

To bridge the gap between University and Company

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Belgique



Centre Wallon de Biologie Industrielle

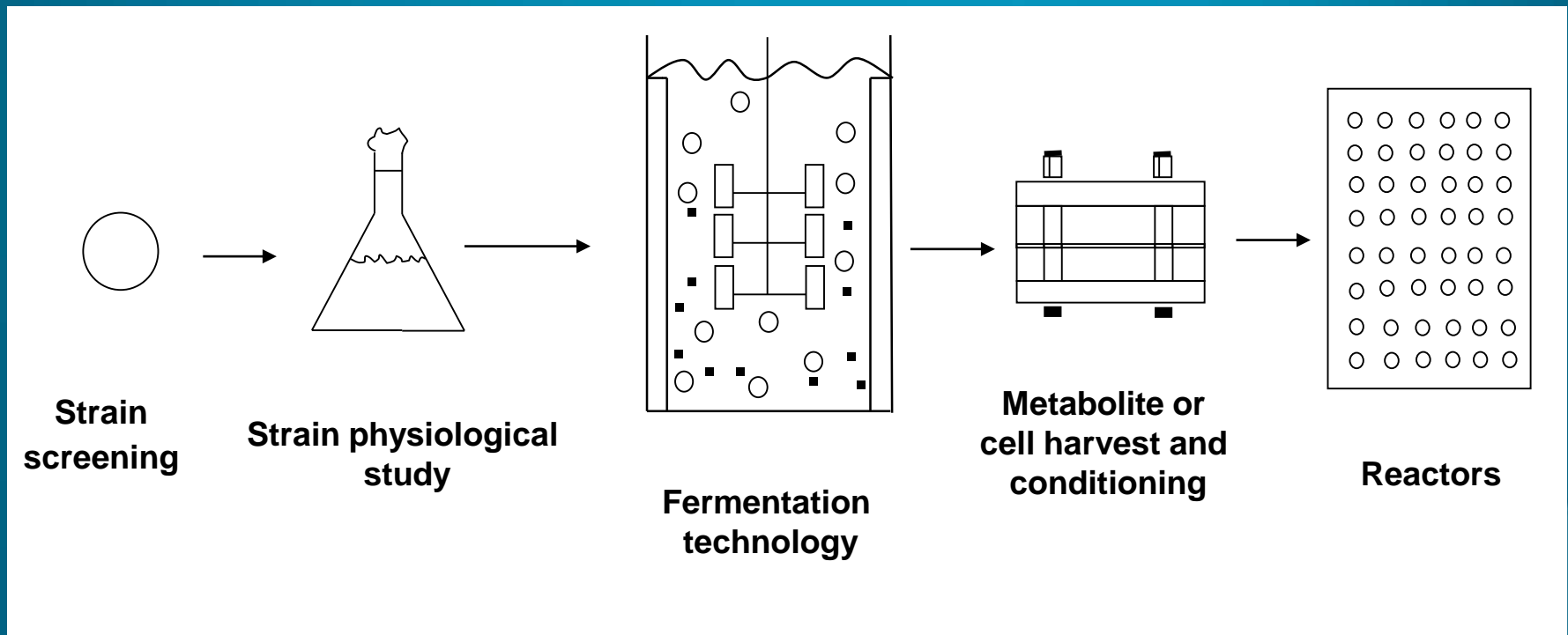


CWBI - ULg

*CWBI- Gembloux
Agro Biotech*



From cells to end products



Screening on plates



Flasks



20 L fermentor

2L fermentor



2000 L fermentor



500 and 2000 L fermentors

Atomisation

Centrifugation

Ultrafiltration



To bridge the gap





Centre Wallon de Biologie Industrielle

T.H.T. s.a.



www.tht.be

Artechno s.a.



www.artecho.be

Microbelcaps s.a.



www.microbelcaps.be

Lacto Research s.p.r.l.

Biotreatment s.a.

Belgoma s.a.

F.F.P. s.a.

THT Research s.p.r.l.

Waldryprocess S.A.



