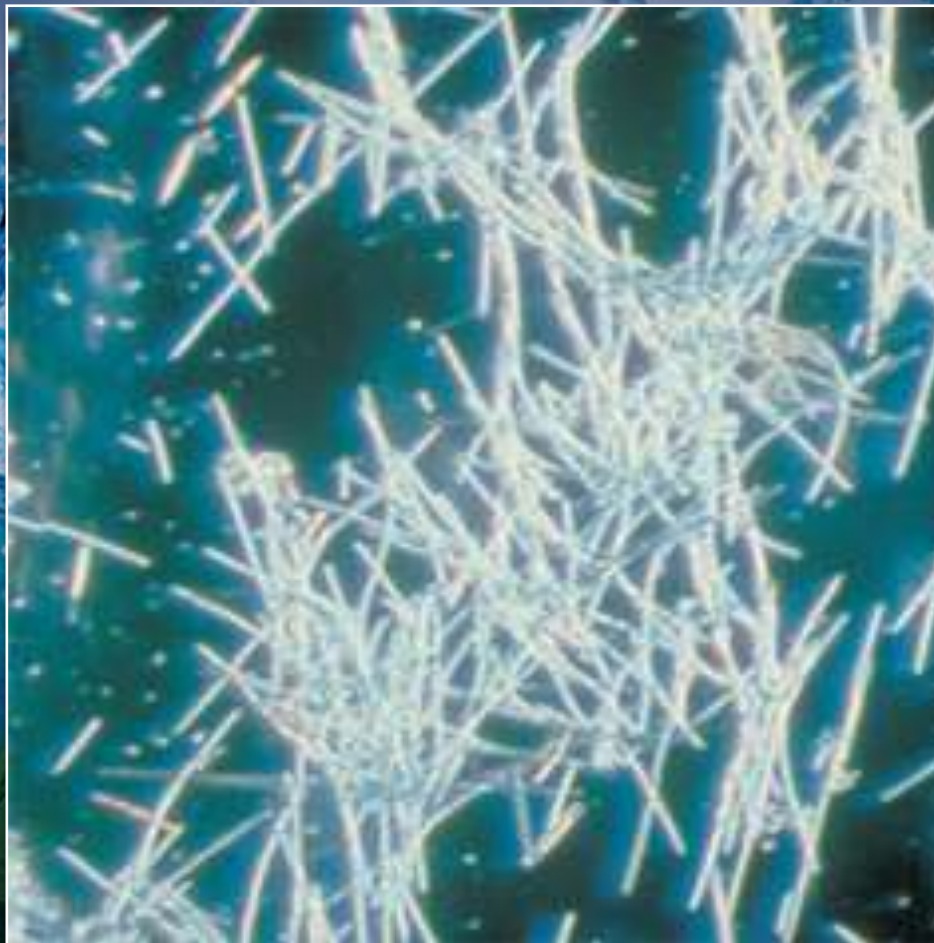


# SPIRULINE AP



- Antioxydant
- Cell renewall
- Detoxifying
- Photoprotector

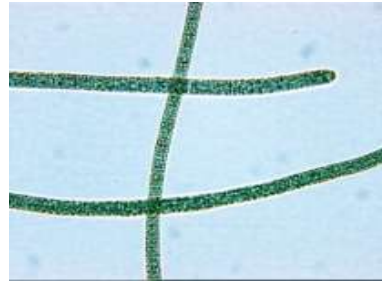


# SPIRULINE AP

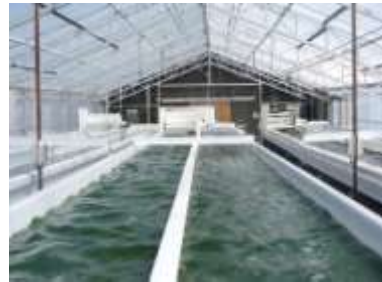
From **Spirulina Platensis cytoplasm**

to **Phycocyanin pigment**

→ **Blue microscopic alga**  
(cyanobacterie)



→ **Raceway culture**



→ **High nutritive elements content**

→ **Natural blue colorant**  
(E.U. food approved as dye)

