

# MULTI-VALORISATION DES COPRODUITS VITICOLES POUR PERMETTRE UNE ÉCONOMIE CIRCULAIRE

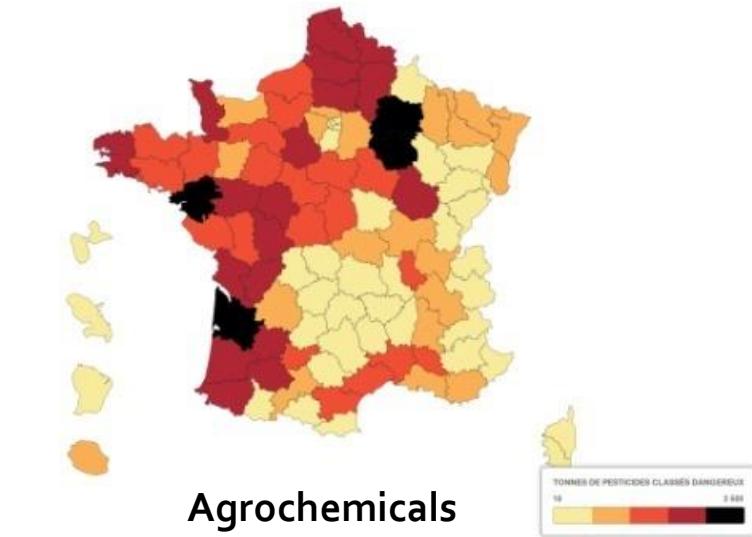
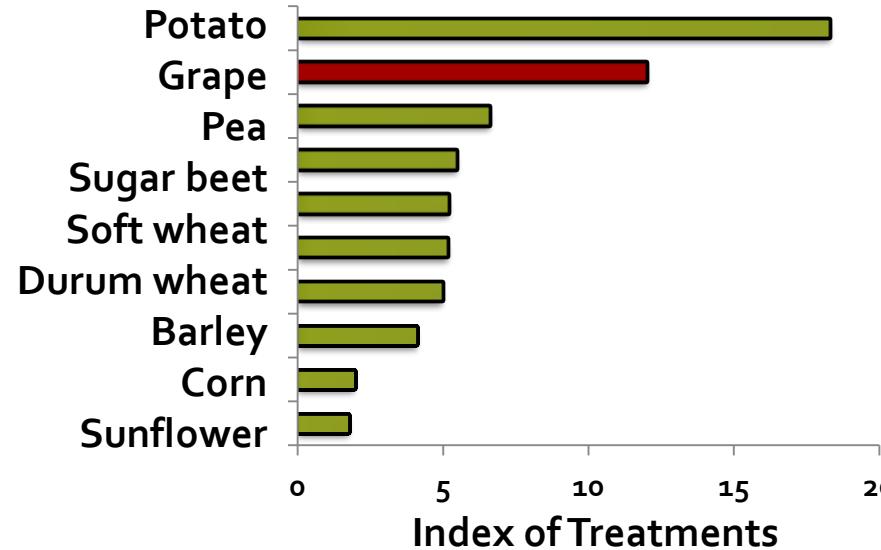
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# The Wine sector relies on Agrochemicals

- . Viticulture: only **3.3 %** of agricultural land
- . But **14.4 %** consumption of agrochemicals

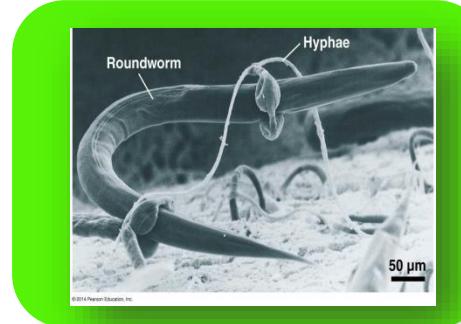


Cliché : S. Tabary - septembre 2004

# Alternative solutions: Biocontrol



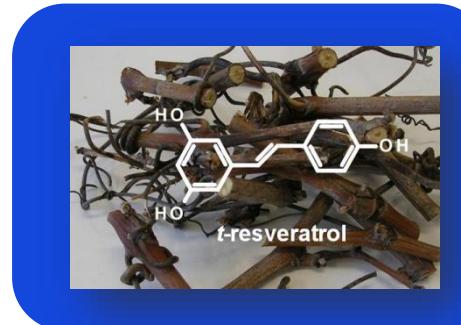
Macro-organisms



Micro-organisms



Sexual confusion



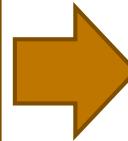
Plant natural products

# Grape polyphenols

## Berry



- █ Anthocyanins
- █ Flavonoids
- █ Phenolics
- █ Procyanidins



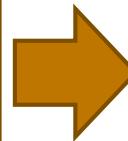
- Wine color
- Wine keeping
- Astringency

## Stem

Resveratrol derivatives



- █ Stilbenoid DP1
- █ Stilbenoid DP2
- █ Stilbenoid DP3
- █ Stilbenoid DP4



- Human health
- Biopesticides

# Stilbenoids promote Human Health

## Resveratrol

Protecting cardiovascular system



"French Paradox"

