and micronutients including chlorophyll, amino acids, polysaccharides, essential fatty acids, carbohydrates, vitamins as well as being naturally high in bioavailable minerals.

While whole dried *Dunaliella salina* may be compared to other so-called 'superfoods' such as spirulina, it is distinctly different. On a gram per gram basis *Dunaliella salina* has more than twice the chlorophyll of spirulina, 8 times the mineral content, and over six thousand times the antioxidant content, being one of the richest sources of natural carotenoids. (Cohen 2006) Furthermore, *Dunaliella salina* has a soft cell membrane rather than a hard cell wall which makes it easily digestible compared to other algae.

Gram for gram Dunaliella may be the most nutrient dense food on earth (Passwater 1997) with minimal indigestible structures in contrast to higher plants or animals, which typically have less than half their dry weight being nutritionally useful. (Bruno 2001).

SOME INTERESTING FACTS

1g whole dried *Dunaliella salina*
- **≃ 20 mg mixed carotenoids**
- **≃ 50 mg magnesium**
- **≃ 10mcg selenium**
- **≃ 22mg chlorophyll**

Carotenoids

Whole dried *Dunaliella salina* has an extremely high content of carotenoids which makes it very beneficial in protecting the body against oxidative damage and sun exposure. Carotenoids are a family of bright yellow, orange and red coloured compounds found in green, yellow, orange and red fruit and vegetables as well as in some animal products such as salmon, lobster and egg yolk. Carotenoids have many functions in animals; they are powerful antioxidants, immune enhancing, anti-carcinogenic and photo-protective.

Carotenoids are important fat soluble anti-oxidants and of the 600 or so known to exist in nature around 20 are found in humans. In addition to providing direct photoprotection via absorption of blue light, carotenoids also act as powerful fat soluble anti-oxidants linked to oxidation-prevention as well as playing a role in cellular communication including stimulation of gap junction communication which is important for cancer prevention by regulating cell growth, differentiation, apoptosis (programmed cell death) and angiogenesis. Carotenoids may also be involved in detoxification of carcinogens, DNA repair and immunosurveillance. These properties are believed to contribute to their antioxidant, immune enhancing, anti-carcinogenic and photo-protective activity. (Stahl and Sies 2005).

Beta Carotene

While whole dried *Dunaliella salina* contains many different carotenoids including generous amounts of alpha-carotene, lutein, zeaxanthin, and cryptoxanthum, it is highest in natural beta carotene which makes up 1-2% of its dry weight, making it the richest known source of this important fat soluble antioxidant. Beta carotene is readily converted into vitamin A which plays an essential role in vision, growth, reproduction and regulation of the immune system as well as maintaining the integrity of the skin and mucous membranes. While vitamin A is toxic in high doses, beta carotene is only converted into vitamin A as required by the body and is considered to be relatively nontoxic even when given in high doses for long periods. (Mathews-Roth; Mathews-Roth 1990).

High intake of natural beta carotene from food has been associated with a reduction in many cancers, (Astorg 1997; Cooper, Eldridge et al. 1999) however studies on supplementation with high levels of synthetic beta carotene have produced mixed results with one study reporting a protective effect (Blot, Li et al. 1993) while other studies have reported no effect (Hennekens, Buring et al. 1996; Lee, Cook et al. 1999) and two further studies reporting an increased lung cancer risk when heavy smokers or asbestos workers were given synthetic beta carotene (Heinonen, Huttunen et al. 1994; Omenn 1996). This association however has not been found with natural beta carotene.

To date most of the clinical research on Dunaliella has been on beta carotene containing extracts rather than the whole organism. Human studies however suggest that Dunaliella extracts can protect against exercise-induced asthma (Neuman, Nahum et al. 1999; Moreira, Moreira et al. 2004), normalise high LDL oxidation in patients with diabetes (Levy, Zaltsberg et al. 2000) and male hyperlipidaemic smokers (Chao, Huang et al. 2002), and protect against radiation damage, as demonstrated by its use in children exposed to the Chernobyl disaster (Ben-Amotz, Yatziv et al. 1998) There is also mounting evidence to suggest that beta carotene along with other carotenoids act as an 'internal sunscreen' and 'internal sunglasses' and play a particularly important role in protecting light exposed tissues such as the skin and the eye from sun damage. (Mathews-Roth, Pathak et al. 1972; Gollnick, Hopfenmuller et al. 1996; Heinrich 1998; Lee, Jiang et al. 2000; Stahl, Heinrich et al. 2000; Heinrich, Gartner et al. 2003; Sies and Stahl 2004). Animals studies further suggest that natural beta carotene from Dunaliella can protect against gastrointestinal inflammation (Lavy, Naveh et al. 2003), water immersion stress (Takenaka, Takahashi et al. 1993), whole body irradiation (Ben-Amotz, Rachmilevich et al. 1996) and CNS oxygen toxicity (Bitterman, Melamed et al. 1994).