→ **Fluorescent phytopigment**  
(used as marker in immunal studies)



→ **Specific cold extraction of the membrane**  
(preserves full hydrophilic molecules)

# SPIRULINE

➔ **The origin of the Photosynthesis:**  
a 3 billion years history

➔ **A food since the antiquity:**  
traditionally eaten in the region of Chad Lake, then by the Aztecs in Mexico

➔ **40 years of rediscovery in Occident:** 1000 references in the scientific libraries



Harvest of Tecuitlatl (Spiruline) on lake Texcoco surface, XVth century (codex Florentin, book 11)



Aztecs harvesting blue-green algae from lakes in the valley of Mexico. Drawing in Human Nature, March 1978 (by Peter T. Furst).

# SPIRULINE

## MAIN ELEMENTS of SPIRULINE

### An extraordinary composition:

- ✓ **Extremely rich in proteins: 50-70%**  
(Presence of all the essential amino acids)
- ✓ **The richest vegetable in assimilable iron**
- ✓ **Very big wealth in  $\beta$ -carotene**
- ✓ **The vegetable the richest in Vitamin B12**
- ✓ **The richest food in  $\gamma$ -linoleic acid**
- ✓ **A big wealth in minerals & bio-available trace elements**
- ✓ **Vitamins: B1, B2, B6, B9, B12 & E**

## Composition (%)

- **Assimilable vegetable Proteins: 50 %**
- **Lipids: 11%** (AGPI 4% & sulfolipids 2%)
- **Glucids: 13%** (including sulfated polysaccharides )
- **Carotenoids: 0,8 %**  
including Provitamin A ( $\beta$ -carotene):0.04%
- **Vitamins: 0,2%**  
B12, E, PP, B1, B2, B3
- **Minerals: 16%**  
Sodium, Iron 0.07%, Calcium 1.2 %, Magnesium 0.7%, Zinc, Potassium...
- **Naturally rich in trace elements**  
thanks to a unique culture in sea water: Copper, Zinc

# SPIRULINE AP: COMPOSITION

## MAIN ELEMENTS

of SPIRULINE AP

→ **Phycocyanin (70 mg/100g)**

→ **Watersoluble molecules:**

• **Proteines** (7%)

