

OP-217 [Beekeeping Technology and Quality]

Physicochemical properties of different honeys from Reunion Island

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Reunion Island is a French overseas territory located in the Indian ocean. It owns a rich indigenous and endemic biodiversity that grows in tropical weather. While the local beekeeping industry has been flourishing for decades, Reunionese honeys have never been described in the scientific state of the art. For the first time, a European project was launched to check the quality and beneficial aspects of Reunionese honeys. The Reunionese beekeeping industry gathered around this project with 100 beekeepers that provided 304 samples of monofloral and polyfloral honeys. Among those samples we can noticed some honeys from exotic plants: Pink pepper (*Schinus terebinthifolius*), Litchi (*Litchi chinensis* Sonn.), and endemic plant: Tan Rouge (*Weinmannia tinctoria*). Firstly, we determined their physicochemical parameters (% humidity, free acidity, hydroxymethylfurfural, pH, conductivity, mineral, sugar...) based on official methods and compared them to standard criteria specified by The International Honey Commission (IHC). Secondly, we evaluated the antioxidant capacity of the different honeys using spectrophotometric analysis: Folin-Ciocalteu for phenol content (PC) and 1,1-diphenyl-2-picrylhydrazyl (DPPH) for antiradical activity. Finally, a preliminary in vivo study was carried out on Wistar rats to assess the potential for wound healing. Our analysis revealed that more than 80% of our samples meet the quality standard requirements. It highlights the serious skills of Reunionese beekeepers, who can produce fine honeys despite the tropical weather and high humidity. Furthermore, our results processed with chemometric techniques demonstrated a clear distinction between honeys from several floral sources. Preliminary in vivo results have shown that Reunionese honey appears to accelerate wound healing. The biological and dermatological characterization of the Reunionese honeys samples showed their high potential for human health.



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Characterization of honeys from Reunion Island : Sustainable valorization of tropical insular beekeeping in the context of environmental challenges

*Presented by Jennyfer YONG-SANG
& Jimmy CHANE-MING*

26 september 2025

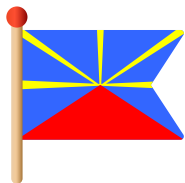
This project is funded by the European Union as part of the INTERREG VI Indian Ocean program, managed by the Reunion Regional Authority.

Interreg
Océan Indien



Cofinancé par
l'Union européenne





Introduction



GIP : **P**ublic **I**nterest **G**roup

CYROI : **CY**clotron **R**eunion **I**ndian **O**cean



Founding member :

- University of Reunion Island
- Reunion University Hospital Center
- Community of Municipalities of Northern Reunion (CINOR)



A multidisciplinary health and biotechnology platform covering an area of 4,500 m², funded by the European Union, the French government, the region, the department and CINOR



MielOmic

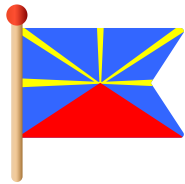


First study on honeys from Reunion Island

Development of Research and Innovation in the Beekeeping Sector

Capitalizing on knowledge for economic development





Geographical context of Reunion Island



Volcanic Island : 2 512 km² - French Territory

“Piton de la Fournaise” is one of the most active volcanoes on the planet

Designated a **UNESCO World Heritage Site** for its “Peaks, Cirques and Ramparts”



Population : 885 700

Ethnic diversity



In the western Indian Ocean, east of Africa



Tropical humid temperate

More than 100 microclimates



Diverse **fauna** and **flora**

Part of one of the 34 global biodiversity hotspots

High biodiversity with **exceptional endemism**



@ Serge Gelabert



Beekeeping

- **Bees** : *Apis Mellifera unicolor* (Mascarene endemic specie)
- **Beekeepers** : **698** including **137** professionals and **561** hobbyists
- **Hives** : 26 000
- **Production** : **350** to **400** Ton of honey/year



Honey library

Schinus terebinthifolius



Pink pepper
n = 170

Litchi chinensis Sonn.



Litchi
n = 49

Weinmannia tinctoria Sm.



