

Mission to Mars inspires food project in Congo

F. Mastroleo¹, K. Wouters¹, B. Vos¹, M. Vanderthommen¹, S. Raffestin²,
P. Mestdagh², T. Clarijs¹, M. Coeck¹, N. Savage², C. Lasseur², H. Aït Abderrahim¹,
N. Leys¹

¹ Belgian Nuclear Research Center (SCK•CEN), 2400 Mol, Belgium

² European Space Research and Technology Center (ESA-ESTEC), 2201 Noordwijk, The Netherlands

Felice.Mastroleo@sckcen.be

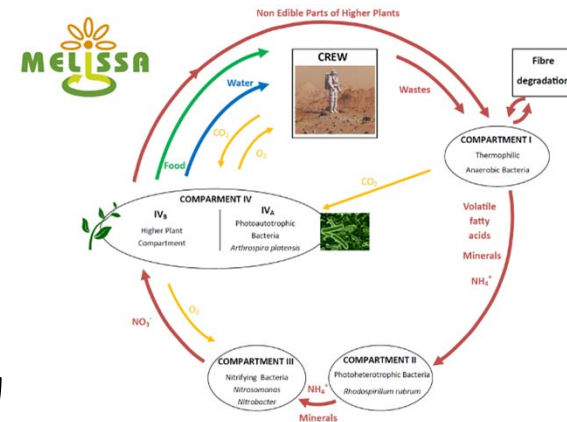
SPIRULINA: ROOTS VS SPACE

Roots among African lakes



Bringing Spirulina back to Africa

Used in Western Countries as food supplement



Studied in the frame of the ESA MELiSSA space program

INSPIRATION

- **IN**troduction of **SPIR**ulina in equatorial **A**frica
To **Im**prove **IO**cal **N**utrition
- **Goal:** to fight chronic malnutrition in Congo by developing local spirulina test cultivation

INSPIRATION

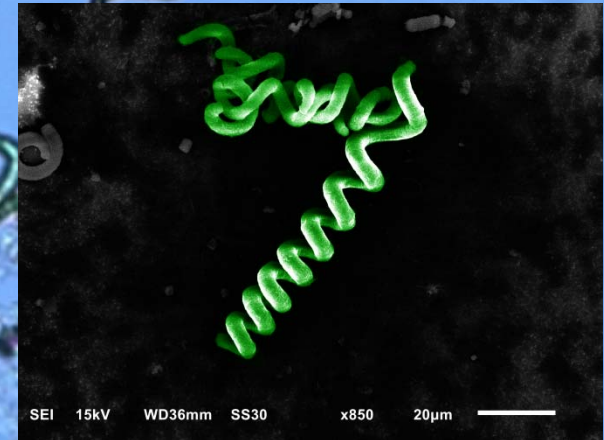
- Since 2012, SCK•CEN is fully committed to Entrepreneurs for Entrepreneurs. We wanted to start a sustainable project in the South
- Our focus = knowledge transfer, skills and competences
- We study spirulina at SCK•CEN in the context of space research

A close-up photograph of a large, vibrant green, textured mass of Spirulina algae. The algae is contained within a white, circular vessel, likely a bioreactor or a large bucket. The surface of the algae is highly textured and appears to be composed of many small, interconnected strands or clumps. The lighting is bright, highlighting the rich green color and the wet, glistening surface of the algae. The word "Spirulina" is overlaid in the center of the image in a large, white, sans-serif font.

Spirulina

Spirulina

- Photosynthetic cyanobacteria
- Appearance of a small green coil
- At the origin of the breathable air that we enjoy today
- Rich in proteins and essential nutrients



Spirulina

- Study in the context of microbiology space research
 - the development of biological solutions to produce drinking water, oxygen and food based on waste recycling
 - behaviour and metabolic functions under conditions of weightlessness and when exposed to high radiation doses.



Installation test basin

- Simulate similar conditions as in Congo in order to study the cultivation of spirulina on a large scale
- 1000 l water + minerals+ nutrients
- Estimated production capacity: 40 g/day/m² (= daily dose for 4 persons)
- Run by volunteers of SCK•CEN (social aspect)



Piloot basin @ SCK•CEN

“Roer eens in de groen soep !”

“ Kook en Proef “



<http://www.sckcen.be/en/Inspiration>

Next stop: Mooto (Congo, RDC)

July 8-18th, 2016



Our water supply for the cultivation of Spirulina...



Officially starting the Spirulina preculture...