• **Amino-acids**,  
such Carbohydrates

• **Sugars**,  
such as Glucids

• **Vitamins**,  
such as Vitamins B12

• **Minerals:**

Iron

Magnesium

Calcium

Potassium

Sodium

Cu

Zn

## Phycocyanin

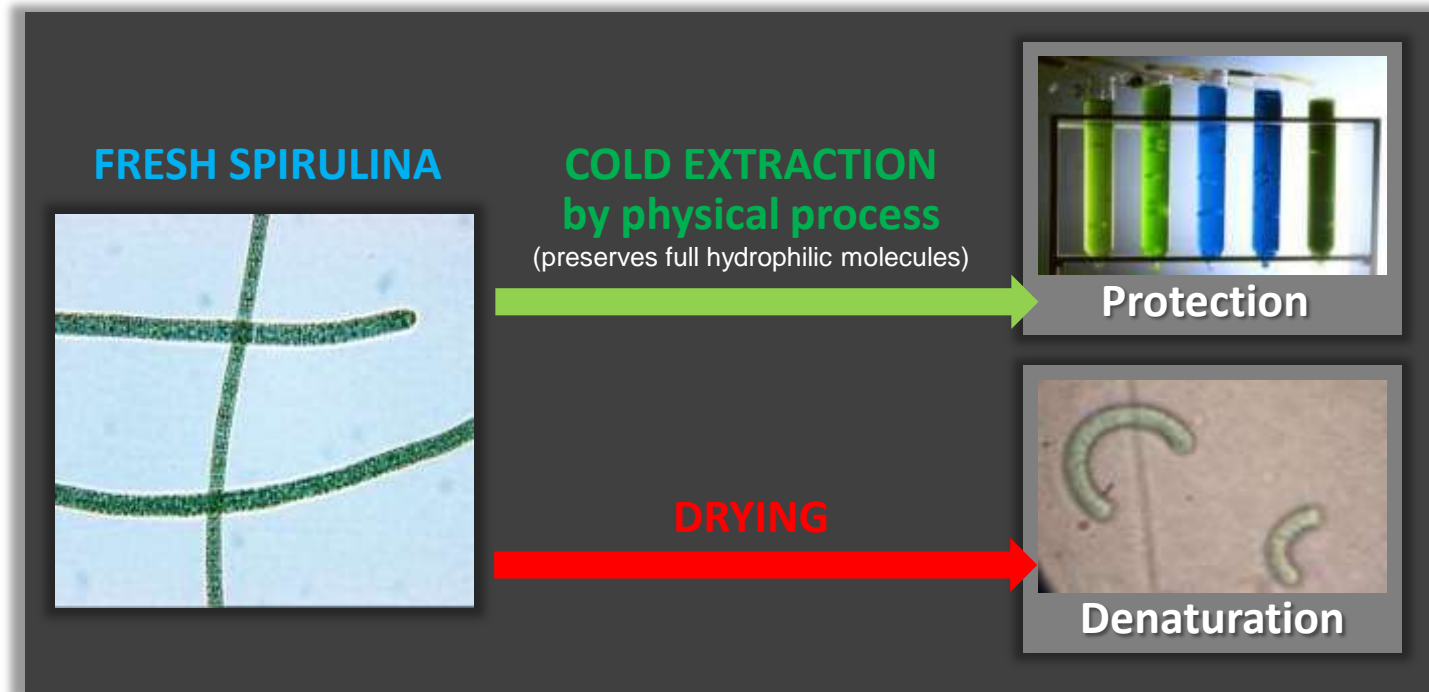
It has a **large spectrum action** against different **free-radicals**,

in contrario of  
antioxydant enzymes,  
which generally only interact  
with specific radicals

(Faroog et al, 2004 b)

# PRODUCTION

## [ COLD EXTRACTION ]



# PHYCOCYANIN

## MAIN DATAS

*of Phycocyanin*

→ **Water soluble proteic & fluorescent pigment**

→ **R.O.S. (Reactive Oxygen Species) powerful antioxidant:**

✓ **Similar chemical structure to biline** (Bhat et al,2001) known as **powerful antioxidant**

✓ **Active molecule tetrapyrrole** (Pinero Estrada et al,2001;Hirata et al,2000) which is **included in bilin, bilirubin & phycocyanin**

✓ **Thermal sensibility** which explains the **necessity of cold process**

✓ **Essential factor in various immune system mechanisms**

## Phycocyanin

It has a **large spectrum action** against different **free-radicals**,

by a **complementary action to organism natural defense** as Phycocyanin action is independant