PROBIOTICS & STARTER CULTURES

Selection and production of lactic acid bacteria

- Pure cultures – Formulation - conditioning

Commercialisation with following sectors

- Pharmaceutical: food supplements (nutraceuticals) and probiotics
- Food : starters (fermented products) and functional foods

tht

PROBIOTICS & STARTER CULTURES



Turnover

2014 : 3.000.000 euros

Staff

2014 : 15 people full-time

ULi

PROBIOLOGIE & STARTER CULTURES

Facilities





ARTECHNO SA

SPIN-OFF DU CENTRE WALLON DE BIOLOGIE
INDUSTRIELLE
(FSAGx – ULG)

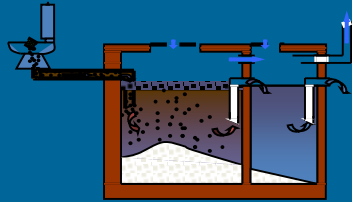


Products

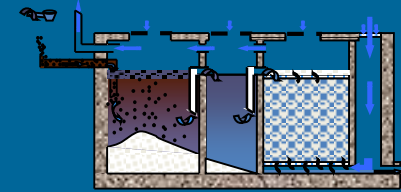
- Pure microbial cultures
- Biological activators
- Enzymes (lipase)
- Septic tank
- Starters
- Waste Water Treatment
- Plant biocontrol
- Functional microorganisms (*Saccharomyces boulardii*, enriched yeast : Se, Ca²⁺ ,Cu²⁺, Zn²⁺)
- Probiotics

Development of plant biocontrol : *Bacillus* /
Pseudozyma / *Trichoderma*

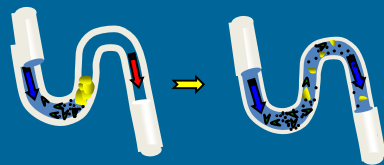
Products for biological household



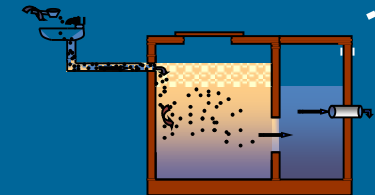
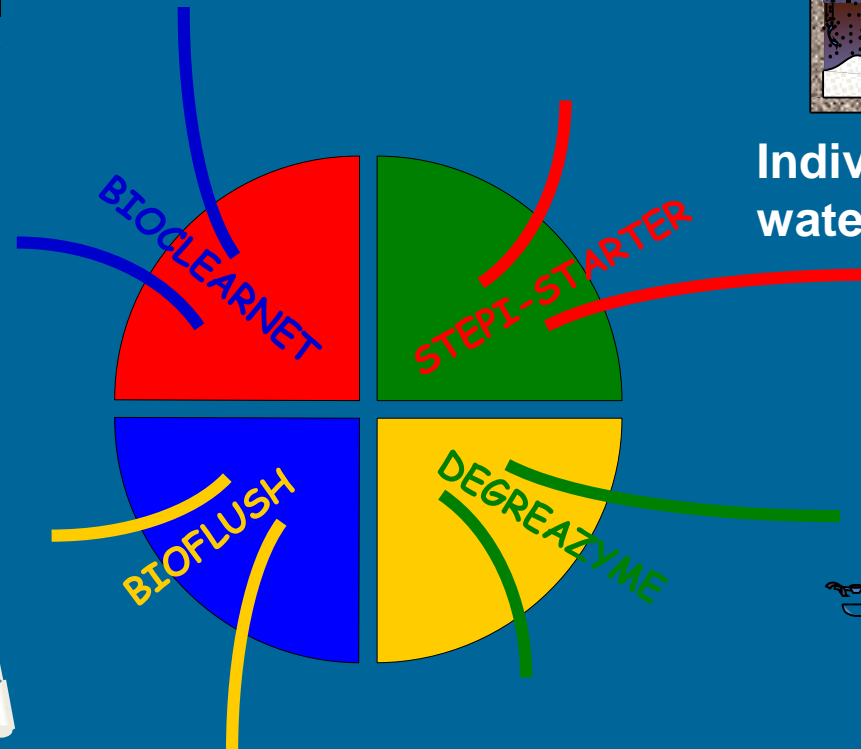
Septic tank