Photoprotection

The sun is the source of all life on earth, and exposure to the sun is an essential and enjoyable part of human existence. The sun however is also a potential threat to life as the suns rays can cause direct damage to living tissue. Exposure to solar radiation can cause sunburn and photodamage to skin structures resulting in photo-ageing with a loss of rigidity, elasticity and resilience making the skin appear rough, leathery and wrinkled with uneven pigmentation and brown spots. Solar radiation has also been linked to photo-allergy, immunosuppression and the development of skin cancers. (Fuchs 1998).

Exposure to solar radiation is an everyday concern that is relevant throughout our entire lifespan, and simple avoidance of sun exposure and the use of protective clothing are widely recommended to minimize exposure to solar radiation. Total avoidance however, is impractical and unhealthy as sun exposure is essential for vitamin D production. The skin has sophisticated mechanisms to protect itself from solar damage including the production of pigments to absorb solar radiation, antioxidant defence mechanisms to mop up free radicals created through reactions with light, as well as immunological defences to detect and destroy damaged tissues. Despite these defences, excessive solar radiation commonly overwhelms the protective capacity of the skin which is then prone to long term damage. (Sies and Stahl 2004).

One of the most important nutritional components for providing photoprotection are the carotenoids. In plants carotenoids play a vital role in photosynthesis and participate in the energy-transfer process as well as protecting plants from oxidative damage. The red, orange and yellow colour of these compounds is due to the fact that they preferentially absorb blue light which is the most energetic and hence the most damaging part of the visible spectrum. Research into carotenoids suggests the important role they have in protecting the skin and eyes from sun damage occurs through multiple mechanisms including absorbing blue and UV light, protecting vulnerable molecules by scavenging free radicals, repairing UV induced damage and enhancing the skins immune function. The photo-protective effects of beta

carotene have been confirmed in laboratory as well as in animal and human studies which suggest that photo-protection requires doses of at least 20mg of natural beta carotene for more than 12 weeks. (Sies and Stahl 2004) While excessive amounts of beta carotene can cause orange or yellow skin (carotenodermia), some people may consider this to be a desirable effect and reflect a healthy glow and this effect has been used in tanning tablets to produce a natural looking skin colour (Der Marderosian 2002).

Women's Health and Aging Studies I and II

A report published in the January 2006 issue of the Journal of Nutrition revealed that older women whose levels of carotenoids and selenium are higher have a decreased risk of mortality compared to those whose levels of the nutrients are low (Ray, Semba et al. 2006). The study performed by researchers at Johns Hopkins analyzed data from 632 women aged 70 to 79 enrolled in the Women's Health and Aging Studies I and II, which were designed to evaluate the causes and course of physical disability in older community-dwelling women. Selenium and carotenoid levels were measured upon enrollment, and participants were followed for 60 months.

At the end of the follow-up period, 14 percent of the women had died. Primary causes of death included cardiovascular disease, cancer, stroke, infection, chronic obstructive pulmonary disease and accidents. Those who died were older and more likely to be African-American, smokers and overweight. Women whose selenium or total carotenoid levels were in the lowest 25 percent of participants had a greater risk of dying than those whose levels were in the top 75 percent, and as nutrient levels increased, mortality decreased. For those who died, mean carotenoid and selenium levels were 1.40 and 1.43 micromoles per liter, compared to 1.72 and 1.54 micromoles per liter for those who survived. Higher levels of selenium and individual and total carotenoid concentrations appeared to be protective against mortality.