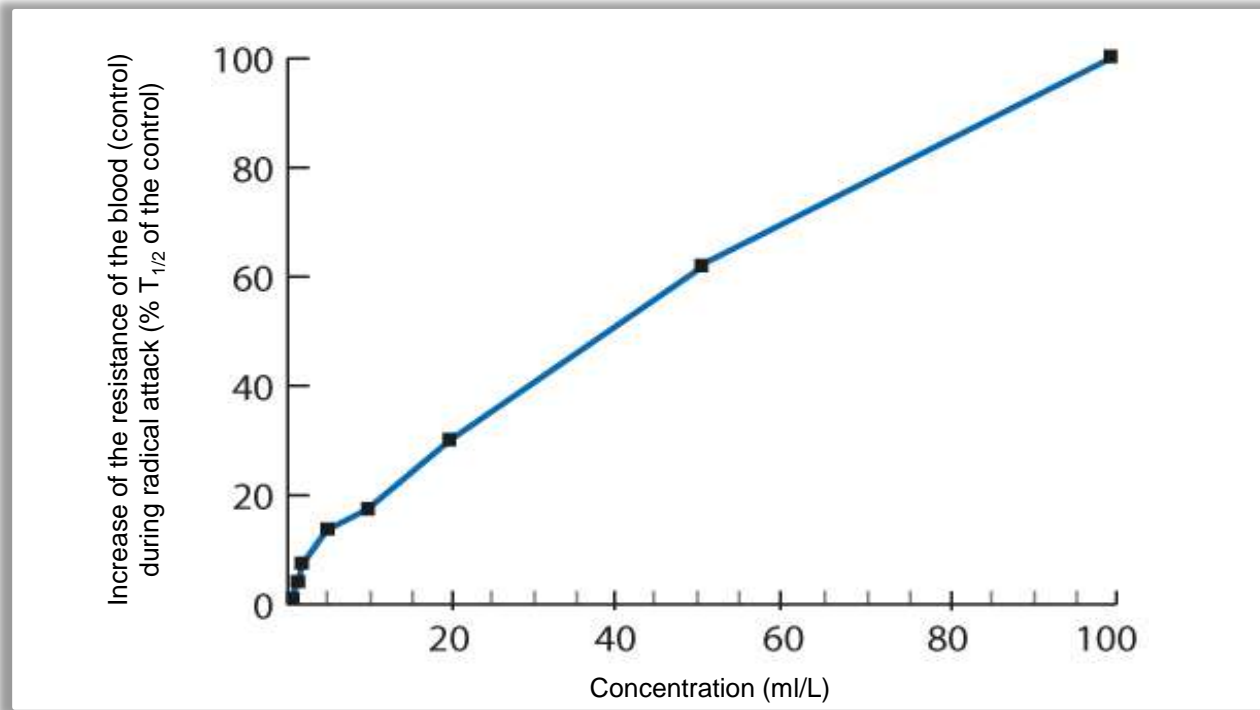
(Faroog et al, 2004 b)

# ANTI-RADICAL ACTIVITY

## ANTIOXYDANT ACTION of Spiruline extract

### Protocol:

- In Vitro test,
- Dynamic measurement of a global potential defense against antiradicals (at human level)
- Test: in presence or not of SPIRULINE conc without solvent (3 vials containing 5ml of the extract)
- Results standardized with Trolox® and/or gallic acid equivalence.



➔ **SPIRULINE AP acts for a linear growth of antiradical activity. Full report demonstrates higher efficiency than Trolox® or gallic acid.**



# GLOBAL PROPERTIES

## Global anti-aging protection

**-15 to -25% of inflammation**

➔ **Anti-inflammatory action** on IL1, PGE2, under UVB stress.

Protocol: > Spiruline AP at 2µl/cm<sup>2</sup> , under stress UVB: 100 mJ/cm<sup>2</sup> and on Reconstituted epidermis: SkinEthic model

