THE SPACE LAUNCH REVOLUTION: OPENING THE WAY TO MARS
22ND ANNUAL INTERNATIONAL MARS SOCIETY CONVENTION

MICROALGAE AS FOOD AND OXIGEN, NEED NUMBER ONE OF TRAVELERS TO MARS

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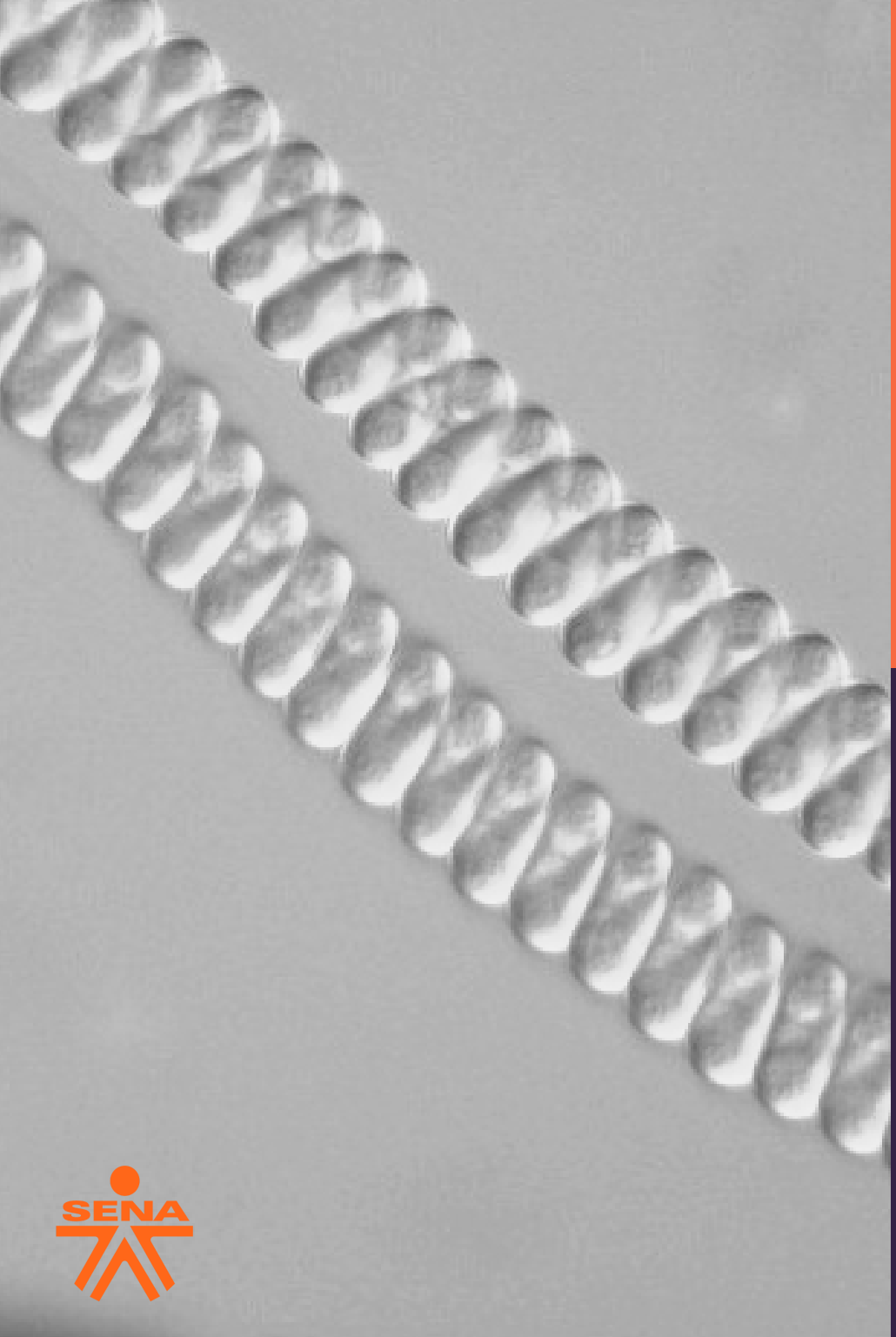
GERMAN SARMIENTO



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WHAT IS SPIRULINA?

SPIRULINA IS A FOOD SUPPLEMENT COMPOSED OF TWO SPECIES OF CYANOBACTERIA, ARTHROSPIRA PLATENSIS AND ARTHROSPIRA MAXIMA.

IT IS CHARACTERIZED BY ITS SPIRAL STRUCTURE, WHICH NEVER BRANCHES.

IT IS FOUND NATURALLY IN AFRICA, ASIA, AND SOUTH AMERICA, THOUGH IT IS NOW CULTIVATED WORLDWIDE.

SENA

IT HAS BEEN USED AS A FOOD PRODUCT FOR MANY YEARS.

THE AZTECS HARVESTED SPIRULINA FROM LAKES FOR CENTURIES.

THEY CALLED IT TEOCUITLATL, WHICH MEANS "THE STONE'S EXCREMENT." MMMM...

MANY ALKALINE LAKES IN AFRICA, PARTICULAR LAKE CHAD, AND ASIA HAVE HARVESTED SPIRULINA FOR HUNDREDS OF YEARS.

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SPIRULINA ITSELF HAS BEEN AROUND AT LEAST 3.5 BILLION YEARS.