Preventing cancers

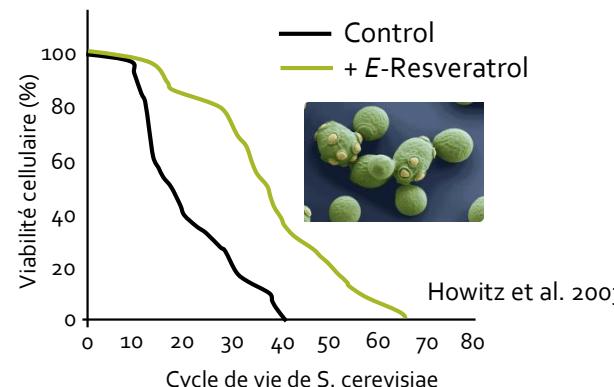


Zhang et al. 2013

Fighting neurodegenerative diseases



Antidiabetic



Cell lifespan



Medecine



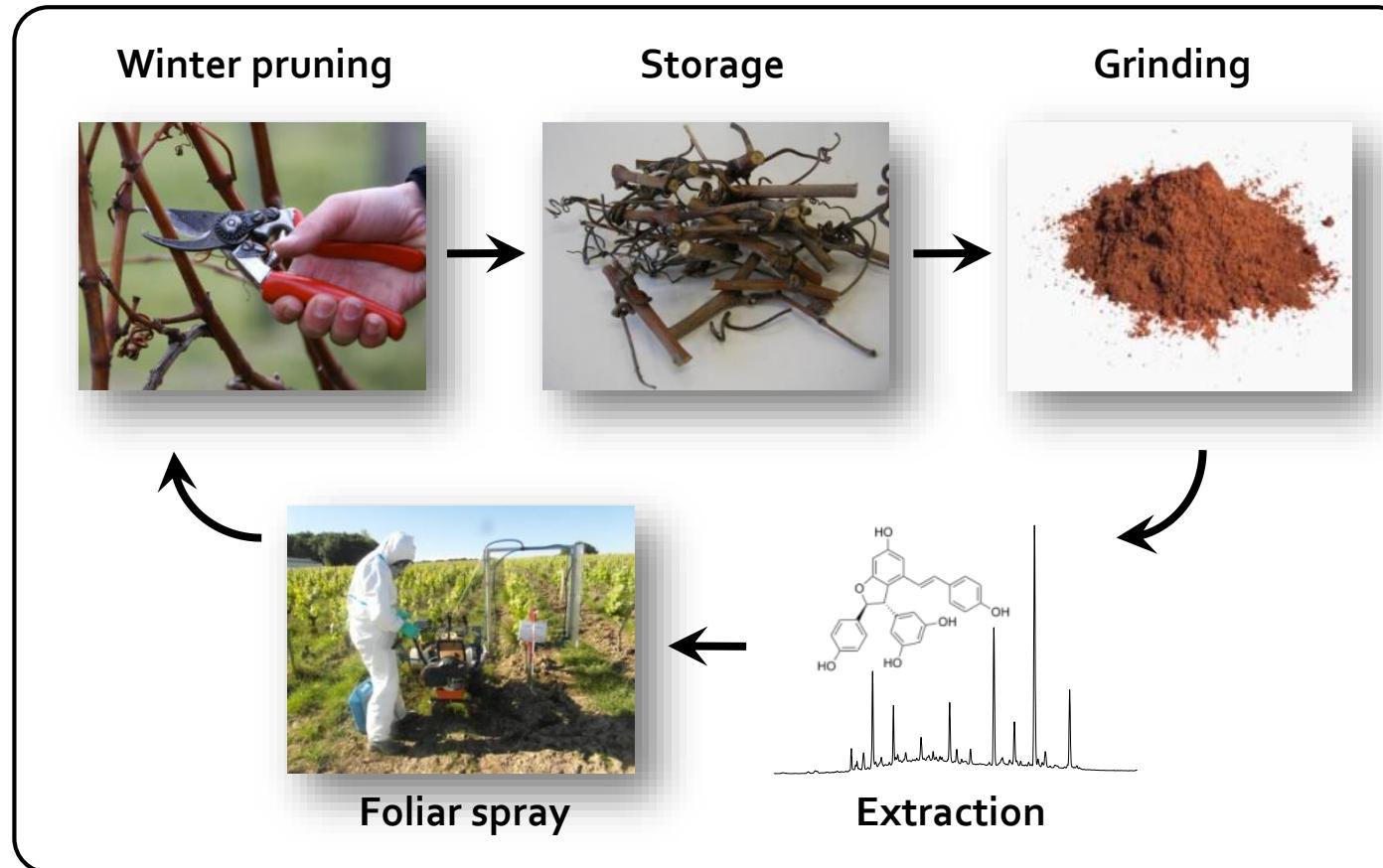
Nutraceutics



Cosmetics

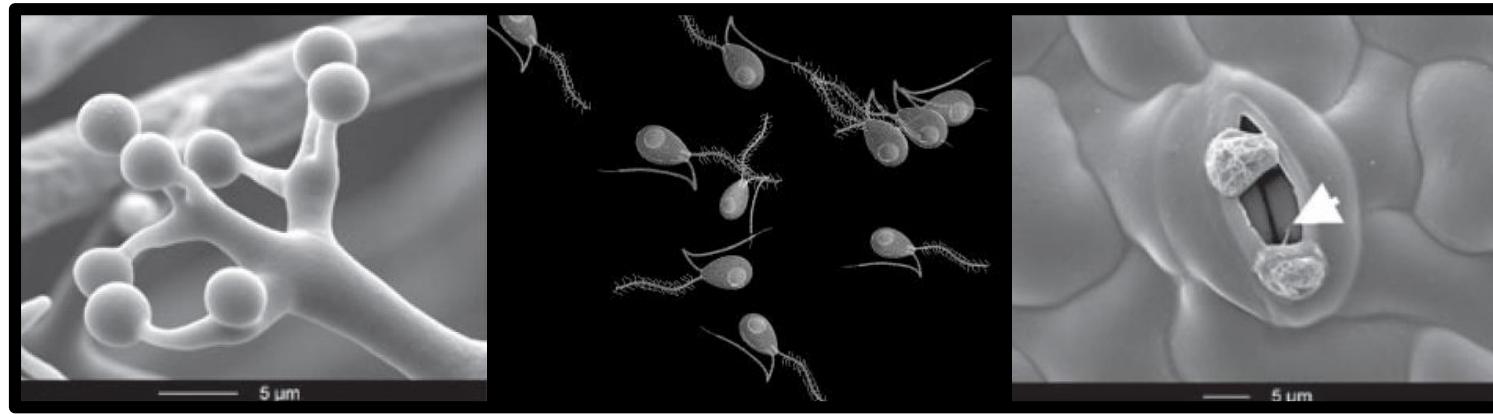