Individual waste water treatment plant



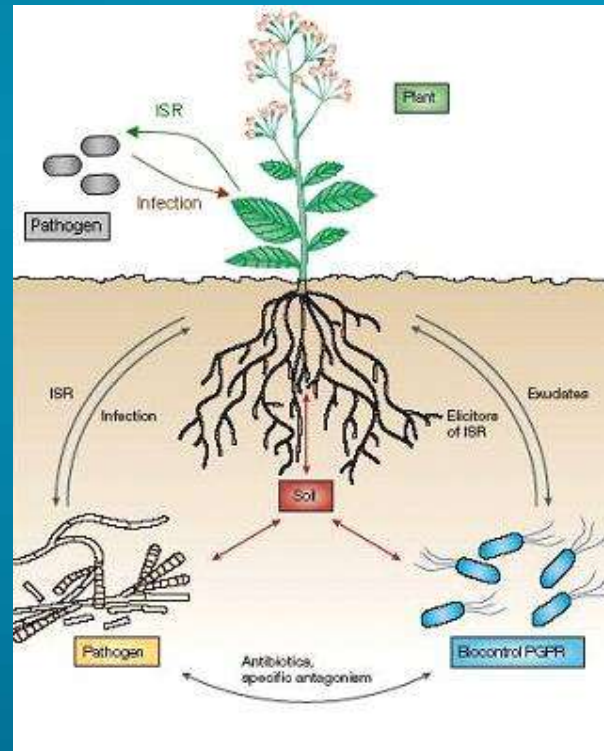
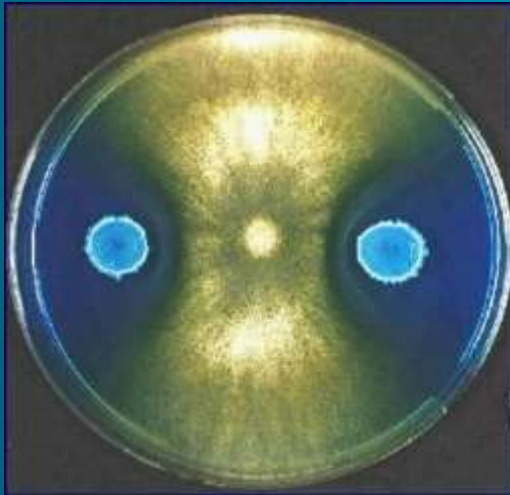
Biological unblocker



Grease traps

APPLICATIONS

Plant biocontrol





Turnover

2014 : 1.500.000 euros

Staff

2014 : 10 people full-time





Facilities

Université
de Liège







Products

Application support and nutraceuticals

- 1. *Vitamins for direct compression*** : Vitamin B1 (Thiamine), B6 (pyridoxine hydrochloride), B12 (Cyanocobalamin) , C coated with vegetable fat
- 2. *Microencapsulated Flavor*** : Microbelcaps makes a spray micro-encapsulation of various essential oils, oleoresins, alcoholates, herbal and natural identical molecules : lemon scent, aroma mint, apple, mango, cola, hazelnut, yogurt, orange flavor
- 3. *Oil rich in Omega 3 microencapsulated in acid and base resistant coatings*** : microencapsulated borage oil, linseed and olive oil
- 4. *Coated Microorganisms:*** *Lactobacillus casei, acidophilus, bulgarius, rhamnosus, plantarum, Bifidobacterium infantis, Streptococcus thermophilic, Lactococcus lactis*
- 5. *Liquid papain***, powder papain and coated papain
- 6. *Dry extracts from fermented papaya*** : extract from fermented flavored papaya



Pharmaceutical Application

1. *Coated Vitamins* for direct compression: Certifications: Good Manufacturing Practice (GMP) and Drug Master File (DMF EU) : Vitamin B1, Vitamin B6, Vitamin B12
2. *Biotin 0.1%*
3. *Leucine*
4. *Vitamin C* coated with vegetable fat
5. *Phenylalanine*
6. *N-acetyl cysteine* microencapsulated



Market

Belgium, France, Italy, Holland

Turnover

2014 : 1.600.000 euros

Staff

2014 : 5 people full-time







SERVICES

Contract spray-drying
Development of drying protocols
Formulation
Granulation
Micro-coating

« Functionalized » powders : Particle size - Concentration
Solubility - Dispersion - Density
Controlled release (pH, kinetic,...)

PRODUCTS

Natural flavors
Natural food coloring agents
Food gums
Enzymes
Hibiscus
Culture medium ingredients

EQUIPMENTS

Spray-drier (200 kg/h evaporation rate)
Fluidized bed drier/coater
Freeze-drier
Controlled liquid reactors (e.g. enzymatic reaction)

Facilities



Relationship between Industry-University

- Dialogue
- Respect of each partner

in economic terms,

in terms of intellectual property protection



**Bronze head from Burkina Faso
(Private Collection P. Thonart)**

A strategy for a collaboration with developing countries



The example of Netetu (Sénégal) – Soumbala (Burkina Faso)

Exchange North-South
Fermented grains used as condiments
Market : 30 billions of FCFA (in Burkina)
26 thousands tons of products



Acid flour produced by milling, fermenting and drying millet grains “pearl millet” (*Pennisetum glaucum*), African cereal with small round grains, resistant to drought.



Treatment: fermentation controlled by a lactic bacterium (*Lactobacillus plantarum*), followed by drying by atomization (technique used for making milk powder, coffee etc.)