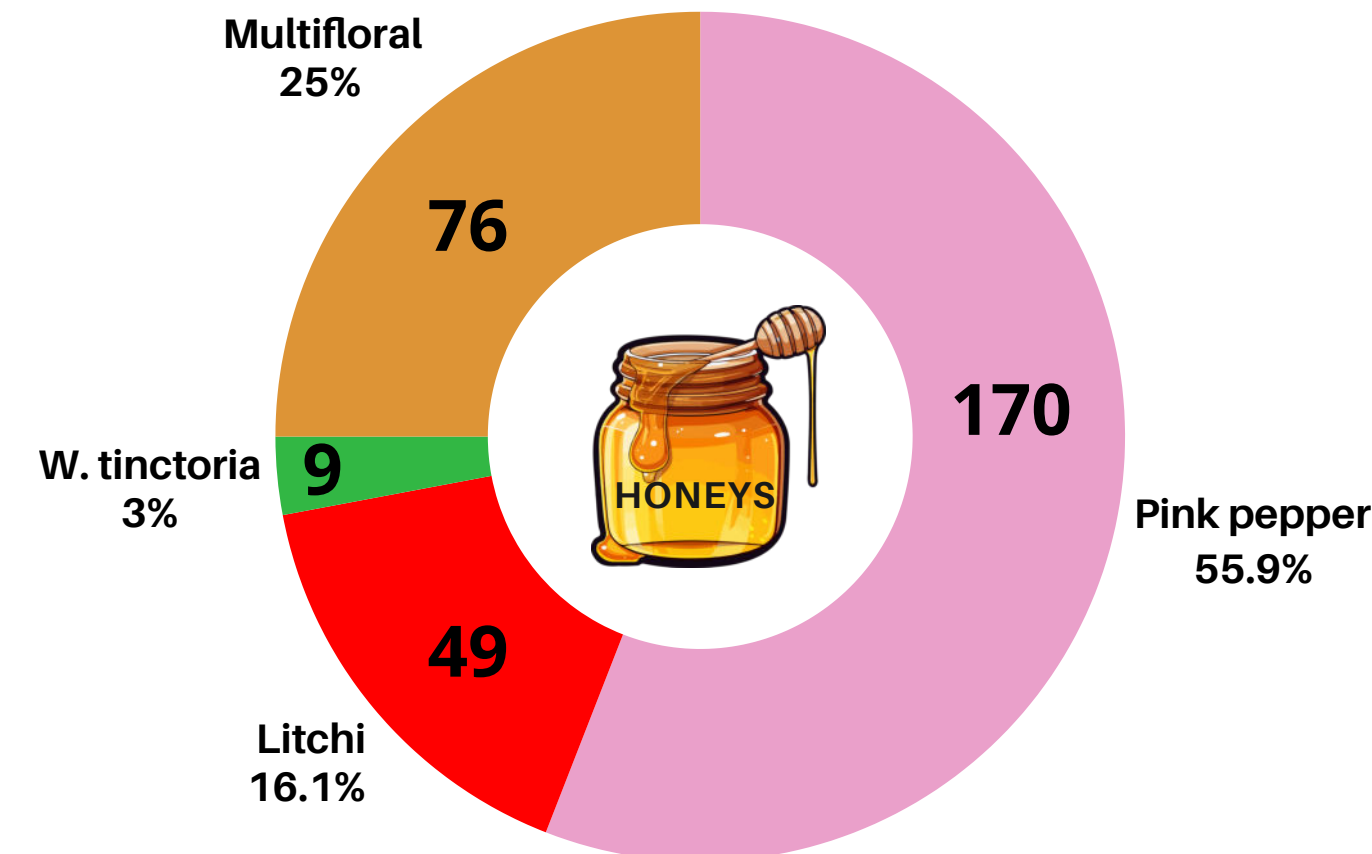
W. tinctoria
n = 9

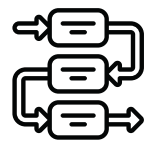
Mix of several



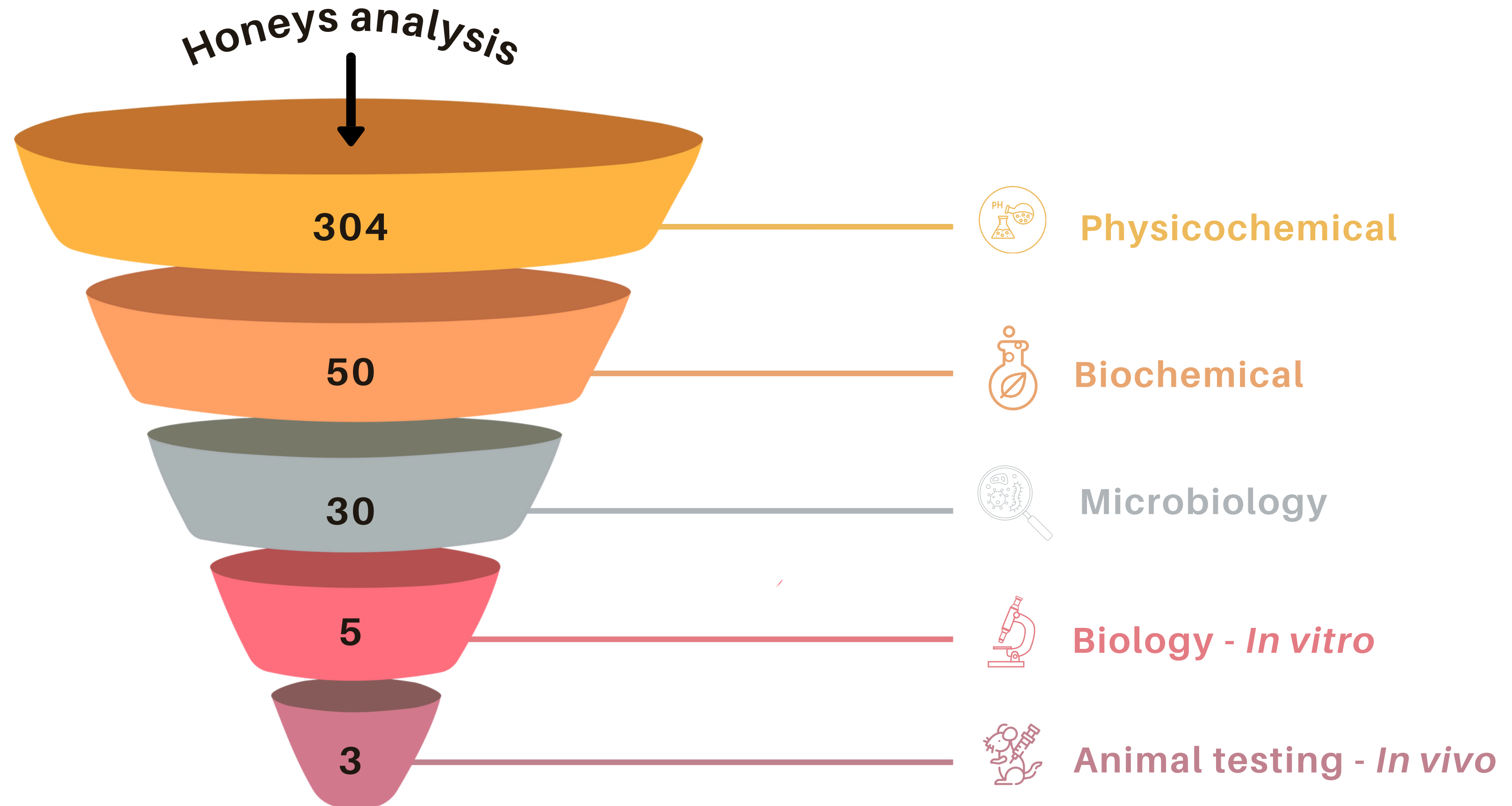
Multifloral
n = 76

- A total of **304 honey** samples to be analysed



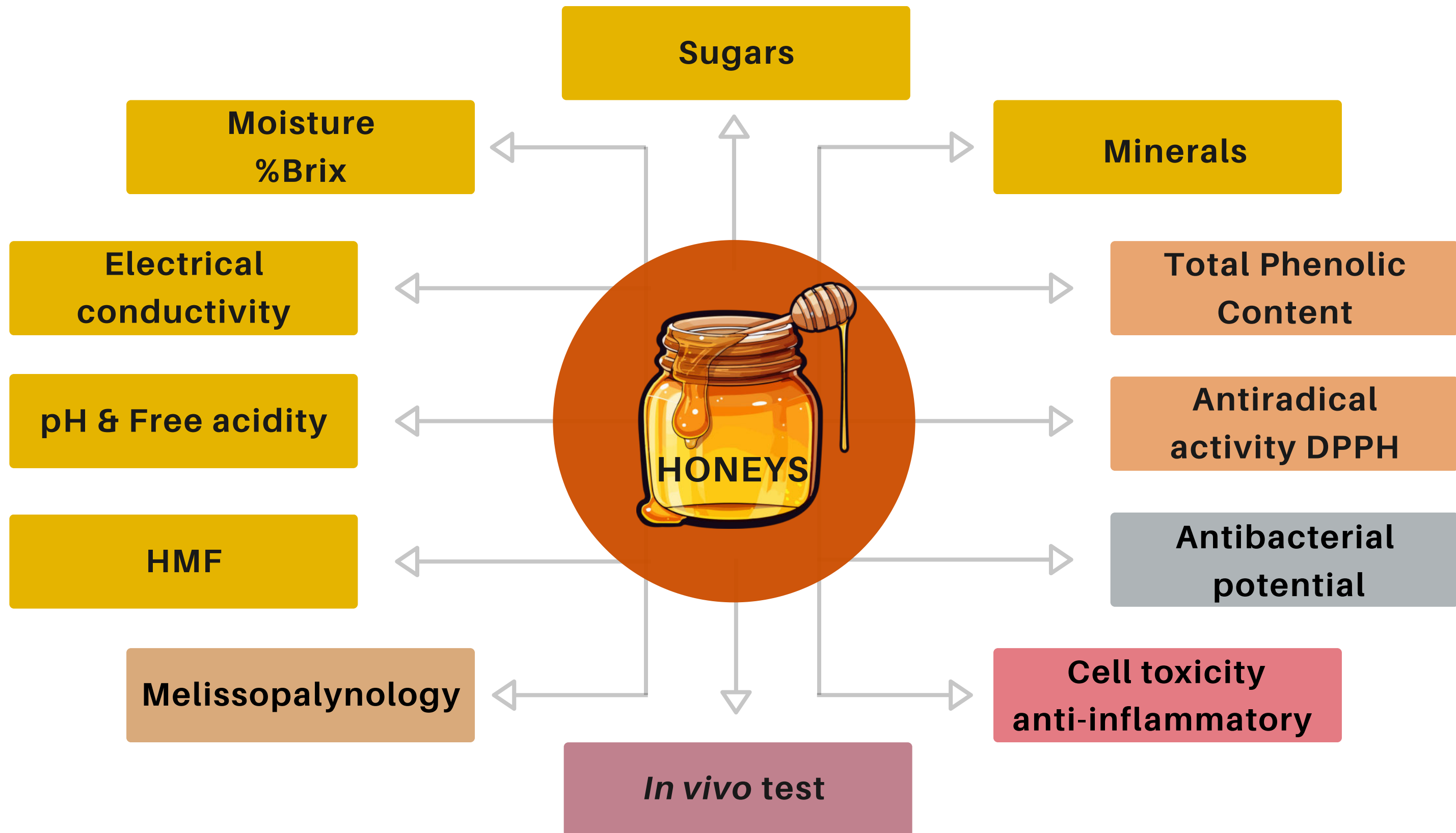


Methodology for this study.





