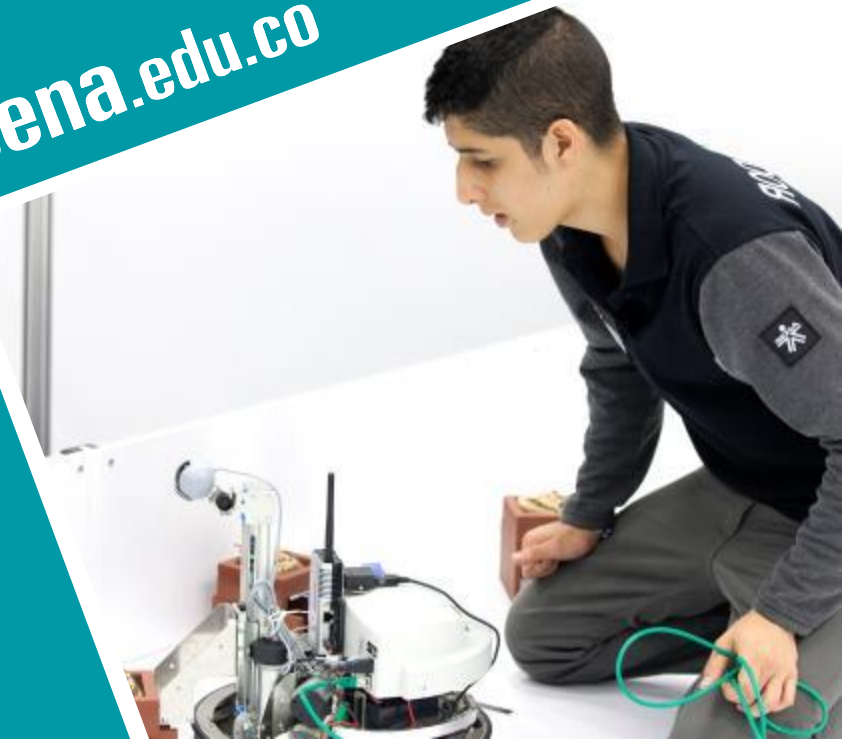


# SENA

Centro Agropecuario La Granja  
Tecnoparque Nodo La Granja  
Regional Tolima  
Colombia



[www.sena.edu.co](http://www.sena.edu.co)



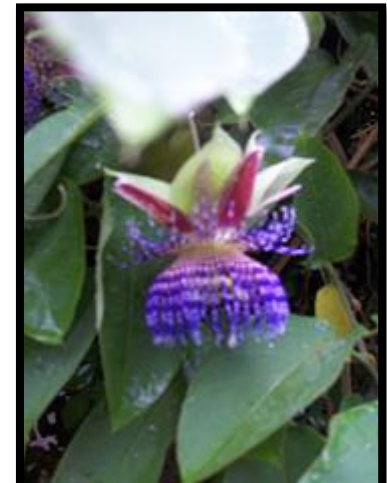
# Antioxidant and antimicrobial potential of the hidroalcoholic and aqueous extracts of the Cholupa (*Passiflora maliformis*).



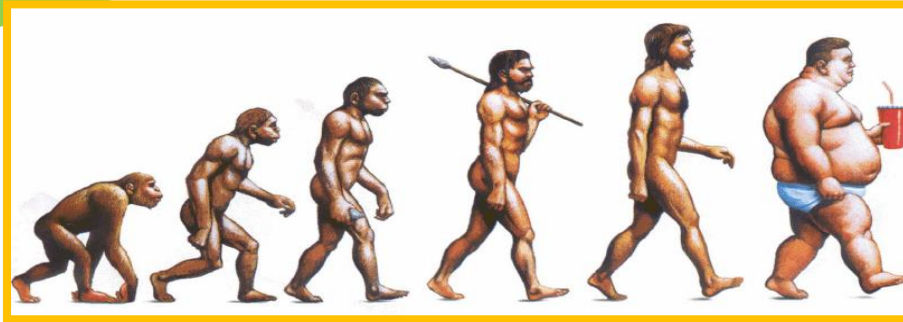
**Sergio Andrés Cabrera Navarro**  
SENA, Regional Tolima