# Grape cane extract: The sustainable loop



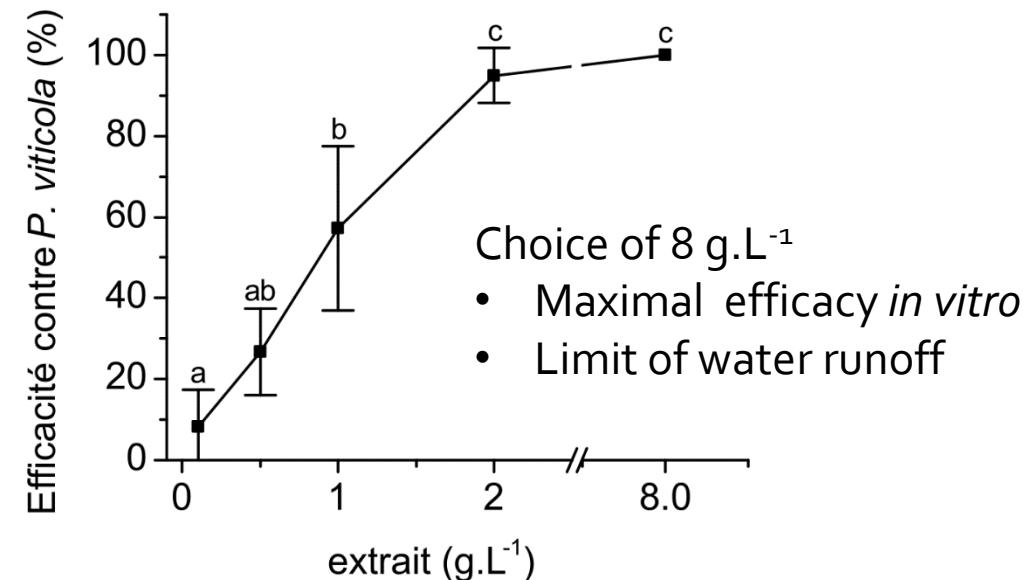
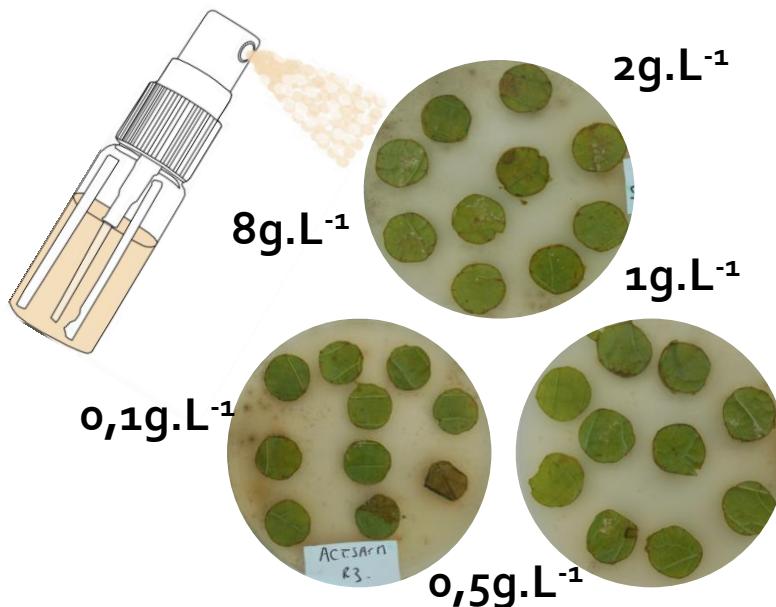
Lanoue et al., Revue des œnologues 2017

# Grape cane extract: Activity against Downy Mildew

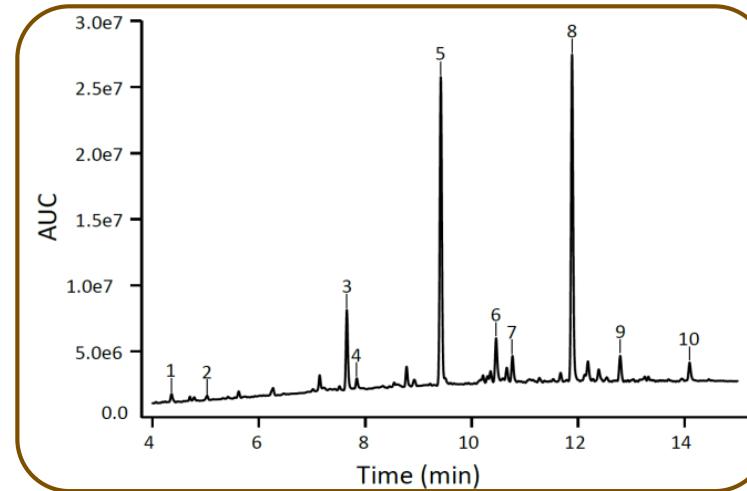
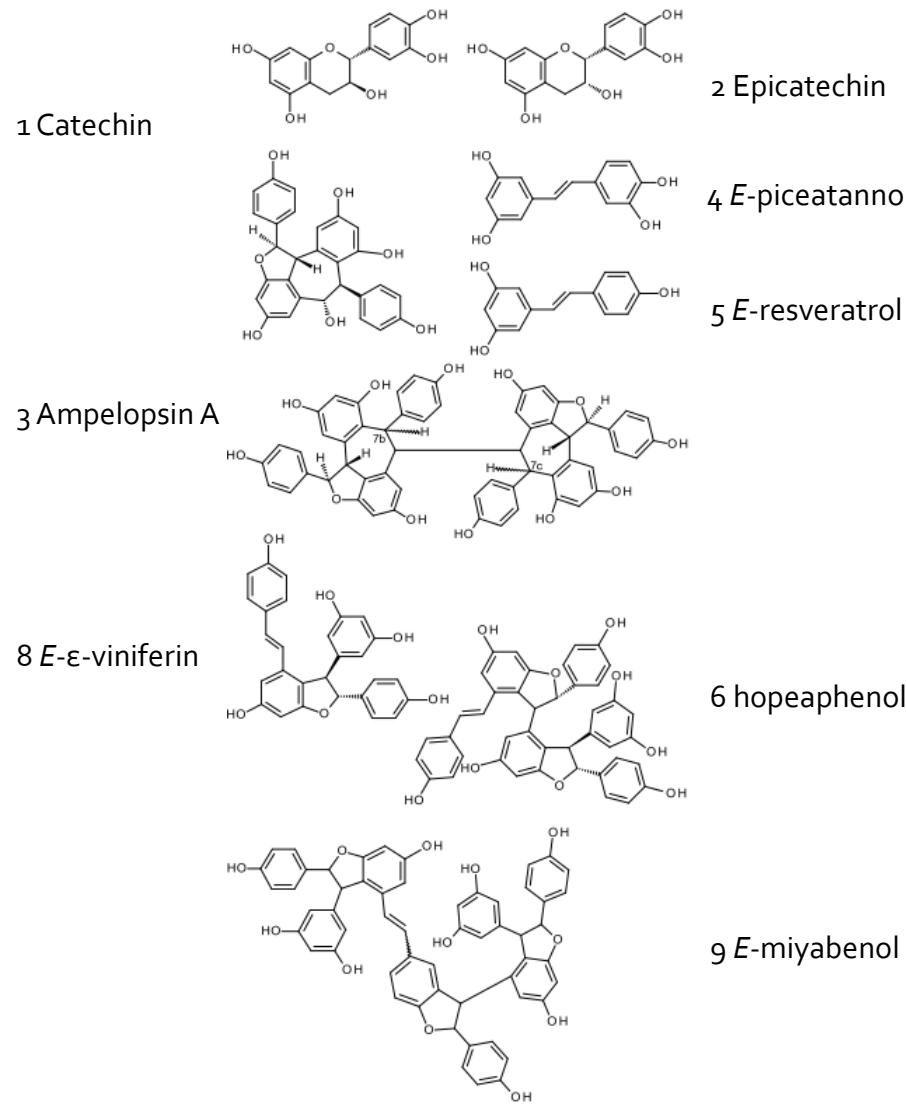