Analyses performed

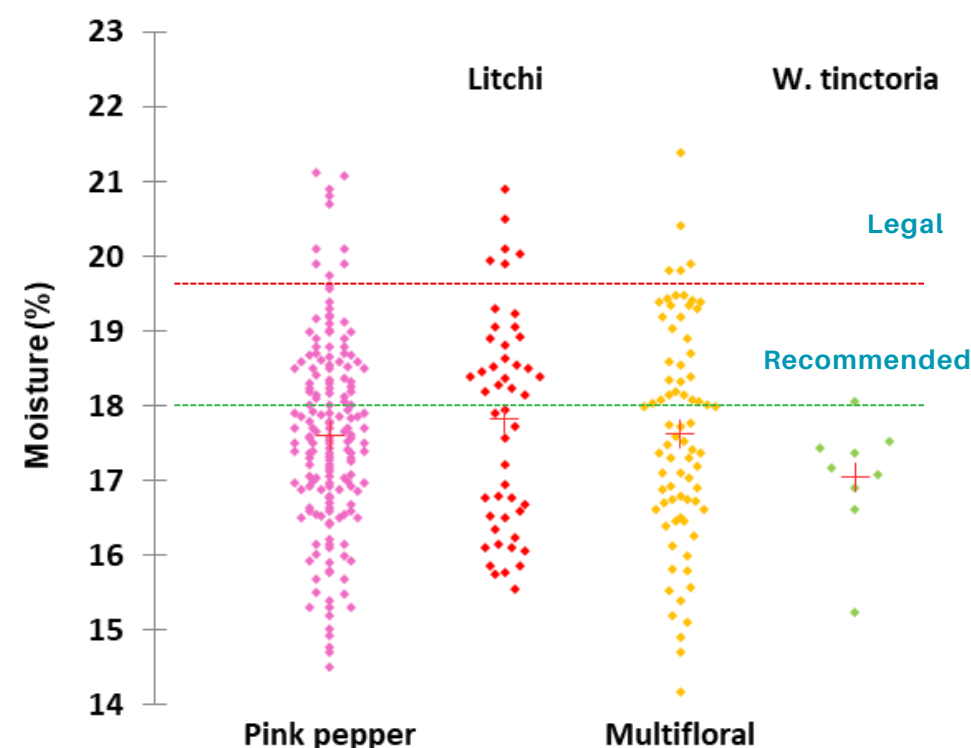




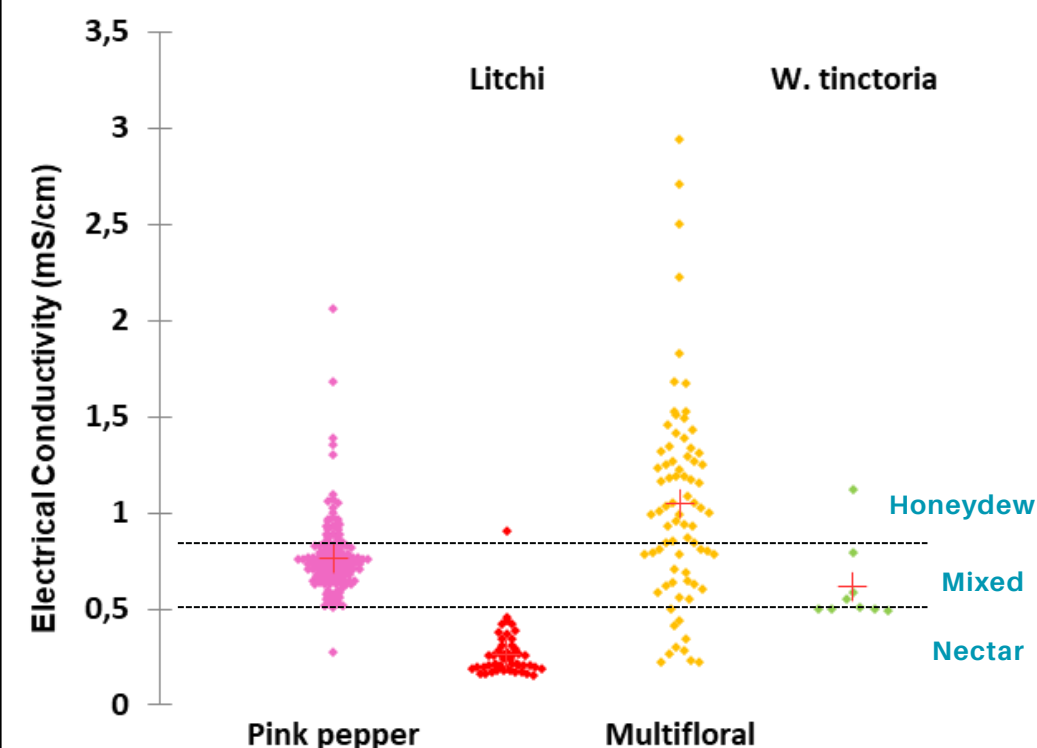
Physicochemical properties

1 point = 1 sample