**Angélica Piedad Sandoval Aldana**  
Universidad del Tolima

**Freddy Forero Longas**  
Corpoica, Centro de Investigación Nataima



# Introduction



- **Balance between diet and health**



- **Functional foods**



- **Increased of biomas production in Colombia**



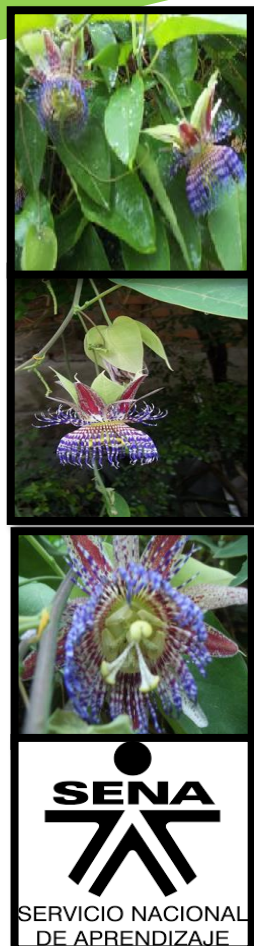
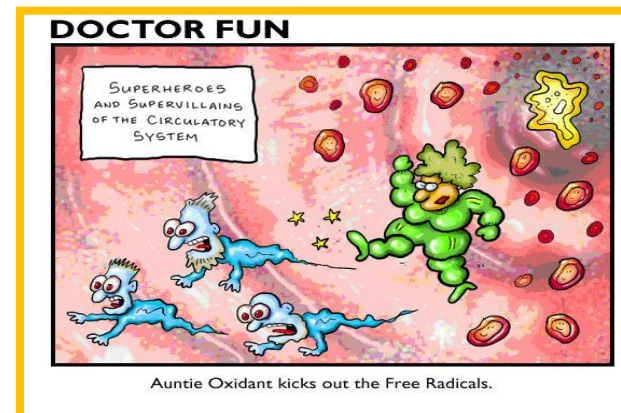
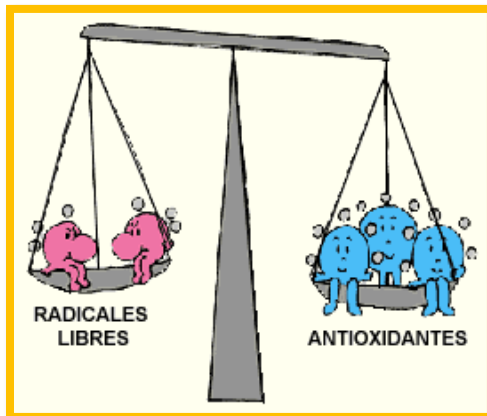


# Introduction

- Prevention health problems



- Market of natural antioxidants



# Introduction

- Potential market for iced teas ready to drink (RTD)

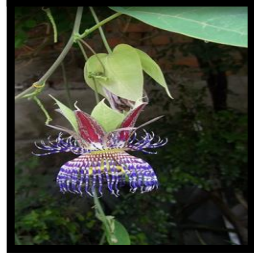
- Phytopharmaceutic industry





# Passionflowers

- There are more than 500 species of *Passionflowers*



# Passionflowers in Colombia

Lack of knowledge of some *Passionflowers* in Colombia



**Cholupa (*Passiflora maliformis*)**



# Objetives

## General Objctive

Determine the antioxidant and antimicrobial activity in leaves and flowers of Cholupa (*Passiflora Maliformis*).

## Specific Objctives

- Obtain extracts of *Passionflower* and quantified total phenols, total flavonoids and total alkaloids.





# METHODOLOGY



# Statistic analysis

Experimental design

2 Factors studied

Herbal Material

[ ] Hidroalcoholic solvents

3 Treatments

3 Treatments

Leaves

Flowers

Mix

Etanol 70%

Etanol 35%

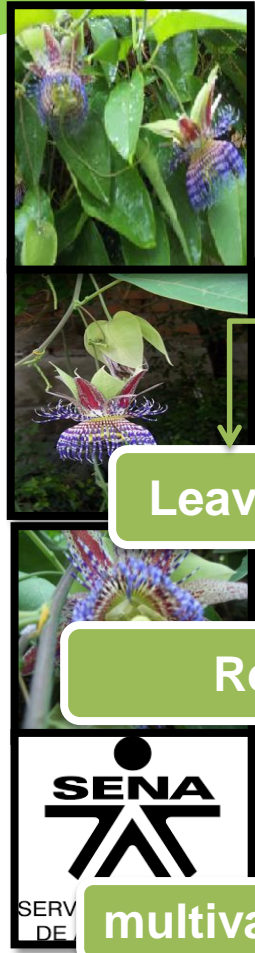
Etanol 0%

Response surface design

Software "STATGRAPHICS centurión XV"

Central composite design 3\*2, de 10 runs

multivariate analysis, Significant differences by Tukey test P-value <0.05.