In their discussion of the findings, the authors write that the underlying biological mechanism by which diminished levels of carotenoids and selenium contribute to an increased risk of death could be increased oxidative stress and inflammation. Serum carotenoid levels are considered to be the best marker for fruit and vegetable intake, and studies have shown that high intake of these foods reduces inflammatory biomarkers (Watzl, Kulling et al. 2005) and protect against cardiovascular disease (Kritchevsky 1999). Additionally, deficient selenium levels have also been associated with atherosclerosis and increased oxidative stress. (Alissa, Bahijri et al. 2003) They conclude that their "work provides some early insight into the relation between antioxidant nutrients and mortality among older women," and recommend the usual further studies.

Selenium is a trace mineral found in small amounts in plant and animal foods however Australian soils are typically deficient in selenium. Both carotenoids and selenium however are found in *Dunaliella salina* which is grown in mineral rich sea water rather than depleted soils.

Algotene

Whole *Dunaliella salina* biomass is arguably the most nutritionally dense food source known and the availability of whole dried *Dunaliella salina* as an organically produced, minimally processed, whole-food available in supplemental form – **Algotene** represents a breakthrough that is expected to generate much excitement in the nutraceutical industry. Thus moving us closer to the Hippocratic ideal of letting food be our medicine and medicine be our food.

For full product details includng a complete nutritional profile and other informational material please contact:

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References available upon request.