Raw millet flour
(10% Hum, $\text{Ø} < 0,8 \text{ mm}$)

↓
Humidification (50% water)

↓
Adding starter → mix

↓
Fermentation during 18-20 h at 30°C

↓
Dilution (75% water)

↓
Atomization (230°/90°C)

↓
Atomized acid flour
(6-8% Hum)

Millet flour dough



*Bakery
mixer*



Fermented flour



Manual rolling



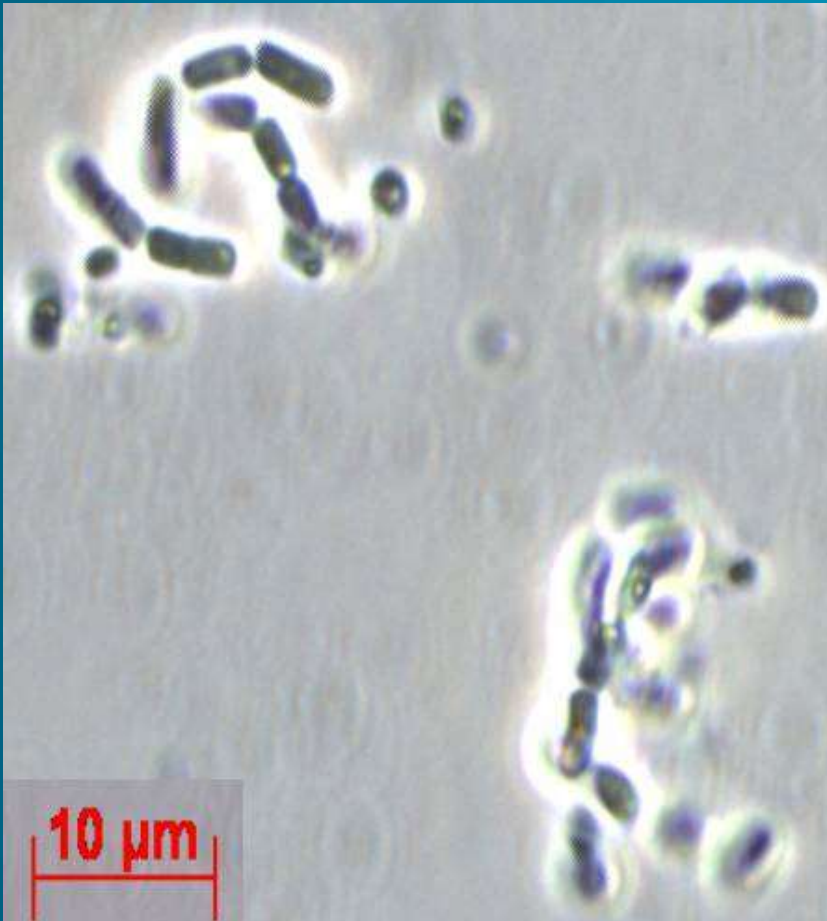
Donuts, with raisins

Production of vinegar

- Development of 2 technologies
- Searching for partners
- Valorization



✓ Description of *Acetobacter senegalensis* sp. nov.:



- Gram-, no endospore formation
- Coccoid, 0.8 μm of width, 1.6 à 2 μm in length and ~ 0.6 μm in Ø.
- Oxydase – and catalase +
- Optimal growth at 35°C on YGM
- Cells are opaque, convex and motile.
- G+C% of DNA is 56.0 mol %.
- Characterized by several phenotypic features.
- The standard strain of CWBI-B418 is LMG 23690^T

- ✓ By combing the phenotypic and genotypic results:

CWBI-B418 is a new species

Acetobacter senegalensis sp.nov



Tank for the Orléans method



Front view of the model accelerator

Avenues of collaboration

- Selection of products (gum arabic, bromelain)
- Development of treatment protocols
- Transfer of raw materials towards North
- Transfer of procedures towards South
- Commercialization South-South, South-North, North-North
- Creation of spinoffs in the North and South

Classify the gum from Burkina based on these quality criteria (valorization South-South, South-North).

Purchase of this gum by the C.W.B.I. in order to develop the purification procedure at industrial scale.

Economic study on the organization and the flow of gum production in Burkina and in Wallonia.