# Methodology

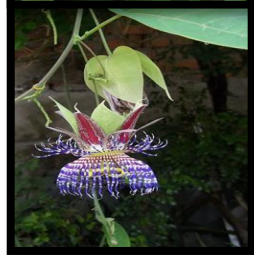
## Sampling plant material



## Postharvest practice



## Drying and milling





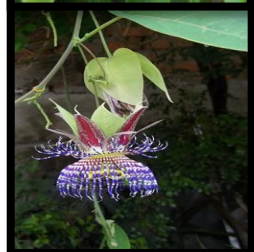
# Methodology

## Aqueous and hidroalcoholic extracts obtaining

### •Reflux extraction

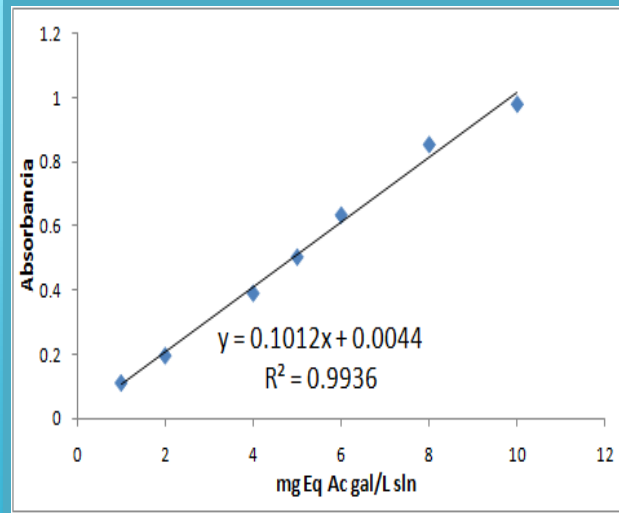


### •Pharmacognostic quality control of extracts



# Methodology

## • Total phenols Uv-Vis



• **Methodology**  
*Singleton & Russi (1965)*

• **Patrón reference**  
Ac. Gálic.

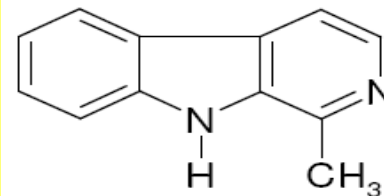
mg Eq Ac gal/g dry weigh



# Methodology

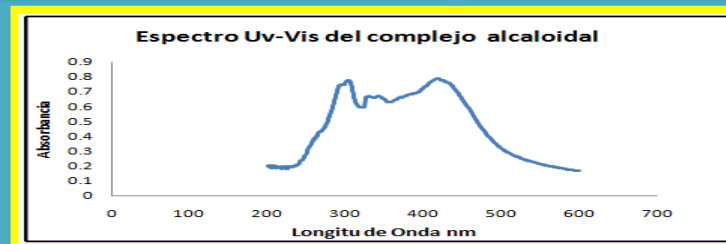
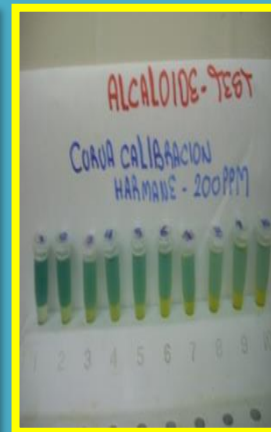
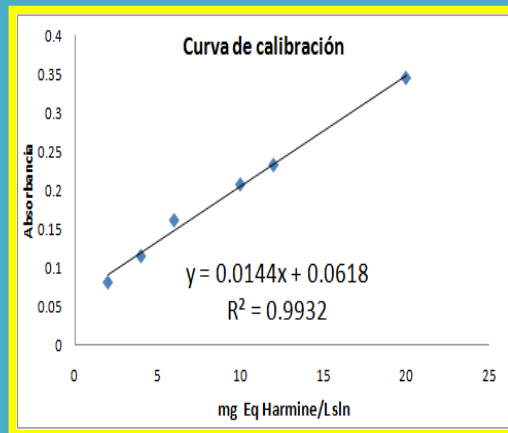
## Alkaloids quantification through Uv-vis

•Patrón reference  
(Harmane)



mg Eq Harmane/g d.w.