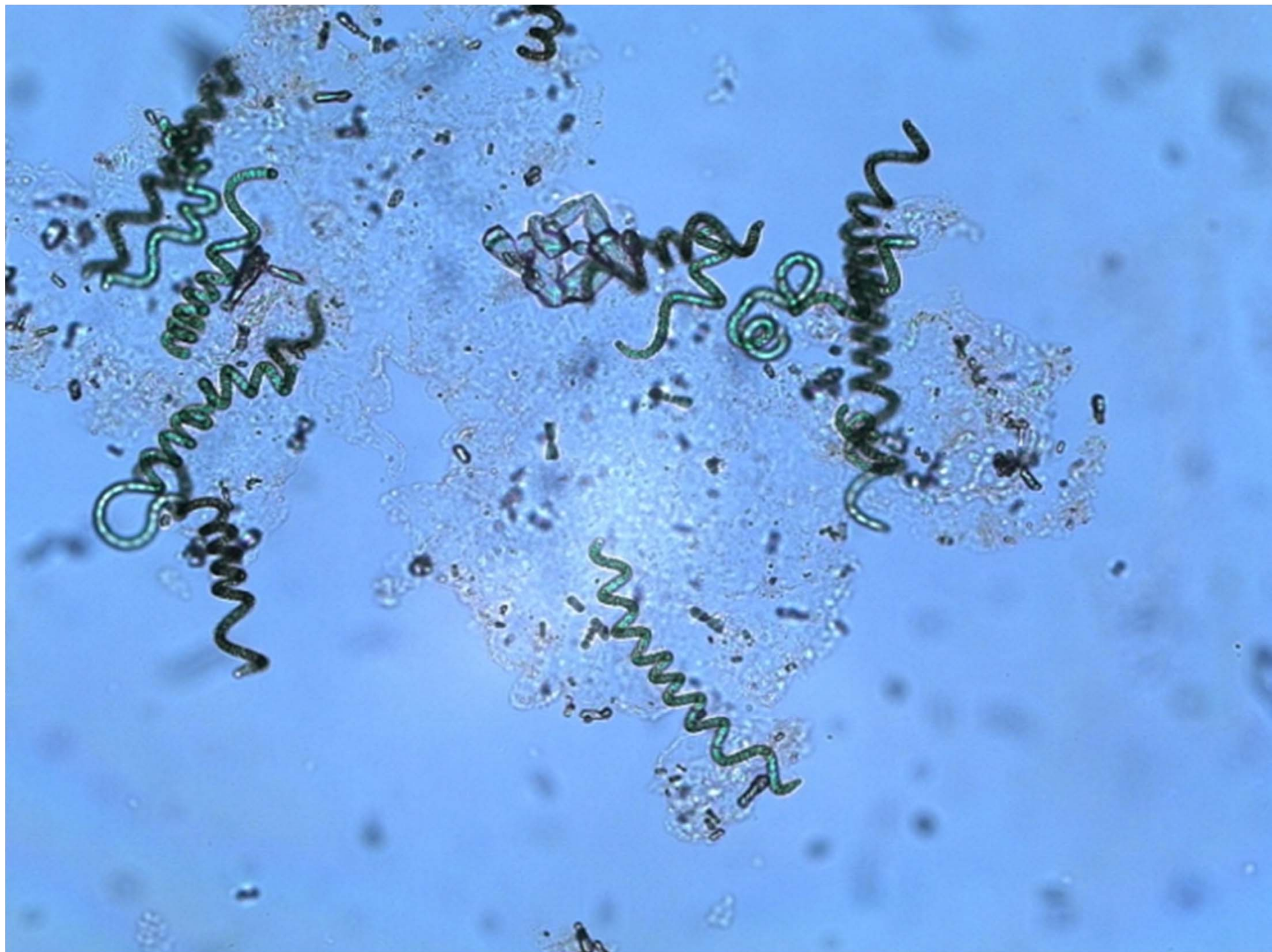


And preparing the forthcoming up-scaling...



Doublechecking the viability of Spirulina after starting the precultures...







Current status

- Cultures in Mooto no longer in use due to lack of maintenance
- Cultures in Mbandaka and Kinshasa (UPN) ongoing
 - Samples received for analysis @SCK•CEN (Prof. Kabongo)
 - Fe, Mn, As, Cd, Cu and Pb concentration in biomass respecting EFSC guidelines
 - F, Cl, NO₂, NO₃ and SO₄ concentration analysis ongoing



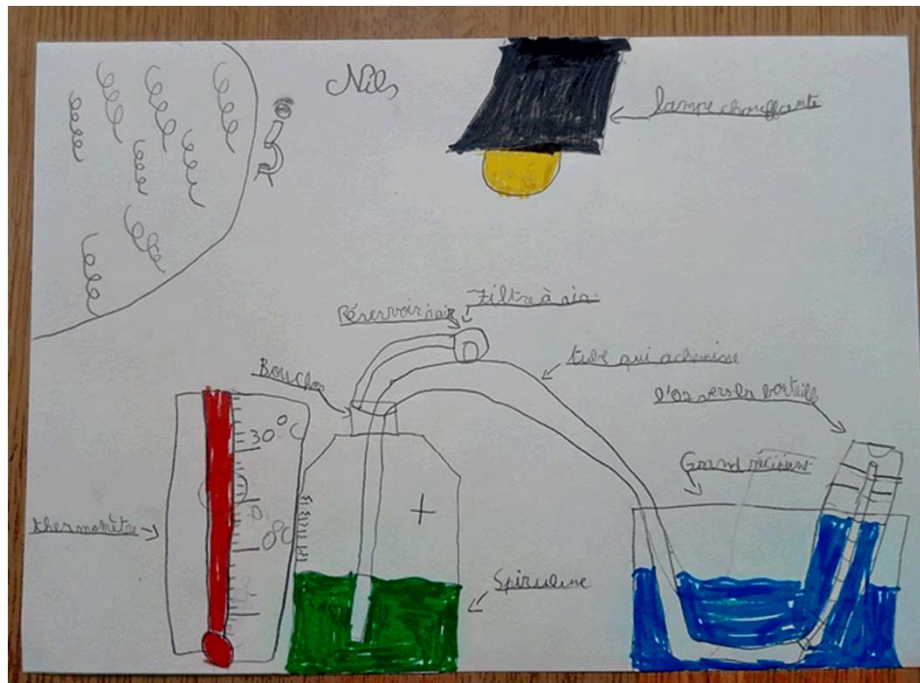
Space education: Food from Spirulina event

- Secondary school contest to illustrate photosynthesis with *Spirulina* from the MELiSSA loop
- 1,000 kits distributed whole over Europe
- Winners could participate to live in-flight call with astronaut Samantha Cristoforetti in the International Space Station



Space education: Food from Spirulina event

- In Kourou, In Cherbourg...



Many thanks to SCK•CEN...

...to CongoDorpen



Hamid Aït Abderrahim



Rik Raemaekers (17/11/1955-02/07/2017+)

**...and to the INSPIRATION and MELISSA teams
...and volunteers!**