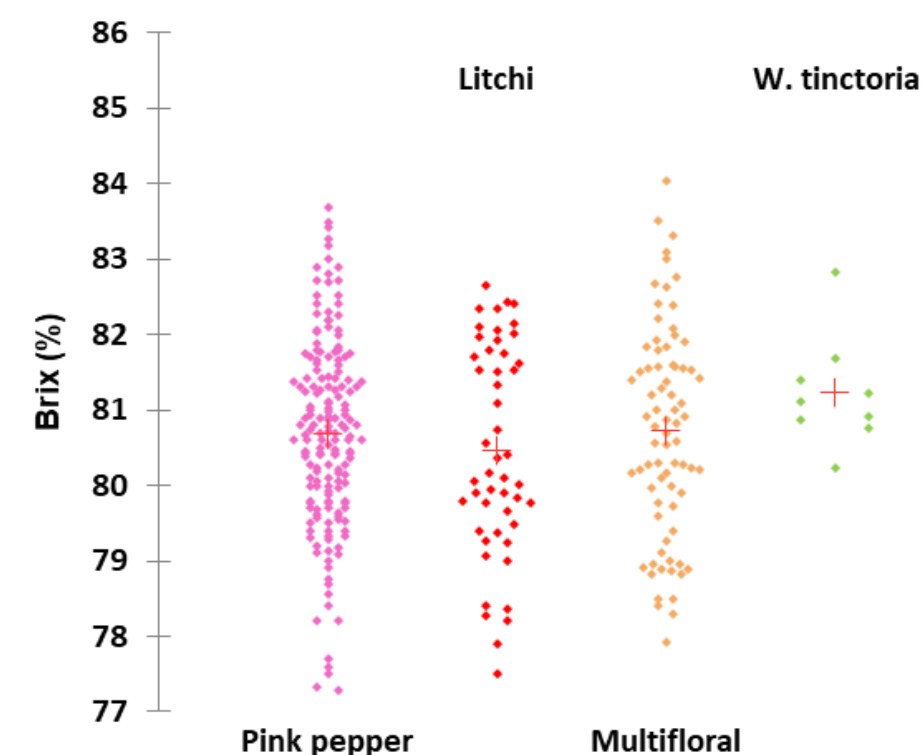
Moisture (%)



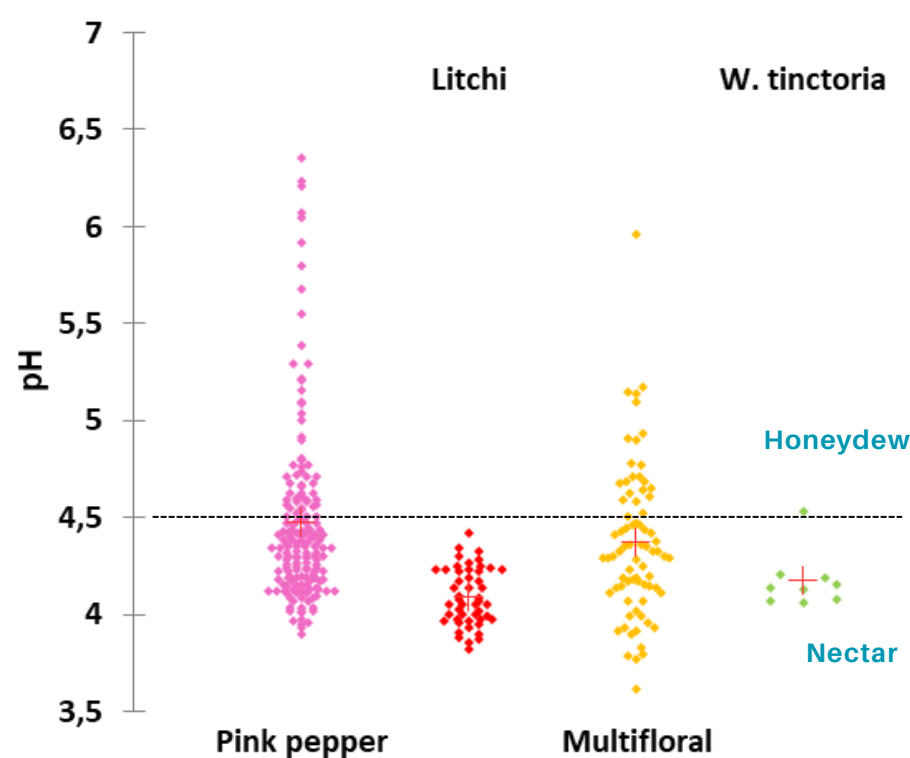
Electrical conductivity (mS/cm)



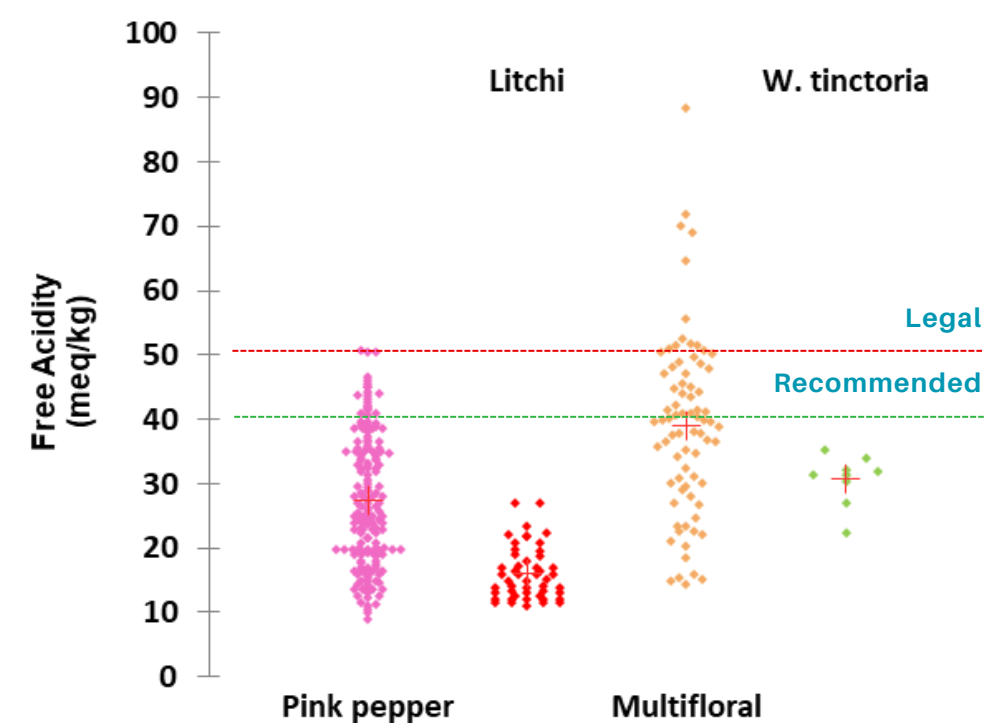
Brix (%)