•Methodology  
*Shamsa et al., (2008)*



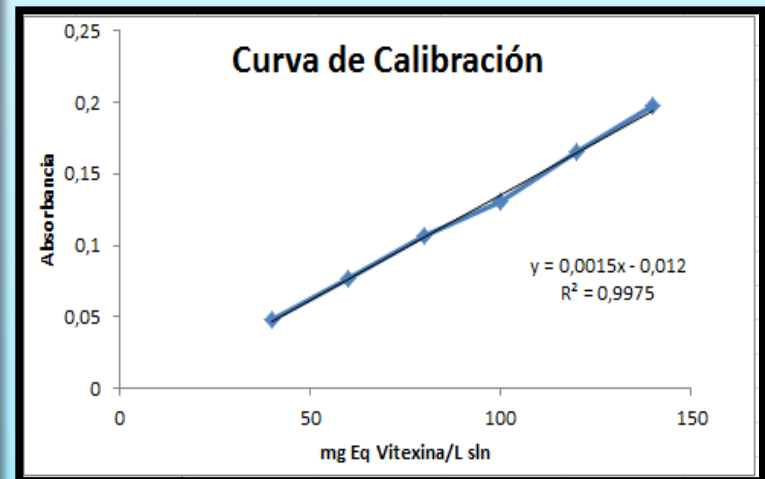
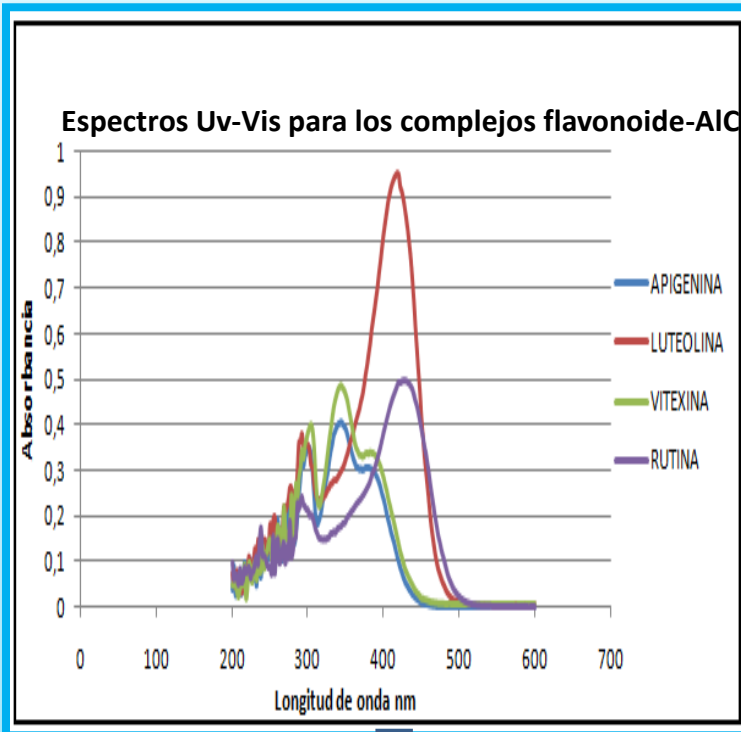
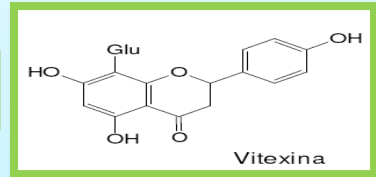