Jürges et al., 2009

Spray on foliar discs to mimick field treatment  
(300 L.ha<sup>-1</sup>)



# Grape cane extract: The active compounds



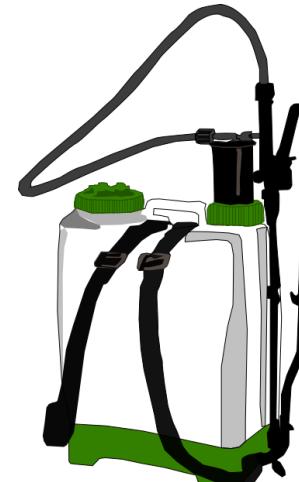
#	Compounds	Concentrations
8	E-ε-viniferin	398.9 mg L <sup>-1</sup>
6	Hopeaphenol	198.7 mg L <sup>-1</sup>
5	E-resveratrol	156.7 mg L <sup>-1</sup>
3	ampelopsin A	135.0 mg L <sup>-1</sup>
7	Isohopeaphenol	84.4 mg L <sup>-1</sup>
10	Z/E-vitisin B	41.6 mg L <sup>-1</sup>
9	E-miyabenol C	20.5 mg L <sup>-1</sup>
1	Catechin	16.0 mg L <sup>-1</sup>
4	E-piceatannol	11.5 mg L <sup>-1</sup>
2	epicatechin	7.4 mg L <sup>-1</sup>

# Grape cane extracts: Field trials

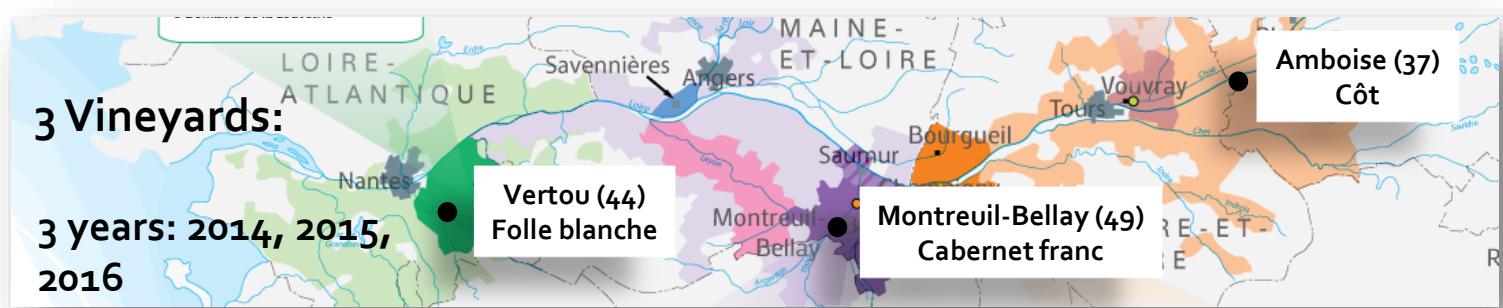
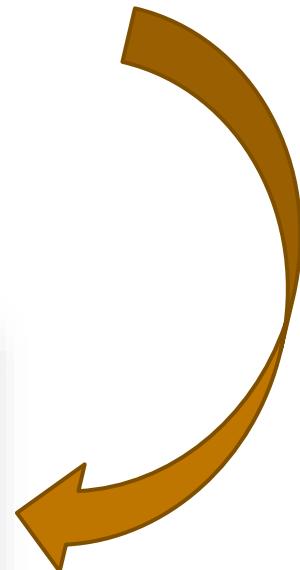