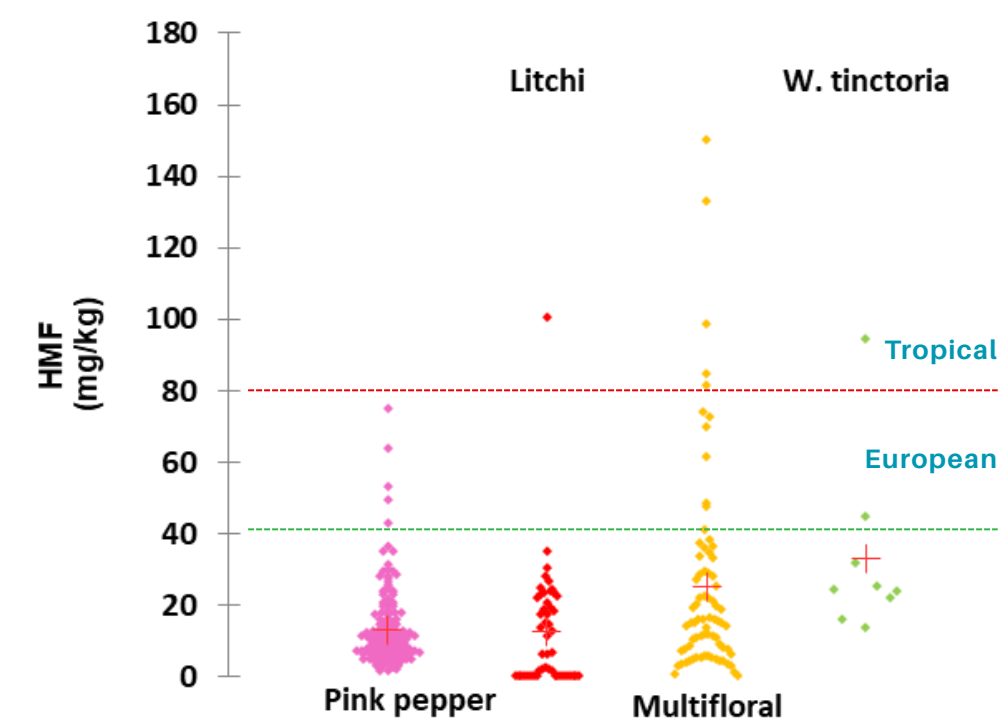
pH



Free Acidity (meq/kg)



HMF (mg/kg)



- 304 honeys analysed
- Codex Alimentarius standards complied with
- 92% of samples comply with standards
- Quality beekeeping expertise



Physicochemical properties by ion chromatography.

Average carbohydrate composition of honey

Carbohydrates	Quantity (g/100g of honey)
Fructose	38.1 ± 2.6
Glucose	31.7 ± 2.8
Turanose + Palatinose	from 2.4 to 0.6 Present in all honeys
Kojibiose	
Maltose	
Isomaltose	
Nigerose	
Erlose	from 0.6 to < 0.1 Present in certain types of honey only
Melezitose	
Panose	
1-kestose	
Raffinose	
Trehalose	
Sucrose	
Gentiobiose	

- No signs of deliberate adulteration detected

Average mineral composition of honey

• Cations (mg/kg of Honey)

	Min	Max
Potassium	962.28	1832.28
Calcium	33.54	100.73
Sodium	27.86	88.48
Magnesium	16.61	59.28
Ammonium	8.63	39.03
Lithium	0.40	0.53

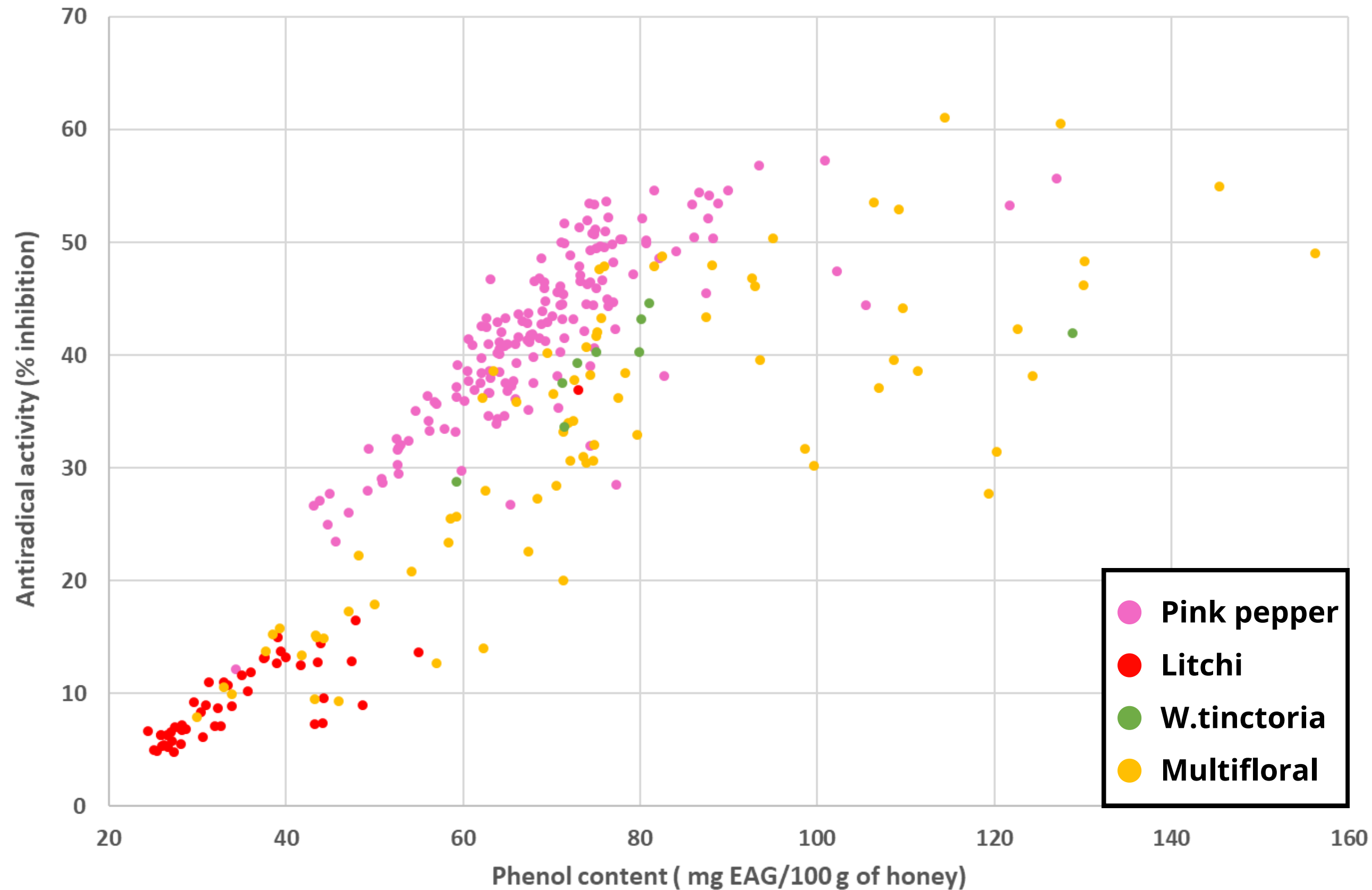
• Anions (mg/kg of Honey)