Purification procedure

Bringing into solution



Filtration on filter press



Clarifying filtration on filter plates



Drying of the solution by atomization



Aggregates 

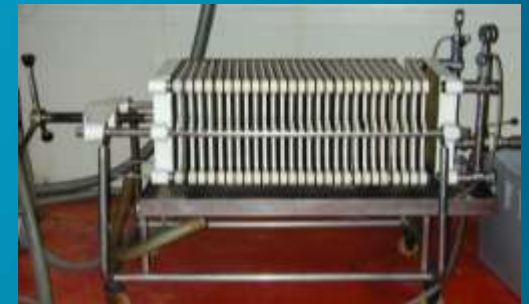
Bringing into solution



Filtration on filter press



Clarifying filtration
on filter plates

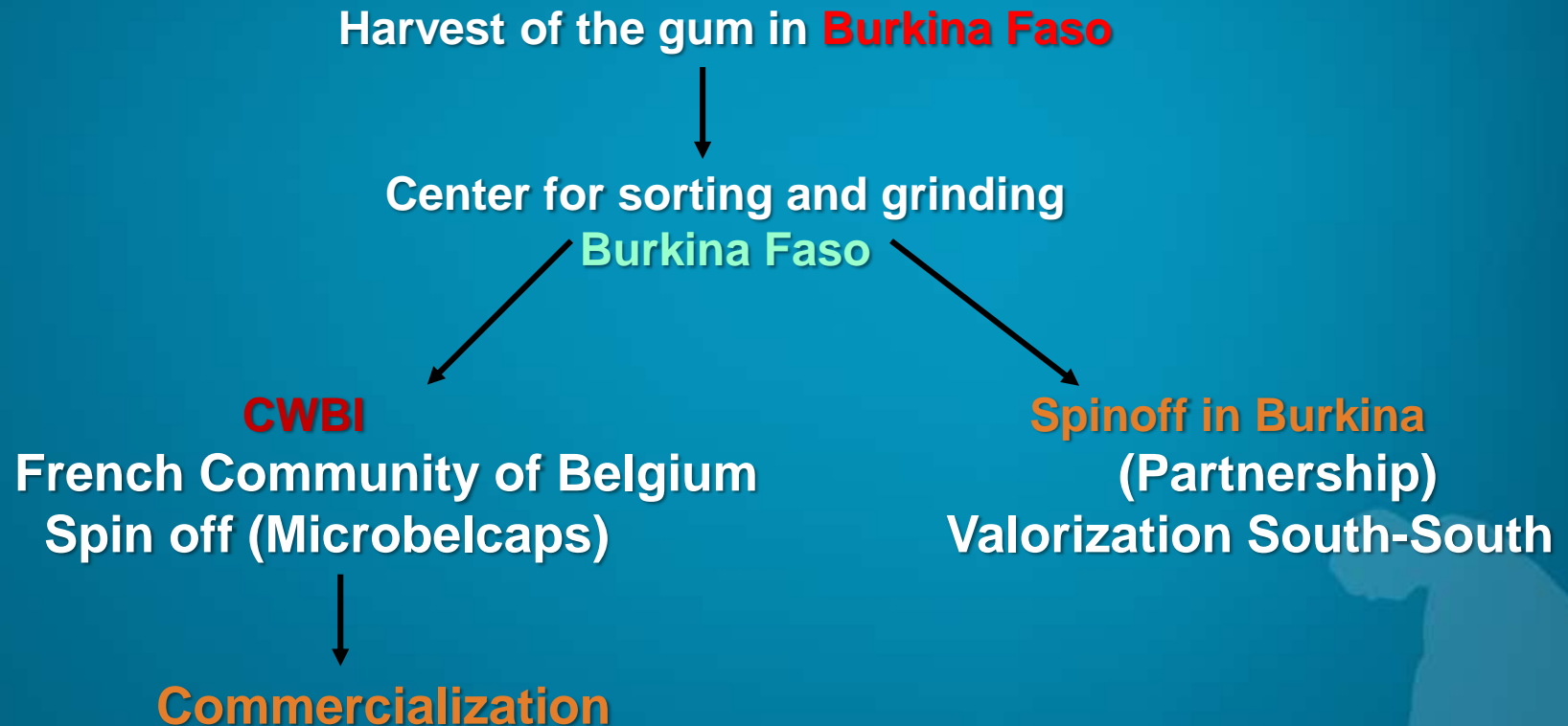


Drying of the solution
by atomization



Powder

Valorization diagram



Study of anthocyanes from Hibiscus sp.