Pre-formulated extract

- 256 mL d'extract
- 320 mL d'éthanol 100%
- 40 mL Addit Koppert



Add Water QS 16L

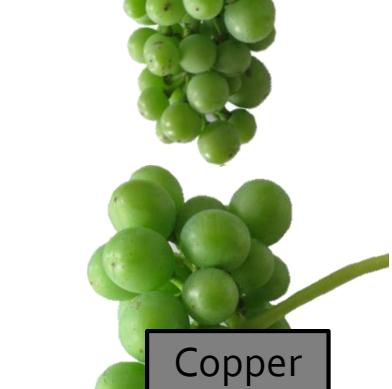
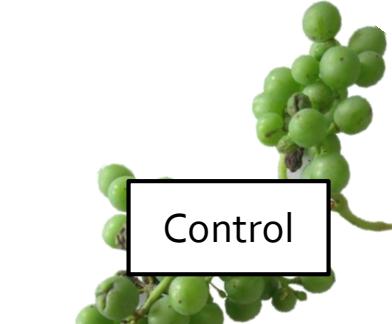
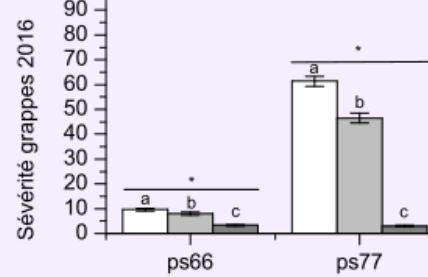
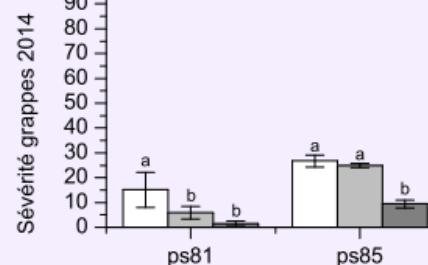
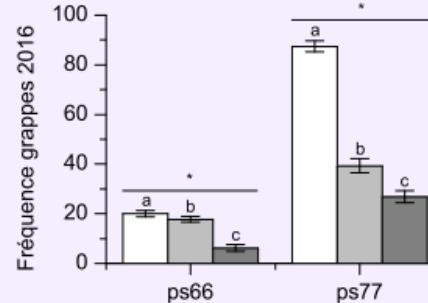
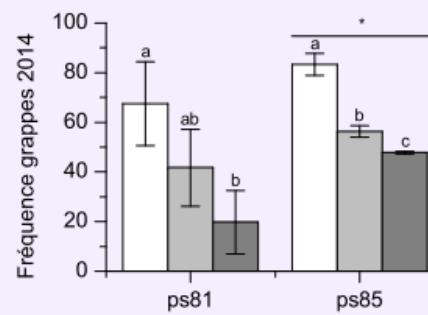
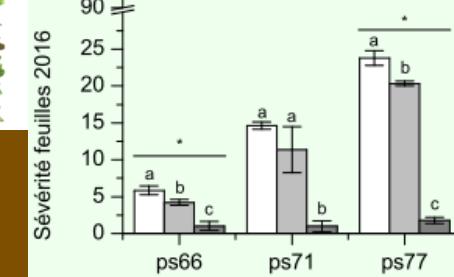
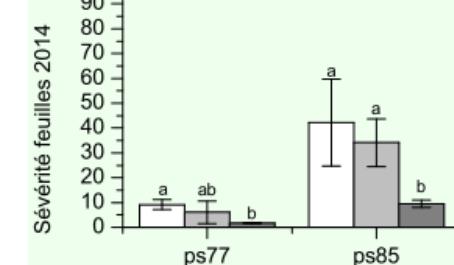
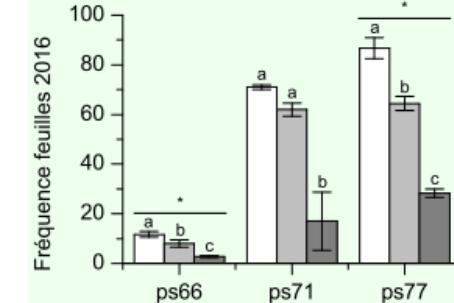
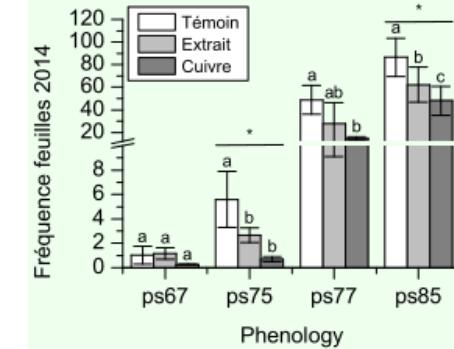
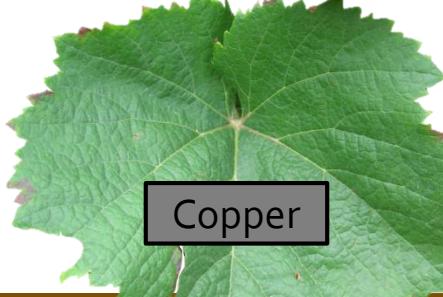
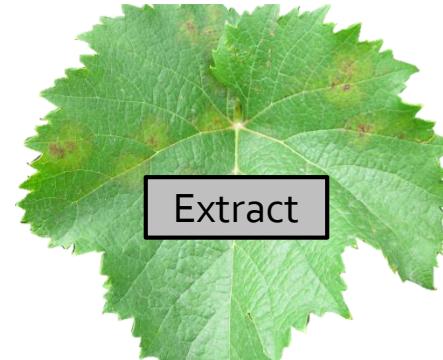
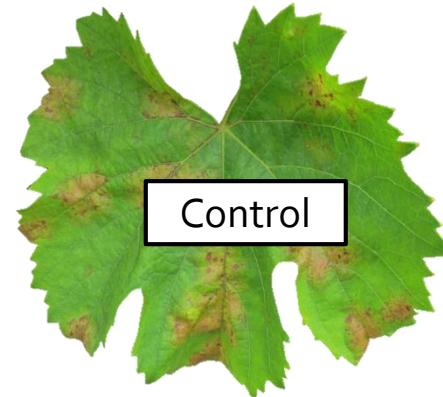


Fisher block: 4 modalities, 5 repetitions, 14 grapevine/modality.

Fréquence and Severity of infection: 100 leaves et 50 clusters / modality.