Table 1 **Pilot Study No1**
Daily Dose 3 Algotene capsules per day

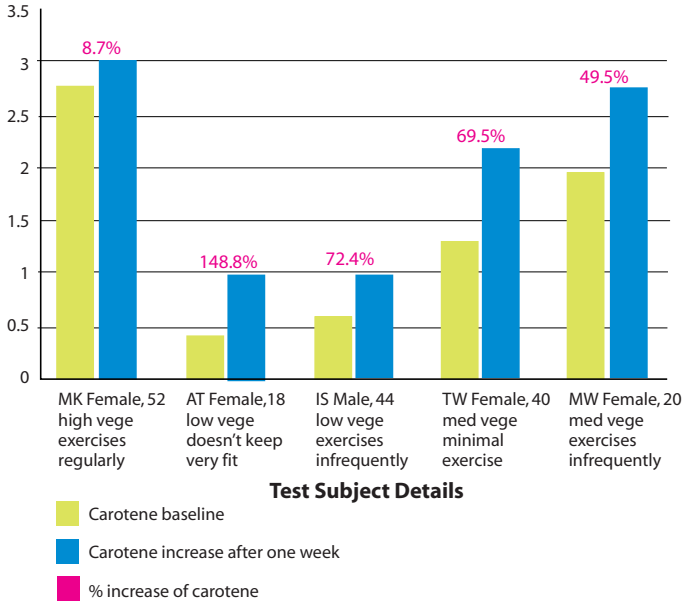
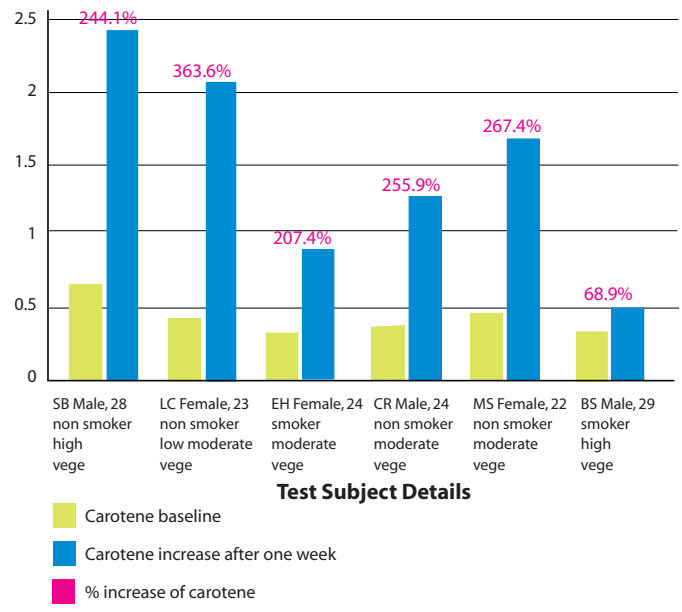
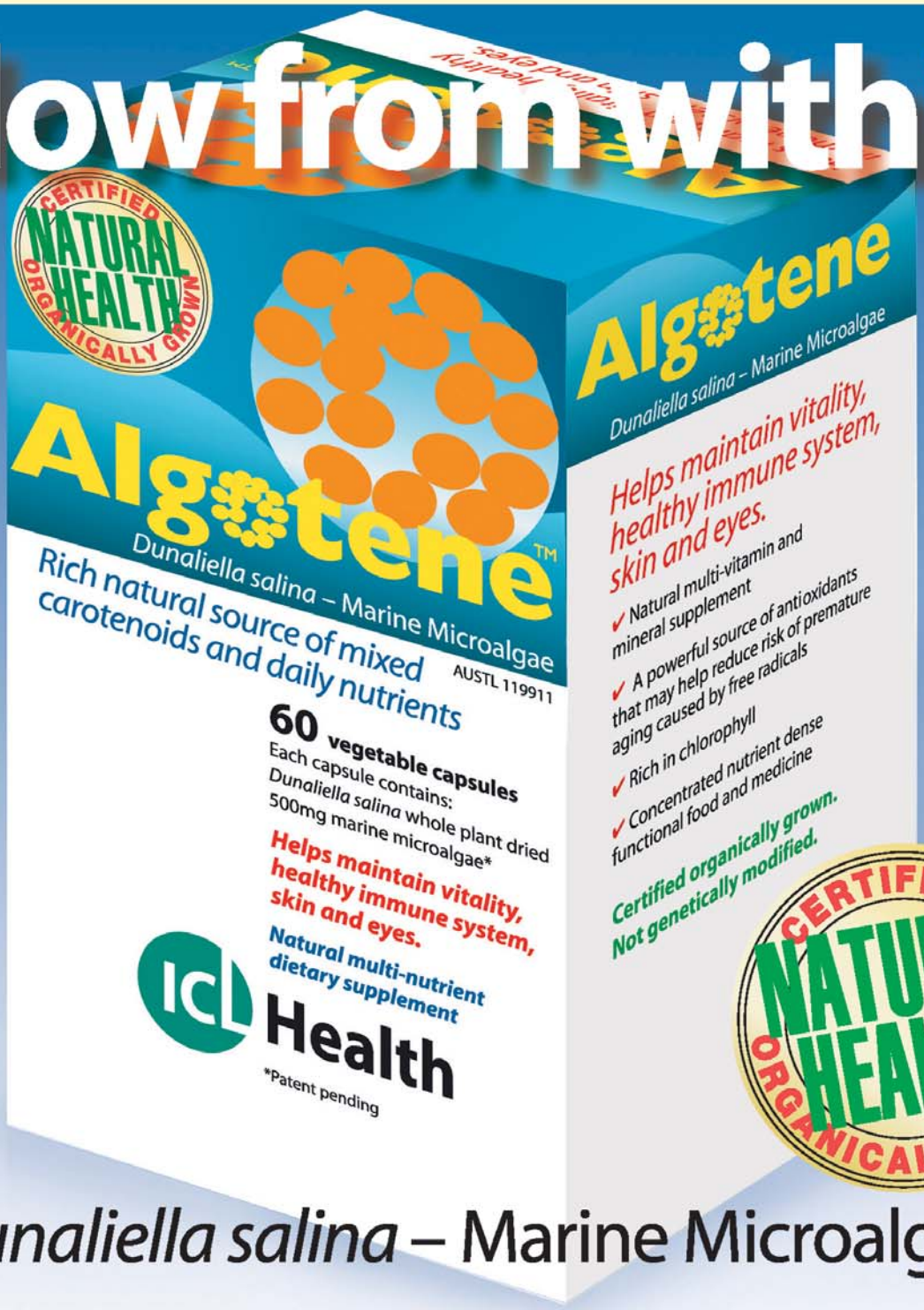


Table 2 **Pilot Study No 2**
Daily Dose 6 Algotene capsules per day



Glow from within



Dunaliella salina – Marine Microalgae

- ✔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

Boost your carotenoids and daily nutrients

Natural multi-vitamin and mineral supplement

Vegan friendly

Use only as directed.
Always read the label.

Available from leading healthcare suppliers

Algotene™

MADE IN AUSTRALIA

CERTIFIED ORGANICALLY GROWN

ICL Health

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