Malvaceae, *Hibiscus sabdariffa* sp

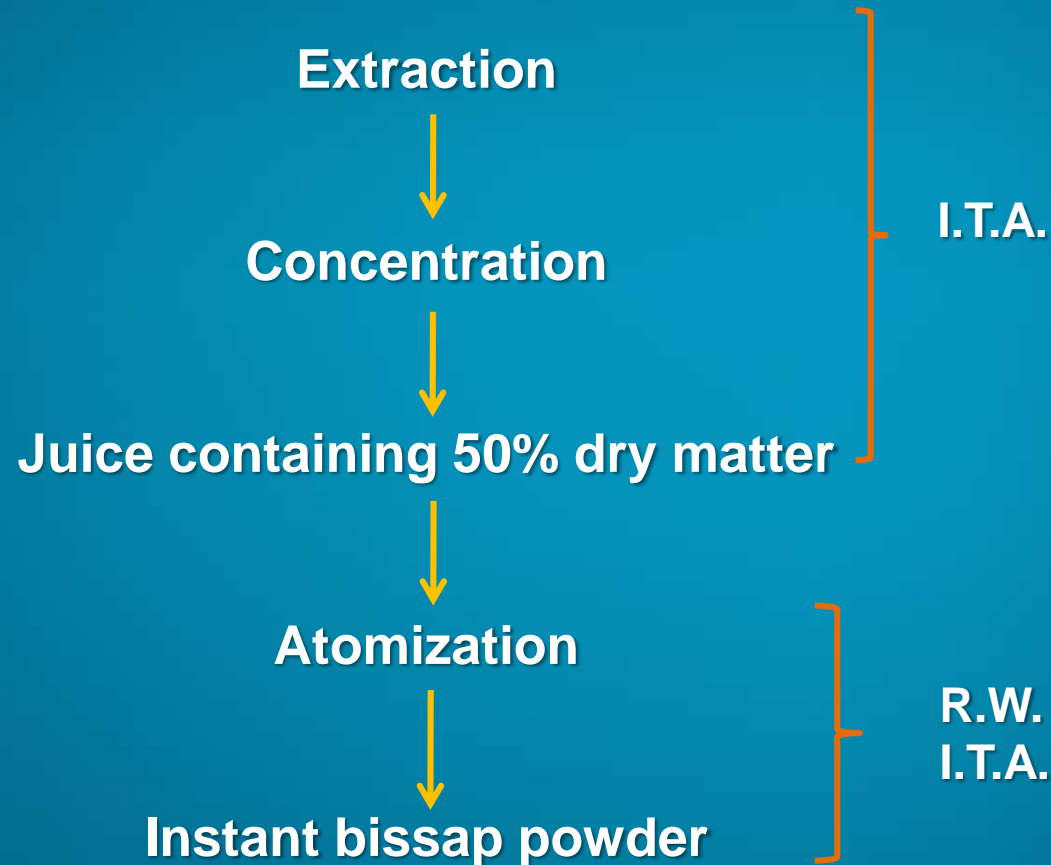
Sorrel, Roselle, sour tea, bissap

Varieties:

- Vimto: dark red calyxes
- Koor: very acidic




Procedure



**BISSAP
INSTANTANÉ**

Préparez votre *bissap* en 5 minutes



PRODUIT 100% NATUREL

POIDS NET: 14 g
Pour 1 litre de boisson

Bissap instantané

100% NATUREL

Préparez votre *bissap* en cinq minutes

La poudre se dissout parfaitement
sans laisser de résidus, restituant à
l'identique le goût du bissap

INGREDIENTS: BISSAP SOLUBLE
POIDS NET: 14 g

CONSEILS DE PREPARATION:
*verser le contenu du sachet dans 1 litre
d'eau, mélanger et sucrer.
Conserver la boisson obtenue au frais*

Produit et emballé par le Pôle de Technologie Agroalimentaire
Commercialisé par la SODEBIO FRA n°175/2008
I.T.A. BP 2765- Hann Maristes, Dakar, SENEGAL

*A consommer de préférence avant fin: 06/2010
N° de lot: 02086872*

Instant bissap bags



Atomization drying system





The instant Touba-coffee

The Touba-coffee is a coffee aromatized with Guinée pepper (diar en wolof). The beverage is prepared using the classical method of filter coffee.

Named after the saint town of Touba, the Touba-coffee was brought by its founder, Cheikh Ahmadou Bamba, who donated the recipe to the Murid community after its return from the exile in Gabon.

Description of Diar:

It is a spice extracted from the fruit of *Xylopia aethiopica* (Dunal) A. Rich, a tree growing in the countries of the Guinée golf and whose dried fruit is like a 3 to 5 cm long clove of ebony color containing small grains.