20 countings for frequency  
19 countings for severity

# Example in Amboise 2014-2016



# EU (Non)-Approval as « Basic Substance »

European Commission



Pilot project: Proposal for approbation of basic substances, in the context of Regulation (EC) N°1107/2009

Grape canes tannins

BASIC SUBSTANCE APPLICATION

April 2017

RÈGLEMENTS

RÈGLEMENT D'EXÉCUTION (UE) 2020/29 DE LA COMMISSION  
du 14 janvier 2020

portant non-approbation des tanins de sarments de *Vitis vinifera* en tant que substance de base conformément au règlement (CE) n° 1107/2009 du Parlement européen et du Conseil concernant la mise sur le marché des produits phytopharmaceutiques

(Texte présentant de l'intérêt pour l'EEE)



## TECHNICAL REPORT

APPROVED: 02 May 2018

doi:10.2903/sp.efsa.2018.EN-1414



**Outcome of the consultation with Member States and EFSA on the basic substance application for *Vitis vinifera* cane tannins for use in plant protection as fungicide on grapevine**

European Food Safety Authority (EFSA)



EUROPEAN COMMISSION



Health and Food Safety Directorate General

sante.ddg2.g.5(2019)2064772

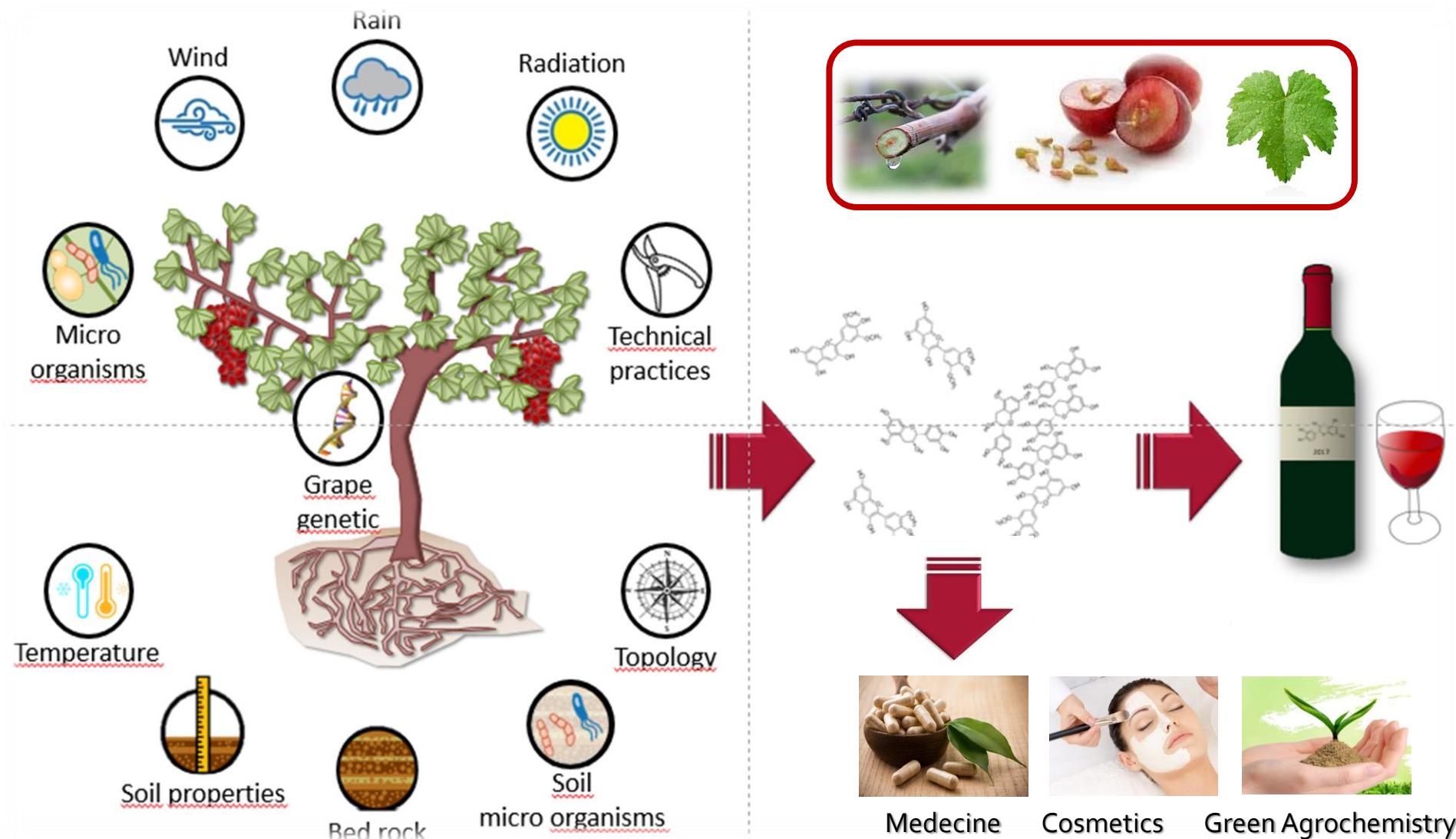
Standing Committee on Plants, Animals, Food and Feed  
Section Phytopharmaceuticals – Legislation  
24-25 January 2019

... “non-dietary risk assessment had been identified for which risk mitigation measures might be necessary.”

