ANR BRIDGE

BRidging **I**nformation on tree **D**iversity in French **G**uiana and a test of **E**cological theories

Molecules from Amazonian forest: characteristics, role and valorisation

Kick-off meeting

19-20 Février 2007

Kourou

Emeline Houël

Ingénieur de Recherche

CNRS – L3MA Cayenne

A chemistry group within EcoFoG

- **D. Stien, E. Houël, M. Royer**

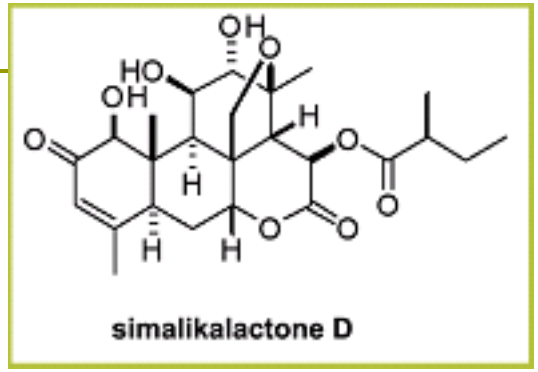
  - extraction & characterisation of molecules
  - biological properties of natural molecules
  - modification of extracted molecules and industrial valorisation

M. Royer (PhD): Bioresistance of woody species linked to their content in bioactive molecules

- **ANR JCJC, MOM, BRIDGE**

Antimalarial traditional remedies

- Study of a traditional herbal tea: *Quassia amara* leaves



simalikalactone D

Quassia amara L.

As an example: molecules with anti malarial activities

Ongoing project with IRD and Pasteur Institute in Cayenne

Leaf status[a]	Concentration of SkD in leaf tea µg/ml
FJ	4.63
DJ	0.05
FM	0.05
DM	2.10^{-3}

[a] FJ: fresh juveniles, DJ: dried juveniles, FM: fresh mature, DM: dried mature leaves.

Antimalarial traditional remedies

Plante entière

Partie de plante

Extraction

Extrait

Purifications

Essais biologiques

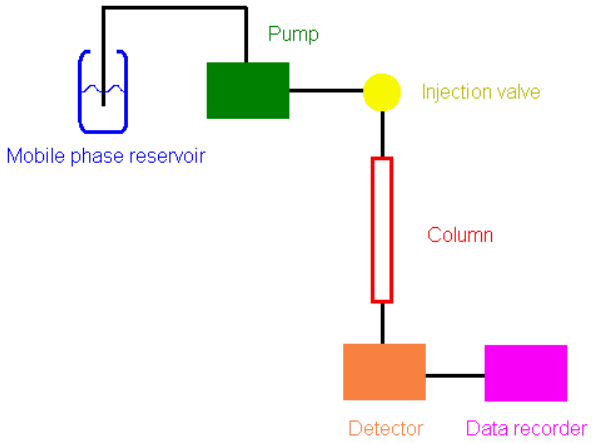
HPLC

Mélange constituants actifs

Purifications / détermination
de structures / essais pharmacologiques

RMN

Principes actifs



Wood durability and natural molecules

Durability

Resistance to biological attacks (fungi, insects)

↓

Pesticides, insecticides or repellents

↓

Applications : wood treatment, agrochemistry, pesticides, **variability, identification**