	Min	Max
Chloride	95.49	448.43
Phosphate	80.41	328.13
Nitrate	6.40	13.39
Nitrite	1.20	4.67
Bromide	1.18	4.24

- Few minerals in honey
- Due to the specific nature of volcanic soils



Biochemical properties



Phenol content
(mg EAG/100g of Honey)

41 > 101

211 51-100

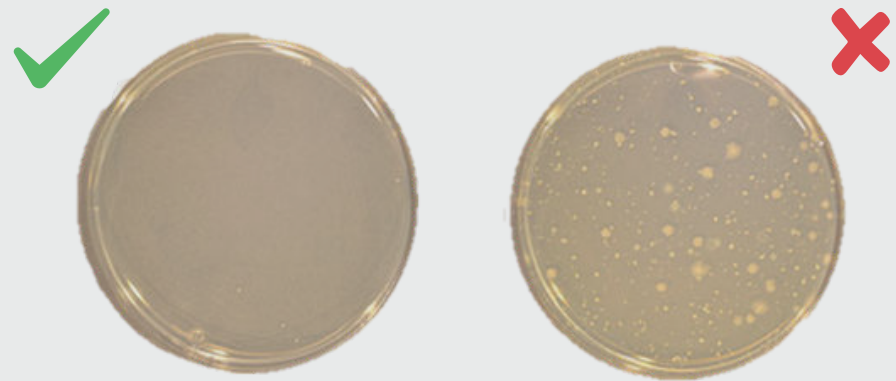
52 0-50

Sarrasin ~126

- 3 distinct groups
- Litchi with fewer polyphenols
- Multifloral high variability
- Quality and richness of honey resources
- 50 honeys selected for microbiology



Microbiology_properties



Cell culture quality control

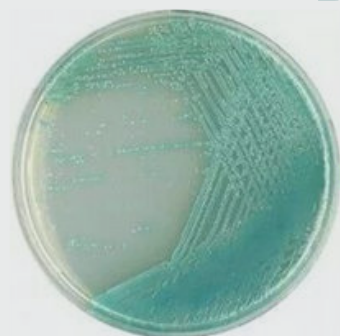
30 Honeys selected
with the lowest
initial bacterial load



Bacteria



Staphylococcus aureus



Pseudomonas aeruginosa

Ubiquitous



Escherichia coli



Candida albicans

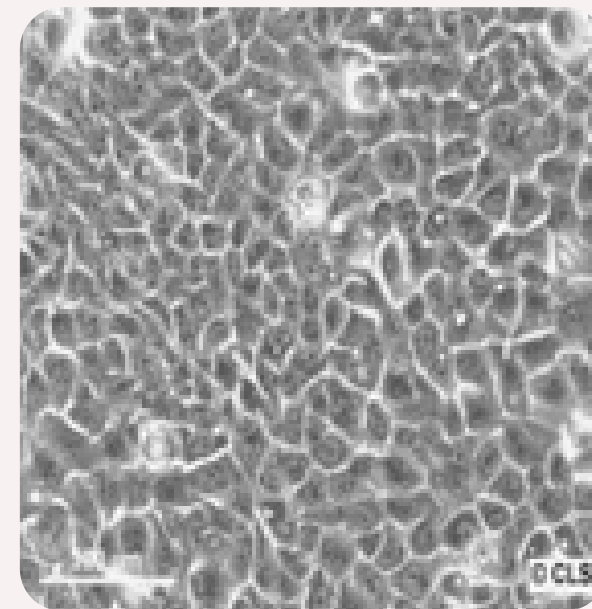
Opportunistic

- Most interesting antibacterial activity
- CMB/CMI ratio
- 10 selected honeys

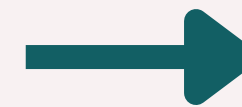


Biology_properties

- Cytotoxicity of honeys
- Anti-inflammatory activity of honeys
- 3 honeys selected for animal experimentation on a Wistar rat model (x6)



