Coconut Market and Research in Europe: Needs and Trends

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Seminar on Hainan’s Coconut Industrial Development

7-10 October 2014, Hainan, China
World coconut cultivated area = 12 millions hectares in 2013

Geographical distribution of coconut cultivated areas in 2013 (%)
(Source FAOSTAT, 2014)

- Asie: 9%
- Afrique: 5%
- Amérique + Caraïbes: 5%
- Océanie: 81%

Cultivated areas (thousands Ha)

+80% in 43 years
World Production: 60 Mt Coconuts in 2012 (6th position)

Major Producing Countries: Indonesia, The Philippines, India

World Average Yield: 5t of coconut fruits/ha/year or 0.5 t oil/ha/year

Characteristics: Various products, « organic » culture, small farmers 96% (1 to 5 ha)
**COCONUT MARKET IN EUROPE**

Imported products

- Coconut oil as copra oil: 1,000,000 t
- Desiccated Coconut (DCN): 117,000 t
- Coconut Milk (cans and TetraPack): no data
- Coconut fibres (substrates, geotextiles): 101,340 t
- Fresh coconut fruits (mature): 35,000 t*
- Coconut Water (bottles, cans, Tetrapack): no data
- VCO (niche Market): no data

*Sources FAOStats & *EUROSTAT
COCONUT MARKET IN EUROPE: FRESH MATURE FRUITS

Major importing countries:
- The Netherlands (33%)
- United Kingdom (19%)
- Italy (16%)
- France (9%)
- Spain (8%)

Major exporting countries:
- Ivory Coast (31%)
- Sri Lanka (26%)
- Dominican Republic (20%)

Source: Fruitrop, 2011
Standards:

- 4 standards from Codex Alimentarius and 1 recommendation:
  - DCN (Stan 177-1991)
  - Coconut Aqueous Product (Stan 240-2003)
  - Coconut water (Stan 247-2005)
  - Coconut oil (Stan 210-2003)
  - Recommended International Code of Hygienic practice

- No standards for fresh coconut fruits

APCC Standards are not in use in Europe

Source Codex Alimentarius
COCONUT MARKET IN EUROPE: TRENDS AND DEMAND FROM IMPORTERS

- High quality products with high functionality such as coconut water, virgin coconut oil, extra fresh coconut fruits, organic DCN and coconut milk
- Problems of quality and standardization
- More tasty products
- Ethical, biological, social-friendly, environmental-friendly...: importance of labels
- Be sure of the origin
Made by PhD Students coming from a coconut producing country

- KU Leuven – Belgique (Mechanical properties of coconut fibres based material)
- INRA – France (Impact of introduction of CNO in fish diet, aquaculture)
- Wageningen University – the Netherlands (coco fibres biobased materials)

Only 3 research institutes with people working continuously on coconut:

- NRI (no more) – UK
- IRD - France
- CIRAD - France
Working together for tomorrow’s agriculture

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An original research organization

- National public institution status, but a global mission

- Targeted research for development

- Based on 50 years’ experience in the field combined to an original approach
12 regional offices in the French overseas regions and abroad

A scientific hub in Montpellier
700 staff members based outside metropolitan France

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One main operating principle: research in partnership

- Working together to establish and implement priorities
- Working in the South, where our partners are, in their laboratories or in their fields
- Building scientific capacity
Training the talents of the future: the need to link research and higher education

More than 300 PhD students supervised each year, 60% of them from the South

International Masters courses run with grandes écoles and universities

800 researchers and technicians received and trained each year

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CIRAD and coconut sector

- Breeding, genomics (L. Baudouin, R. Bourdeix, JP Labouisse)
- Agronomy (X. Bonneau, J. Ollivier)
- LYTS (M. Dollet, F. Pilet)
- Biofuel (A. Liennard, G. Vaitilingom)
- Coconut wood (H. Baillères)
- Coconut processing and products quality (A. Prades)
- Carbon sequestration (O. Roupsard)
- Entomology (L. Ollivier)
- GIS (G. Coppens)
Coconut oil as fuel for electrification, for transport (cars, trucks and boats)

A. Liennard, G. Vaitilingom
CIRAD - UPR BioWooEB
Cocowood processing manual: from coconut wood to quality flooring (2010)

H. Baillères, Queensland
CIRAD - UPR BioWooEB

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Structuration of QUALISUD Joint Research Unit

“Determinants of the organoleptic and nutritional quality of fresh and processed products”
Metabolites analysis, biological activities, aromatic quality

“Contaminant control and food safety”

“Stabilization and transformation processes”
Improvement of post-harvest technologies
Development of innovative processing technologies
Reverse engineering
Coconut: two research axes

Objective 1
Deep study of the raw material characteristics

✓ Study the variability of the quality and coconut fruits regarding varieties and taking into account the stage of maturity at harvest
✓ Preserve quality thanks to innovative technologies

Objective 2
Assess the performance of new processes and evaluate their impact on CW quality

Strategy taking into account the raw material variability

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Computer Coconut Digital Image Analysis

- Coconut global Shape and Volume
- Meat & Cavity Shape
- Husk, Shell and Meat Thickness...

Total duration of analysis = less than 1 min/picture

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Near Infra-Red Spectroscopy (NIRS)

- Moisture content
- Fat Content
- Protein Content
- Carbohydrates content...

Total duration of analysis = 5 min.

Davrieux F., Prades A. et al., 2008

Dried kernel NIR spectra

Database and calibration
Impact of Variety and Stage of Maturity on CW volatile compounds

55 components detected / 41 identified
Ketones, alcohols, aldehydes, acids, esters, lactones...

Prades et al., JSFA, 2012
Coconut water stabilization

Polyphenoloxidases & peroxidases (Duarte et al., 2002)

Phenolic compounds

\[ \text{O}_2 \rightarrow \text{H}_2\text{O}_2 \]

Melanoidins (red, yellow or brown pigments)

Consequences = discoloration

PPO
- 73.8 kDa
- pH = 6.0
- T = 25°C

POD
- 49.2 kDa
- pH = 5.5
- T = 35°C

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Batch ohmic heating reactor

- $V = 100\text{mL}$
- $U = 0$ to $320\text{ V}$ and $I = 0$ to $20\text{ A}$
- Special DSA Titan electrodes
- Five cylindric sampling collectors

Roux et al., 2010
Ultrafiltration pilot plant

4 modules

$V_{\text{min}} = 2L$
COGENT
International Coconut Genetic Resources Network
Alexia PRADES, COGENT coordinator
7-10 October 2014, Hainan, China
Who are we?
A Network of Countries

- 39 country members, coconut producing countries
- 24 national genebanks
- 5 International Coconut Genebanks (ICG) in 5 sub-regional networks
Coconut producing countries and genebank location

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Our main activities

- Encourage the **protection and use of existing germplasm collections**
- Identify and secure **threatened diversity**
- Promote greater **collaboration** among research groups
- Conduct **appropriate training**, disseminate information and secure necessary **funding** for network activities
- Establish and maintain an **international database** on existing and future collections
Some of our partners

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