Scientific name: *Xylopia aethiopica* (Family of Annonaceae)

Other names: Grains of Selim, Moor pepper, Kani pepper, Senegal pepper



Green unripe fruits of diar

Ripe fruits of diar



Dried fruits of diar



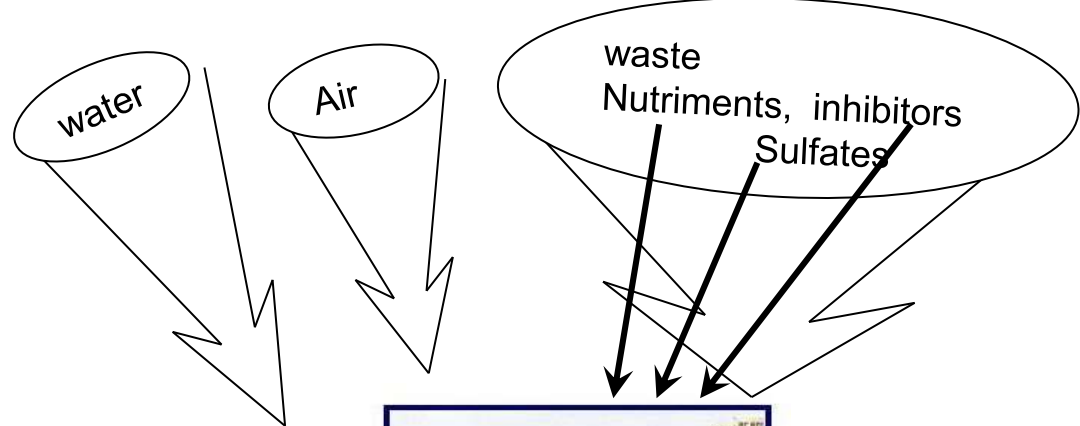
Touba coffee bag



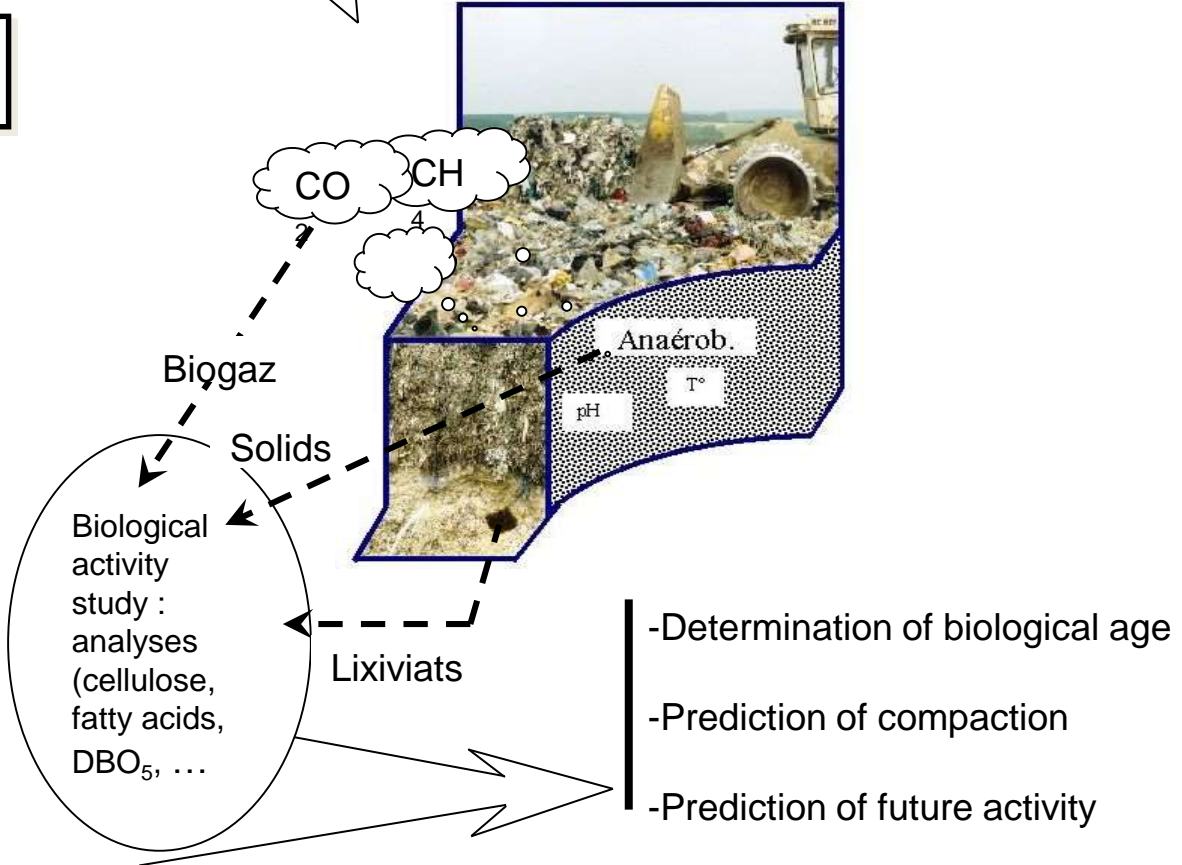
Other products,..... :