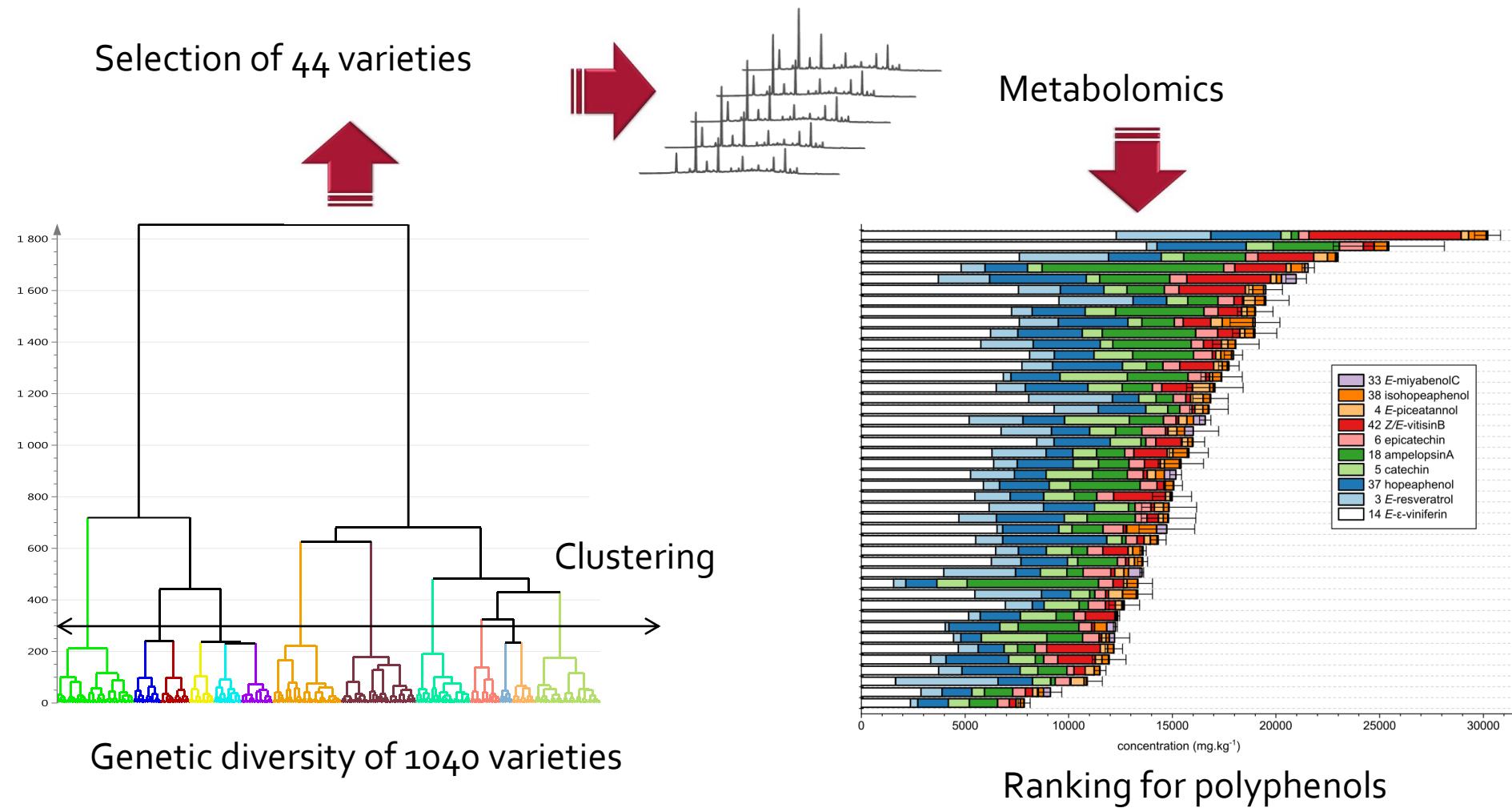
Journée Entreprise-Recherche  
**Multi-valorisation des plantes du Val de Loire**  
20 mars 2020 à Tours



# Molecular diversity of grape bioactive compounds

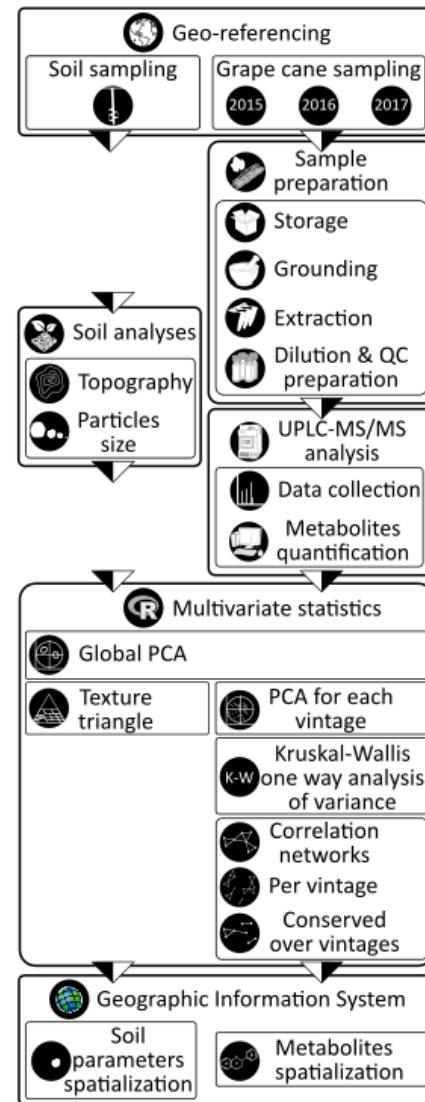
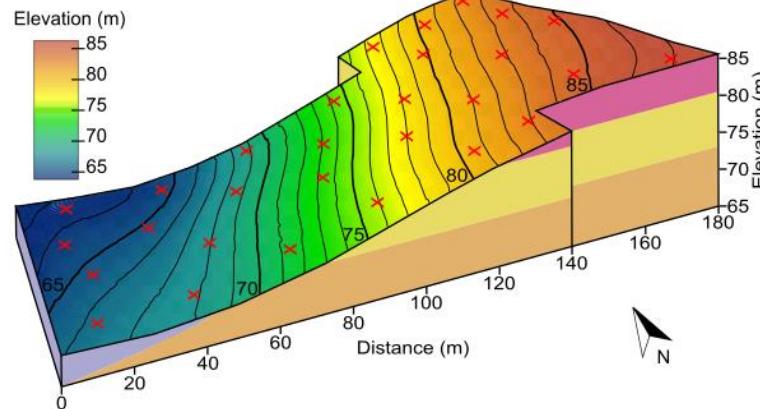