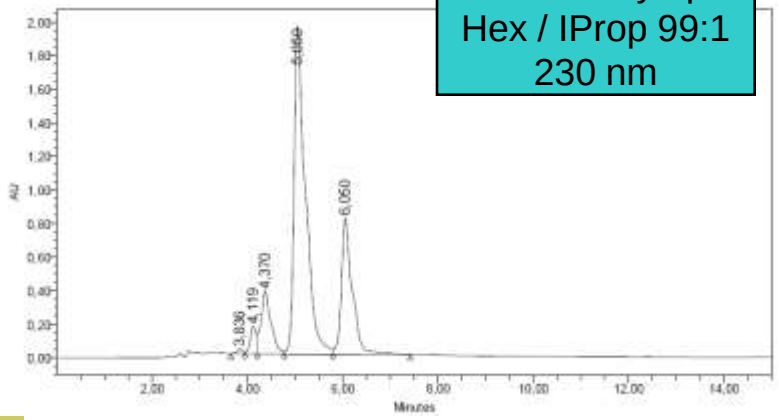
Polarité croissante

Extrait à l'hexane de la sciure de Wacapou

EH136-WAC2; m = 3.105g

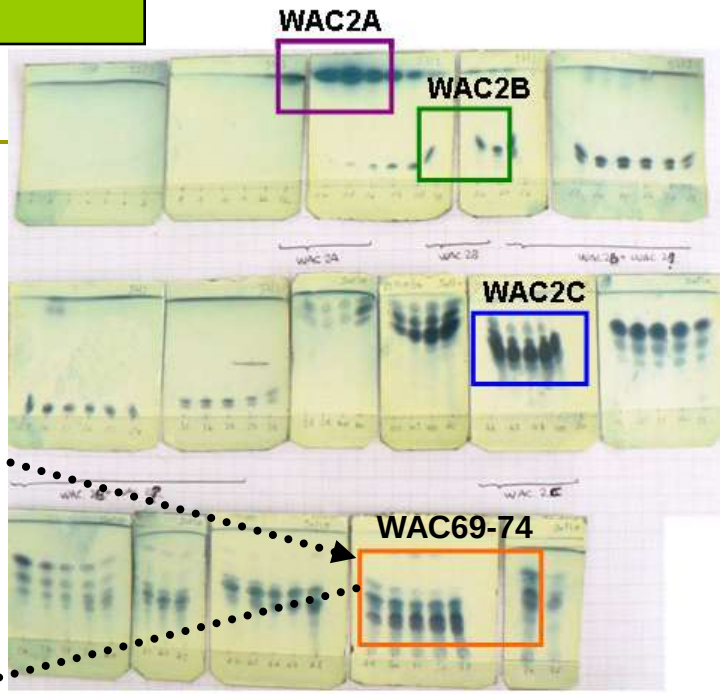
CCM

HPLC analytique
Hex / IProp 99:1
230 nm



Colonne silice

Fractions
69 -> 74:
mélange
m = 262.4 mg



HPLC

HPLC prep.

HPLC prep.

8 fractions

EH146-WAC69-74F1
m=0.8 mg

Stocké au congel

EH147-WAC69-74F3
m= 24.8 mg

CCM

Stocké au congel 4.1 mg

Rien d'intéressant /F4

EH148-WAC69-74F4
m= 78.3 mg

CCM

HPLC

EH151-WAC69-74 F5
m= 17.7 mg

CCM

Raman

Stocké au congel

WAC69-74 F2/F3'/F6 F7

Non conservé

Perfumes and cosmetics

- Search for new fragrant molecules from guyanese plants and woods

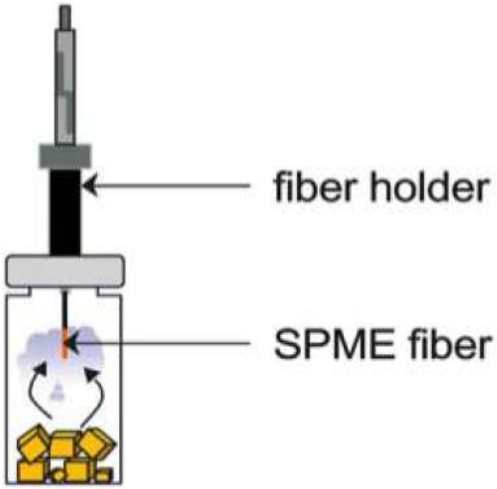
- Industrial collaboration : KLR/Sylvessence – OSEO project

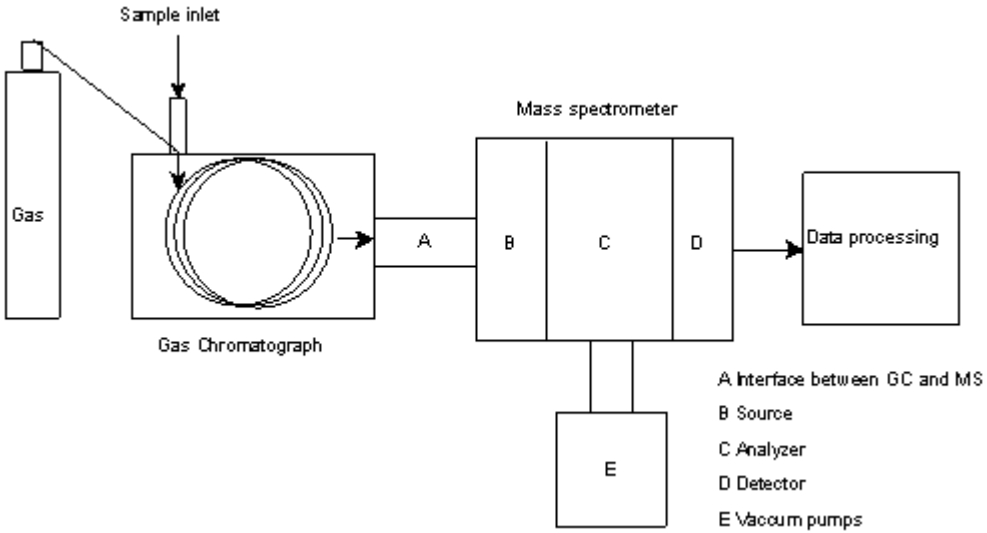
- Studies on rosewood

Tools and methods

Chemical properties

- HPLC device
- RMN spectrometry (at the end of the year)
- Mass spectrometry: SPME/GC/MS (*Institut Pasteur*)

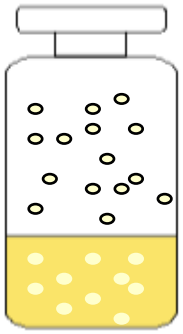




Study of volatile molecules from woods and leaves

- Headspace analysis: analysis of the gaseous phases above a solid or liquid sample