In vitro

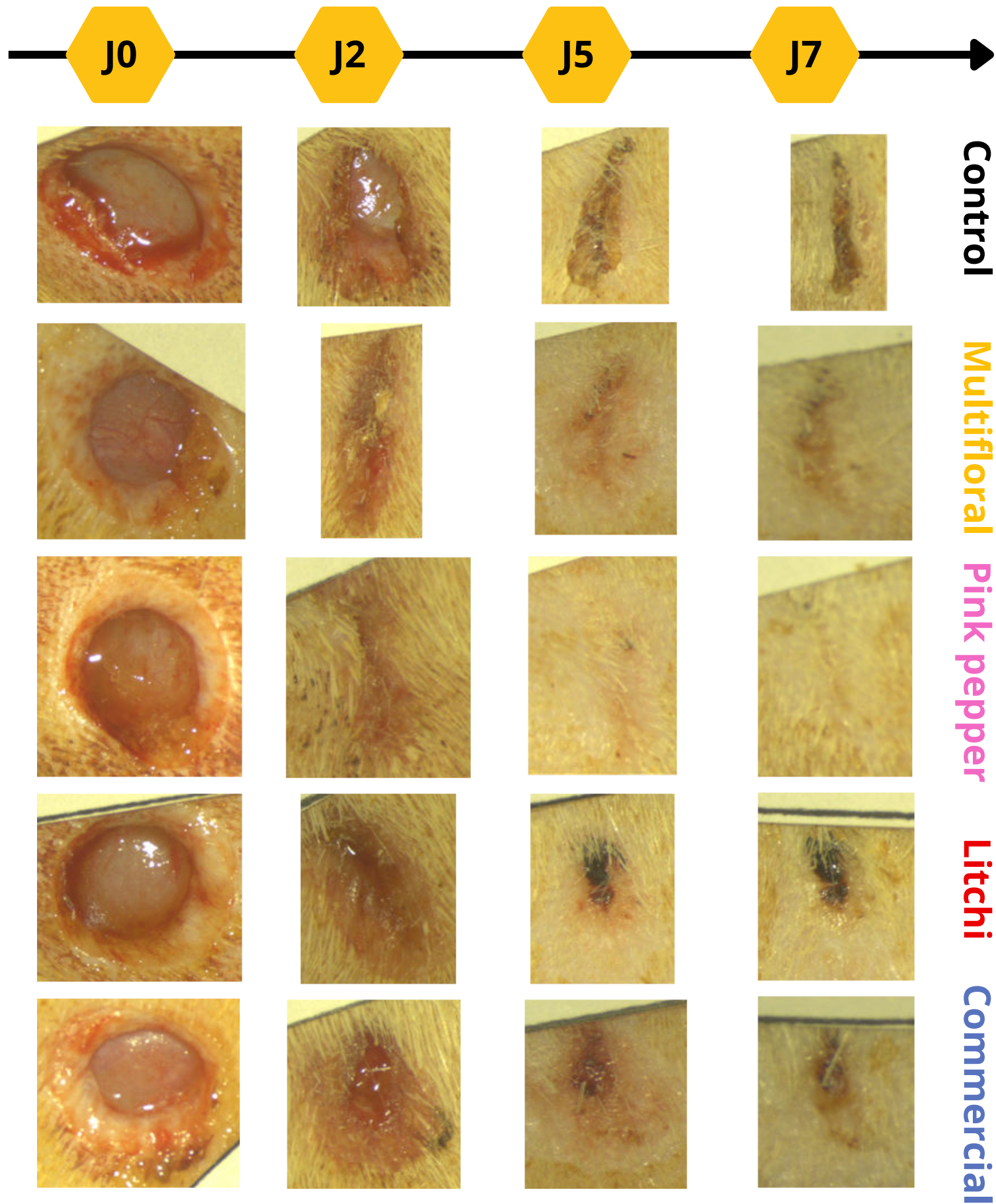
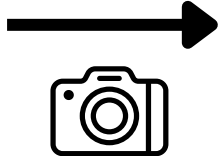
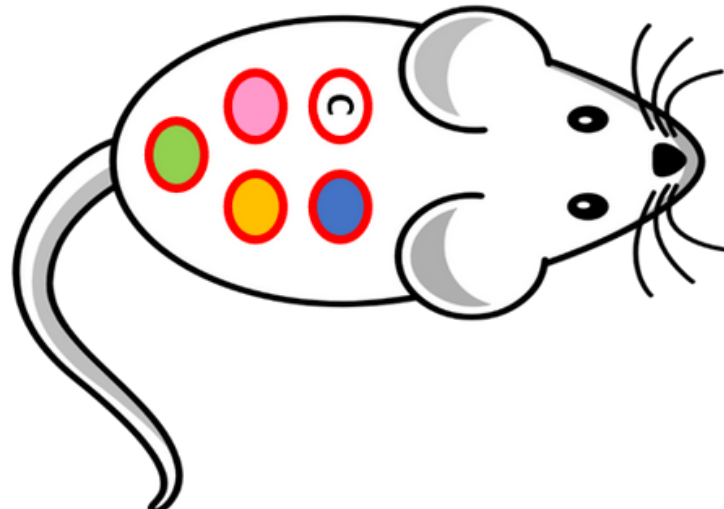
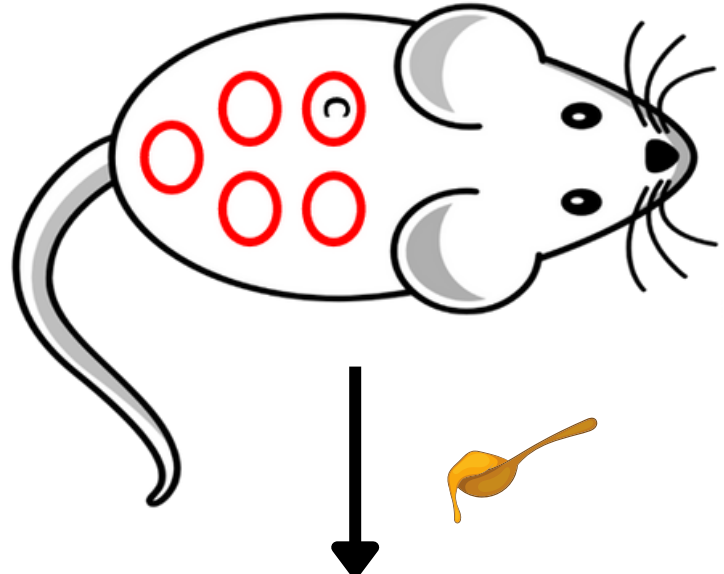
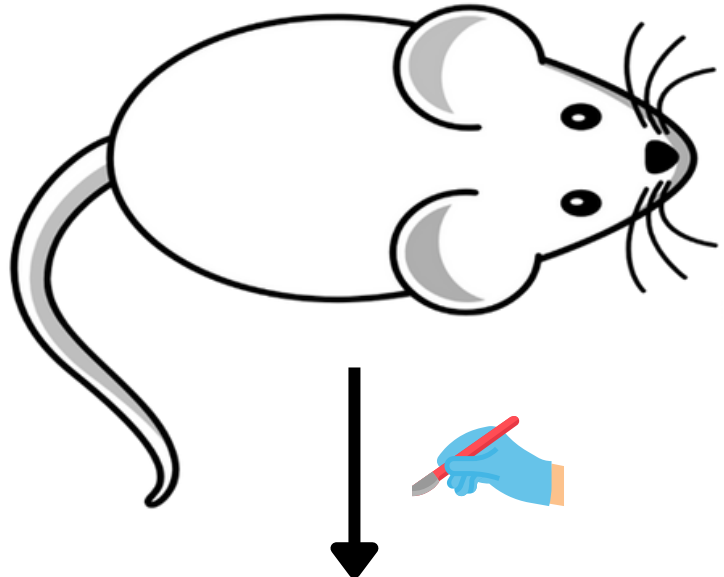


In vivo



Preliminary animal testing

6 Witsar rats



Protocol

- Animal Study Proposa (2022112214519246)
- 5 Skin lesions with 6mm punch biopsy
- Photographic monitoring every 2 days

Acceleration of the wound healing process

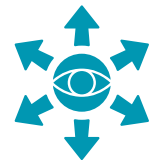


Control	×
Multifloral	✓
Pink pepper	✓
Litchi	×
Commercial	×



Conclusion

- The honeys complied with regulatory requirements: no signs of adulteration detected
- High-quality beekeeping expertise
- 80% of honeys are rich in polyphenols: nectar-producing species rich in beneficial compounds
- Multifloral and pink pepper honeys appear to accelerate the healing process
- Rich biodiversity with exceptional endemic species



Prospects

- Study other bee products : pollen and propolis



Acknowledgements

- Volunteer beekeepers
- Financial partners
- Project partners
- CYROI colleagues