# Metabolomics screening of European *Vitis vinifera*

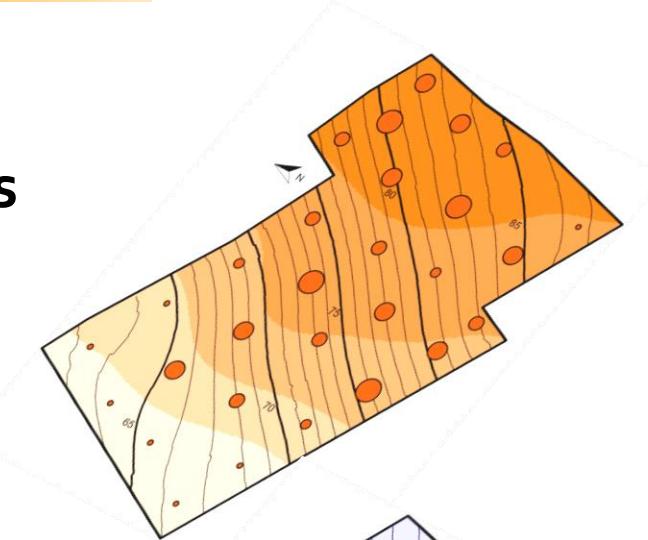


# Terroir influence on bioactive polyphenols

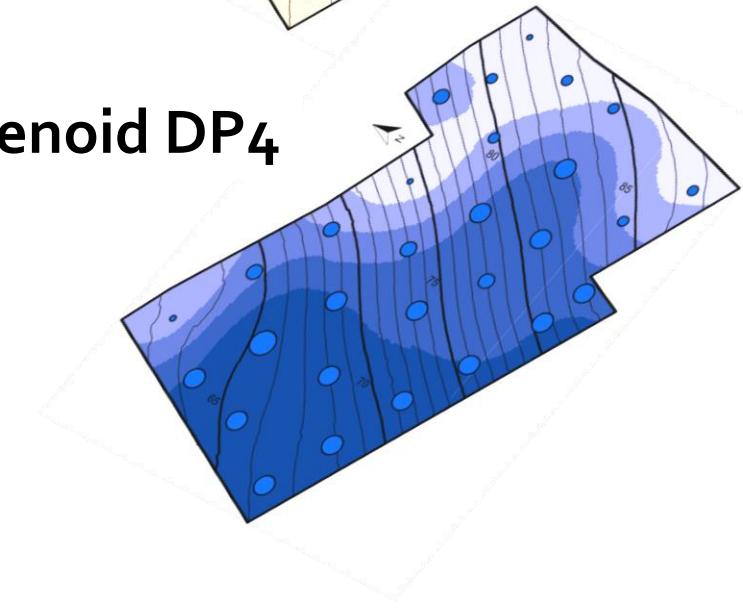
AOC Chinon  
1 clone Cabernet Franc  
↓  
4 geological layers



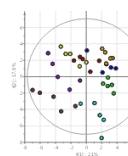
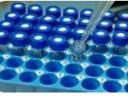
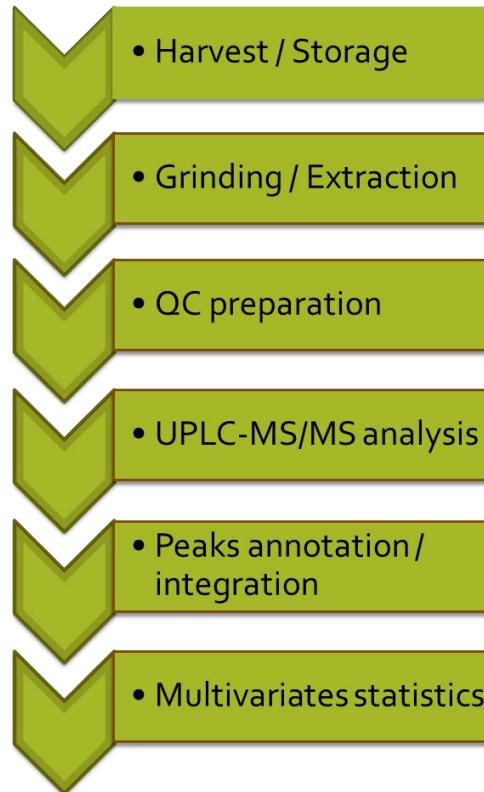
Flavonoids



Stilbenoid DP4



# UPLC-MS-based metabolic profiling of botanical extracts



*Achillea millefolium*  
*Arabidopsis thaliana*  
*Cassia sieberiana*  
*Catharanthus roseus*  
*Centella asiatica*  
*Choisya ternata*  
*Ginkgo biloba*  
*Hedera helix*  
*Indigofera tinctoria*  
*Linum usitatissimum*  
*Malus domestica*  
*Melia azadarach*  
*Myrica gale*  
*Paeonia lactiflora*  
*Papaver nudicaule*  
*Phelipanche ramosa*  
*Pisum sativum*  
*Prunus avium*  
*Quercus robur*  
*Rauwolfia serpentina*  
*Sambucus nigra*  
*Saponaria officinalis*  
*Sigesbeckia orientalis*  
*Syzygium aromaticum*  
*Tanacetum Vulgare*  
*Thymus serpyllum*  
*Vaccinium macrocarpon*  
*Vicia faba*  
*Vinca minor*  
*Vitis vinifera*  
*Zanthoxylum zanthoxyloides*

*Achillée millfeuille*  
*Arabette*  
*Casse du Sénégal*  
*Pervenche de Madagascar*  
*Hydrocotyle*  
*Oranger du Mexique*  
*Ginkgo*  
*Lierre*  
*Indigo des teinturiers*  
*Lin*  
*Mout de pomme*  
*Margousier*  
*Piment royal*  
*Pivoine*  
*Pavot d'islande*  
*Orobanche rameuse*  
*Pois*  
*Queue de cerise*  
*Chêne*  
*Sarpagandha de l'Inde*  
*Sureau noir*  
*Saponaire*  
*Herbe de Saint-Paul*  
*Clou de girofle*  
*Tanaisie commune*  
*Thym serpolet*  
*Cranberry*  
*Fèverole*  
*Petite pervenche*  
*Bois, raisin, feuilles, pépins*  
*Fagara*

