



## Cellular Fraction-Line activated Spirulina


Spirulina, in its natural form, is one of the most beneficial sources of nutrients known to mankind. Everything from vitamins (A, B1, B2, B6, E, and K), major (and trace) minerals, essential fatty acids, and protein to chlorophyll, phytonutrients, enzymes, antioxidants, polysaccharides, *all eight* essential amino acids (*eighteen* amino acids total), nucleic acids (RNA and DNA), salts, phytonutrients, and even gamma-linolenic acid (GLA) and phycocyanin can be found in spirulina.

*“Spirulina contains the highest concentration of protein (by weight) of any food known, between 65 and 71 percent protein, depending upon the variety.”—David Wolfe*

Spirulina is fabulous for balancing brain chemistry, building and purifying blood, increasing the production of stem cells, enhancing the immune system and eyesight, promoting healthy hair and skin, and even helps reduce allergies. It is truly a super food.


The challenge is to provide spirulina as close to fresh as possible with the nutrients, enzymes, and antioxidants in tact. Dried spirulina powder is the best form in which to deliver its benefits. When we eliminate the water we eliminate the medium for enzymes and microorganisms to degrade the product. Once fully dried, there is no need to add preservatives or refrigerate.

Thai Freeze Dry’s Cellular Fraction-Line Technology  (CFL) will process the spirulina into dry powder without destroying its beneficial properties

**CELLULAR FRACTION-LINE TECHNOLOGY  (CFL):** The conventional tray freeze dry process is slow and expensive due to high use of energy in the process. While it does not work well for every product. Spirulina resists the traditional freeze dry process. As it sits in pans (with a solid bottom and sides) on the trays only the top layer is exposed, The exposed top layer dries to form a crust (moisture barrier) while the spirulina below the surface remains moist. Until now, even those in pursuit of the highest quality have not been able to employ the freeze dry process efficiently to spirulina.

Typically the spirulina is “spray dried” – a process that uses high levels of heat to create dry powder. There are variations of spray drying some of which may protect the nutritional qualities better than others, but in all cases the spirulina is subjected to substantial exposure to heat. Brilliant marketing attempts to overcome this basic fact claim a brief exposure to heat and/or reduced oxygen levels but if you have ever handled raw spirulina as it comes from the ponds, ( a thick slurry ) it is easy to see that, in any case, it will not dry quickly using moderate heat . A shorter time span of exposure to heat will require higher temperatures. A longer exposure to heat may require a lower temperature. The bottom line is this: if temperature over time is strong enough to remove a water content of approximately 90%, it is also strong enough to demolish the product.

That’s the problem – now what is the answer? An evolutionary and transitional freeze dry process has been applied to bio-active (live) herbs and botanicals that applies to spirulina as well. This is a pharmaceutical process and it produces pharmaceutical quality results

Thai Freeze Dry Co. Ltd. located in Chiang Mai, Thailand has applied its trademarked “Premium Freeze Dried” Cellular Fraction-Line Technology  (CFL) successfully to spirulina. Rather than product sitting motionless on trays inside the product chamber, the product moves vigorously – flying around inside the product chamber within a vacuum in what might be described as a whirling vortex This dramatically increases the exposed surface area (speeding up the sublimation process) and exposes all the product at the same time. The motion of the super frozen particles and the sublimation of the ice structure that holds the particles together causes the plant tissue to fracture between/along the layers of the cell walls **preserving cellular integrity and improving the retention of the bioactive intracellular contents. Exposure of the entire surface area to be dried results in “even” drying which preserves cell wall structure and preserves the biochemical makeup of the plant as it exists in nature.** In addition to higher bioactivity this process results in particles having a more bio-available particle structure. **Higher bioactivity combined with higher bio-availability make all of our CFL bio-activate botanicals significantly more effective.**

The extracellular matrix (ECM) consisting of molecules secreted by plant cells provides biochemical and structural support to surrounding cells. Plant ECM includes cellulose as well as signaling molecules among other cell wall components. Dynamic biological functions including but not limited to intercellular communications, growth factors, healing processes, gene expression, cell death (apoptosis), cell migration and differentiation are effected by the extracellular matrix as are mechanical properties such as elasticity.

**Damage, diminish or destroy intercellular and intracellular contents and you have dramatically limited the function and efficacy of your plant material regardless of to what degree you may capture specific targeted ingredients used as markers to indicate effectiveness. Maintain the complex synergy of the Master Formulator – Mother Nature.**

The introduction of this “transitional” evolutionary freeze dry technology allow us, for the first time, to efficiently freeze dry spirulina and avoid the damaging oxidative effects of heat. The bio-active phyto-chemical ingredients are preserved and highly bio-available. The enzymes are in tact. Antioxidants are sustained and the nutritional elements are maintained.


### Comparison of spray dried and CFL activated Spirulina



Ladies and Gentlemen, Introducing spray dried spirulina on your left and CFL activated spirulina on your right !!!! Both samples start out green in color but after only several moments the red fluorescence is apparent in the CFL processed spirulina.

The red fluorescence is an accessory/antenna pigment for photosynthetic light collection. The spirulina absorbs energy in portions of the visible spectrum that are poorly utilized by chlorophyll and through fluorescence energy transfer, conveys the energy to chlorophyll at its photosynthetic reaction center.

The water soluble fluorescent proteins (phycobiliproteins) in spirulina are arranged in subcellular structures which allow the pigments to be arranged geometrically in a manner which helps to optimize the capture of light and transfer of energy with red being the most highly energetic spectrum.

Thai Freeze Dry's Cellular Fraction-Line  (CFL) activated spirulina is highly bio-active.



Dan Foxman examines and compares the cellular/molecular structure of spray dried and CFL activated spirulina. The former is “dead” while the later is still strongly bio-active.

**Factory :** 224 Moo 10, T.Banthi, A.Banthi, Lamphun 51180 Thailand  
**Head Office :** 165/3 Moo 1, T. Changphueak, A.Muang, Chiang Mai 50300 Thailand

**Phone :** +66 (0)8 1764 4324 **Phone / Fax :** +66 (0)53 414 064 **E-mail :** info@thaireezedry.com **www.thaireezedry.com**