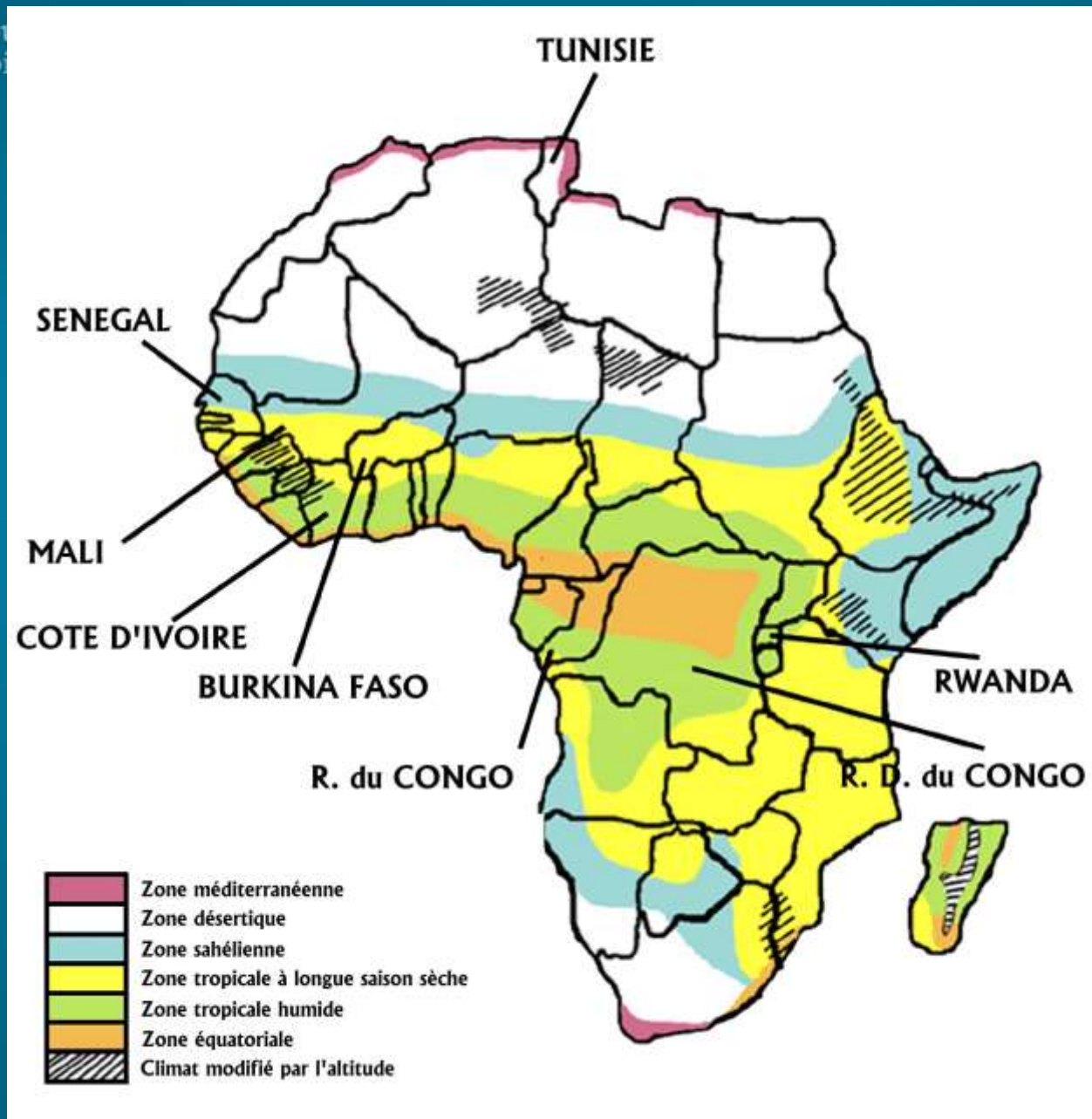
- Ginger
- Monkey bread
- Tamarin





Landfill







**Center: empty pilot landfill for the Saaba discharge.
Periphery: same landfill during filling, followed by biological activity,
compacting, laying of the mineral cover and final profile.**

Innovation :

a necessity for North and South