BLUE-GREEN ALGAE LIKE SPIRULINA ARE PROBABLY RESPON SIBLE FOR OUR AT MOSPHERE BECOMING OXYGEN-RICH DURING THE ARCHAEAN AND PROTEROZOIC ERAS, ALLOWING ORGANISMS AS WE KNOW THEM TODAY TO FLOURISH

THEY ARE THE LIKELY ANCESTORS OF ALL MODERN PLANTS.

SENA

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NUTRICIONAL ANALYSIS

Protein. Spirulina is 65-71% protein by dry weight, and contains all the essential amino acids except histidine.

Minerals. Spirulina contains relatively high concentrations of K, Ca, Zn, Mg, Mn, Se, Fe, and P.

Vitamins. Spirulina contains B1, B2, B6, B12, biotin, pantothenic acid, folica acid, inositol, niacin, and Vitamin E.

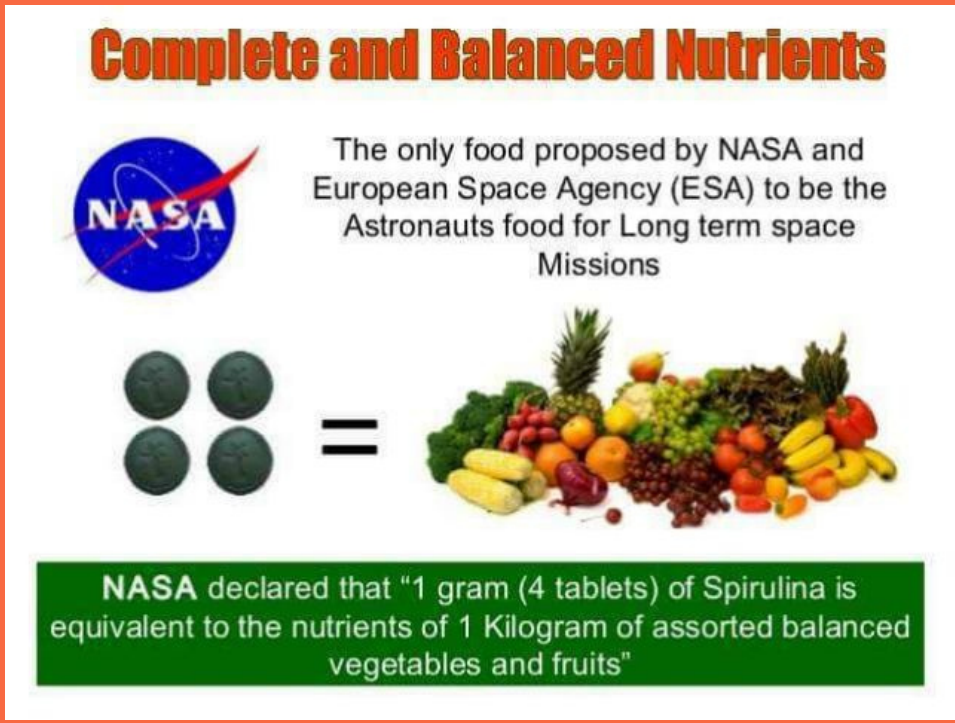
Carotenoids. Spirulina has alpha-carotene, beta-carotene, xanthophylis, cryptoxanthin, echinenone, zeaxanthin, and lutein.

Pigment. Chlorophyll is found in great abundance in Spirulina, as are phycocyanin and porphyrin.

Spirulina contains very little carbohydrates, and about 3.9 Kcal/gram. There is also very little Na, which is important for some people.

When you look at the numbers, Spirulina appears to be promising as a nutritional supplement, as long as you don't go overboard.

FOOD AND O2 SPACE



National Aeronautical and Space Agency (NASA), has conducted relevant studies on Spirulina, a vegetable nutrient, as a potential food for space travel. The goal was to provide astronauts with foods that are rich in nutrients, vitamins and minerals. Spirulina is a rich source of beta-carotene, which helps to improve eye sight and has very high natural protein content. This protein has 18 of the 22 amino acids that the body needs and this nourishment digests easily. This ensures proper utilization as well as assimilation of food. Also, Spirulina's rich content of natural iron and folic acid helps not only to highly enhance the hemoglobin levels in the blood, but this has found to be sixty times more absorbable than normal iron capsules.

PROJECT
ROVER MANTIS

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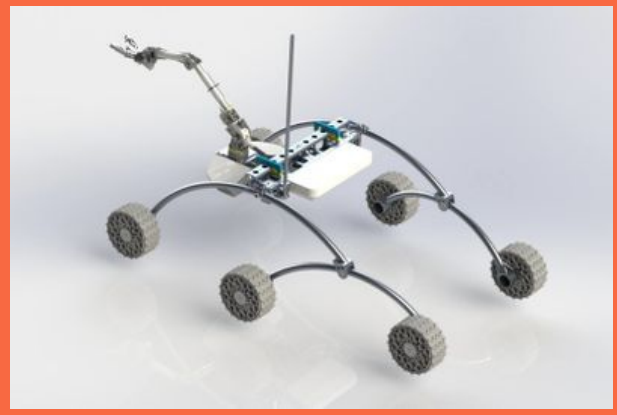

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MANTIS

RESULTS

The Rover vehicle loads a 50 cm by 30 cm platform on which a pyramidal structure covered with solar panels. The pyramid structure is divided In two sectors, each sector contains a set of four tubular bioreactors capable of 500 c.c. each Each bioreactor has a nutrient supply device and a set of temperature, pH, nutrient, water level, oxygen concentration and carbonic gas sensors. Every twelve hours the cycle of light from LED type light is reversed in each sector, thereby Earth night and day cycles are simulated, thereby, while a sector is in the phase of Photosynthesis, the other sector is in the breathing phase.

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