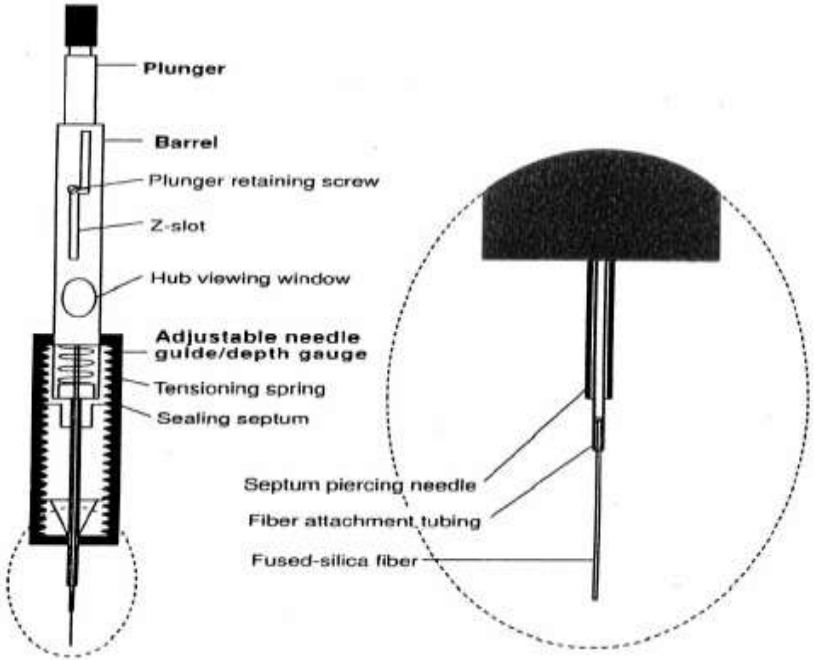
Equilibrium



Headspace (= gas phase)

Sample matrix

- SPME analysis: volatile molecules analysis after a preconcentration step

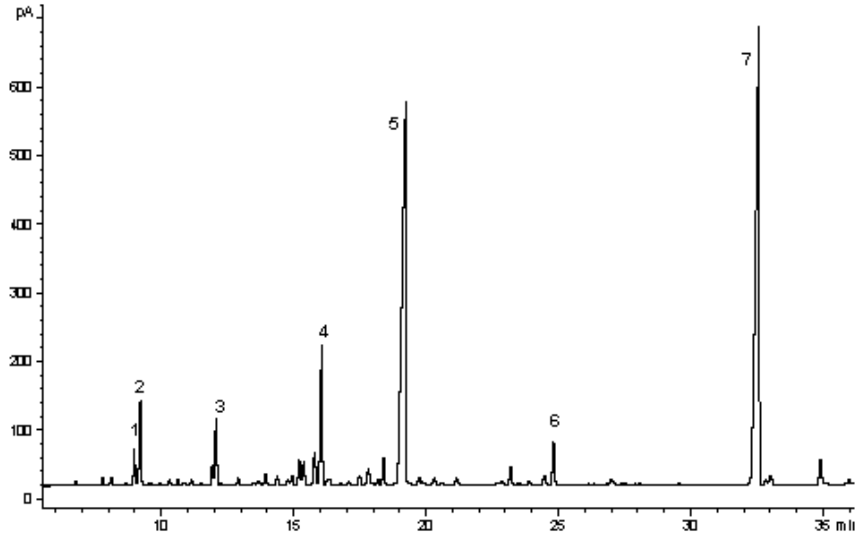


Study of volatile molecules from woods and leaves

- Vegetal material: bark / outer heartwood
  Possibly sapwood and leaves

- GC/MS spectra:
  - Study of chemical defenses: terpenes
  - Comparison to existing databases

- Aim of the study:
  - Aid for identification
  - Database construction
  - Phylogeny



Study of volatile molecules from woods and leaves

- Aid to identification:
  - « Anibaba and the 40 Lauraceae »(J.Beauchêne®)
    - Vernacular name:
      too many « bamba apisi » !
    - Wood anatomy: insufficient alone
    - Taxonomy: long and difficult for non-specialists
    - GC/MS: chemical fingeprint
      ⇒ **COUPLING**

  - Bibliographic studies:
    - *Ocotea teleiandra*: contains benzyl benzoate and benzyl salicylate: exception among *Ocotea* genus
    - Identification: search for « exceptional » molecules
    - Bridge: molecules in common between genus, species, family

Study of volatile molecules from woods and leaves

- « Chemiophylogeny »:

  - Benzoyl esters (benzyl benzoate, benzyl salicylate): Lauraceae wood constituents

  and

  some *Cinnamon* species leaves constituents

  => Compounds which represents a chemical link between Lauraceae and Annonaceae

Study of volatile molecules from woods and leaves

- Elodie Courtois: training period 10/03 – 30/04
  L3MA / Institut Pasteur

  - SPME/GC/MS analysis
  - Biosynthesis: « family-specific » pathways ?

Thank you for your attention