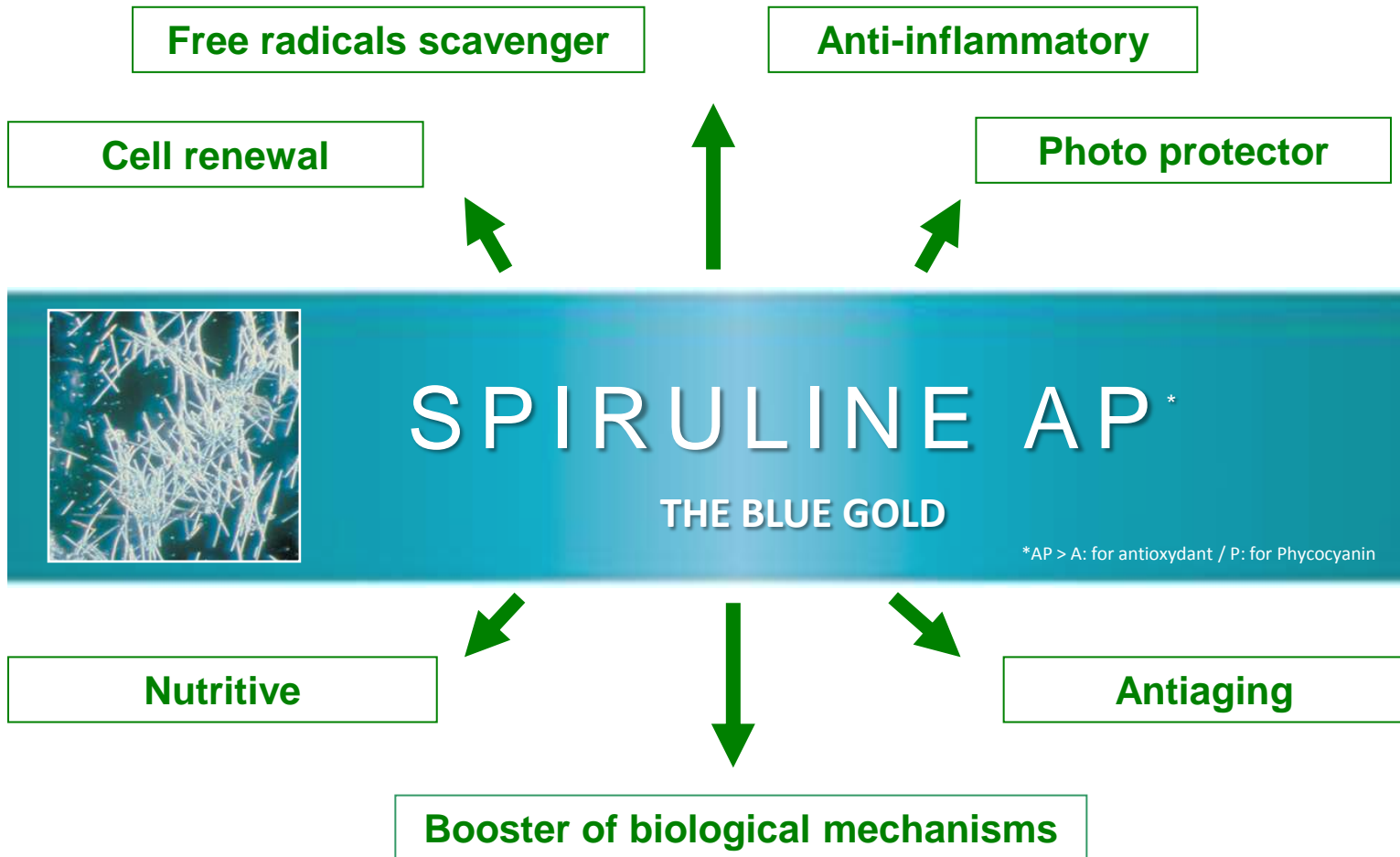
**+15 to +25% of cell renewal**

➔ **Cell renewal:** global action on human keratinocytes & lymphocytes, with 3H-thymidin marker incorporate in DNA.

**-15 to -30% of IL8 & IL10 release**

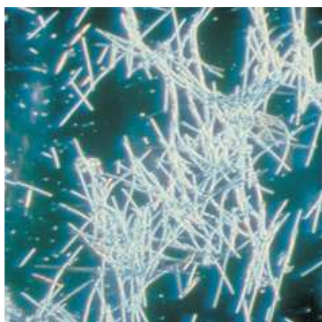
➔ **Cell protection** (on human keratinocytes/lymphocytes co-culture)  
no IL8 & IL10 release without stress  
**significant inhibition of IL8 & IL10 release under UVB stress.**

# SUMMARY



## CHARACTERISTICS

# SPIRULINE AP



**INCI NAME:** Aqua/Water - Butylene glycol - Spirulina Platensis Extract

**CAS:** 7732.18.5

**SOLVENT:** Butylene Glycol

**COLOR:** Dark Blue

**SOLUBILITY:** Water soluble

**PRESERVATIVE:** phenoxyethanol

**RECOMMENDED USE:** 1% - 2%

**ASPECT:** Limpid liquid

**ODOR:** Slight woody

**CERTIFICATIONS:**



CTFA 2004

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**Scavenging of peroxyxynitrite by phycocyanin and phycocyanobilin from *Spirulina platensis* protection against oxidative damage to DNA.**

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*Biochemical and Biophysical Research Communications*, 275, 20-25.

# Contacts



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