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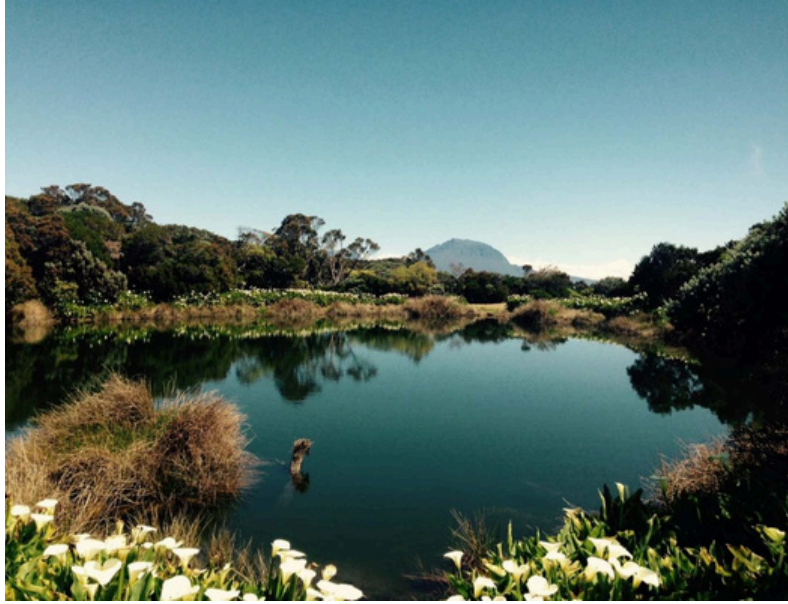
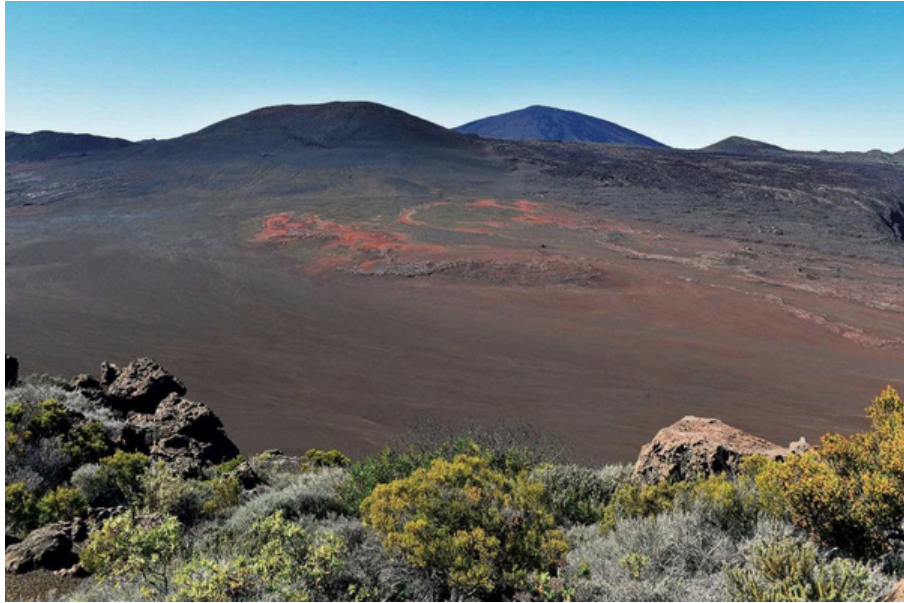
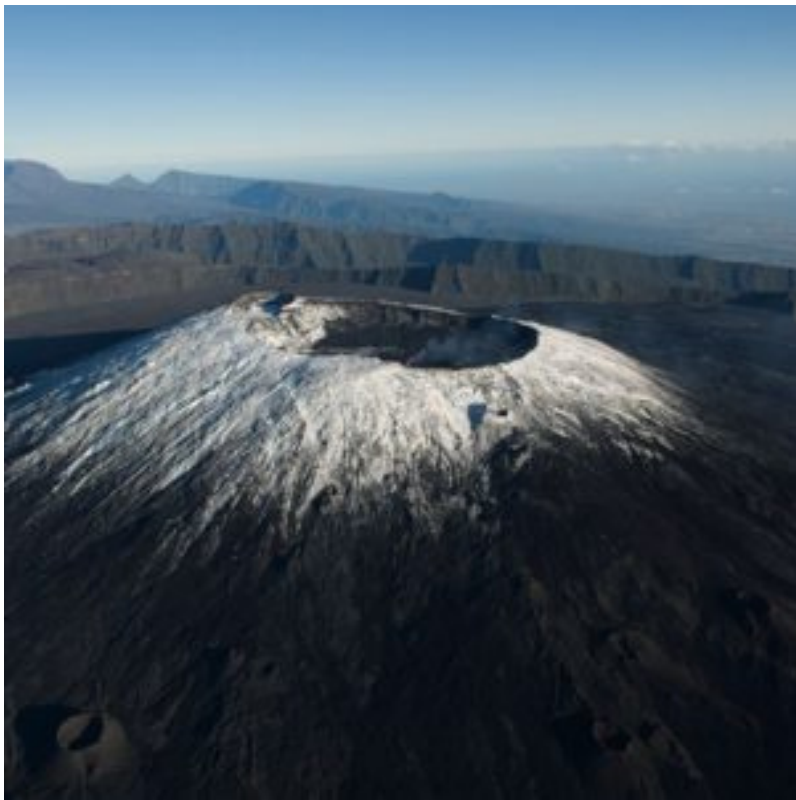
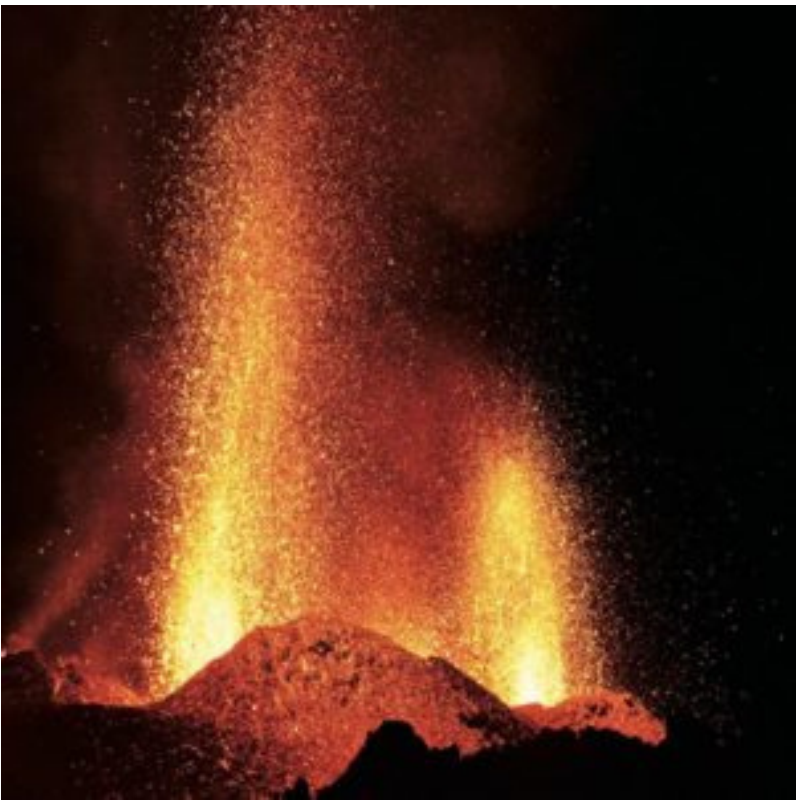


My team



Partners





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