# Methodology

## Total flavonoids by Uv-vis

•Methodology by  
*Soares Pozzi., (2007)*

•Reference patron  
**Vitexina**



mg Eq flavonoide-Vitexing/ g d.w



# Antioxidant Activity

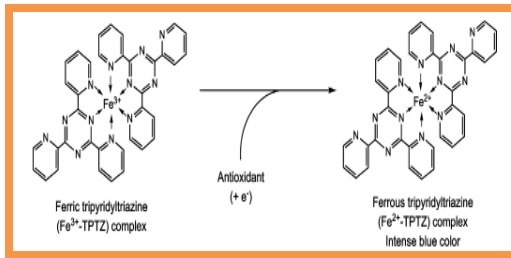
**THE FERRIC REDUCING ABILITY OF PLASMA**

Antioxidant Activity

**FREE RADICAL SCAVENGING ACTIVITY DPPH**

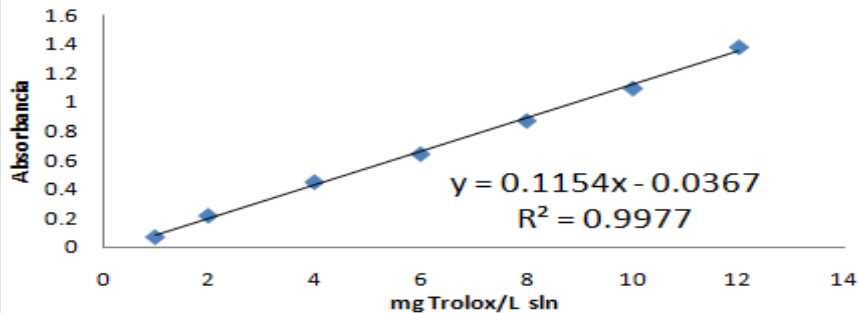
## •Methodology

*Benzie & Strain (1996)*



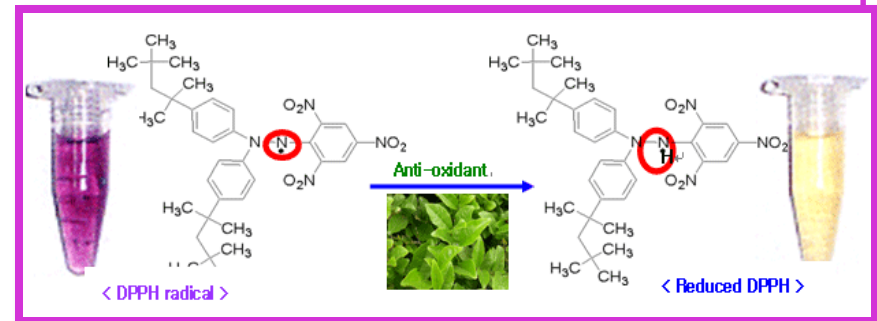
**TEAC**  
μM Trolox/g d.w

**Curva de calibración**



## Methodology

*Brand-Williams (1995)*

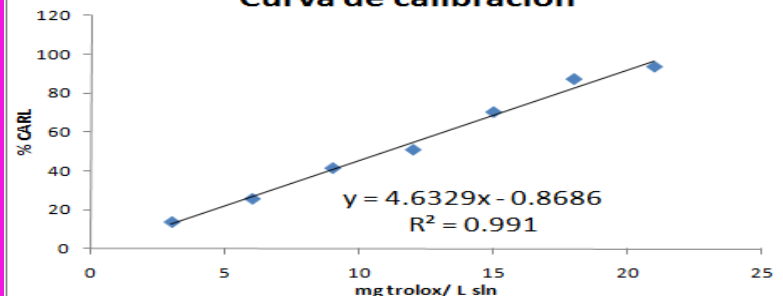


μM Trolox/g d.w

**TEAC**

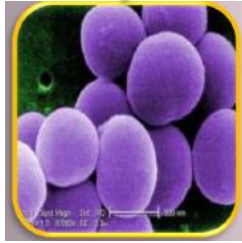
**CI50**

**Curva de calibración**



# Antimicrobial Activity

## ANTIMICROBIAL ACTIVITY



ATCC 25923 *S. Aureus*.  
Gram +

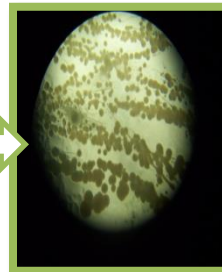


ATCC 25922 *E. coli*.  
Gram -

Methodology  
Disk diffusion  
*Bauer., (1966)*

Extract  
concentration ppm:  
1000, 2000, 3000, 4000, 5000

$$\% \text{ Inhibition} = \left[ \frac{D.\text{haloextracto} - D.\text{haloblanco}}{D.\text{halocontrol} - D.\text{haloblanco}} \right] \times 100$$



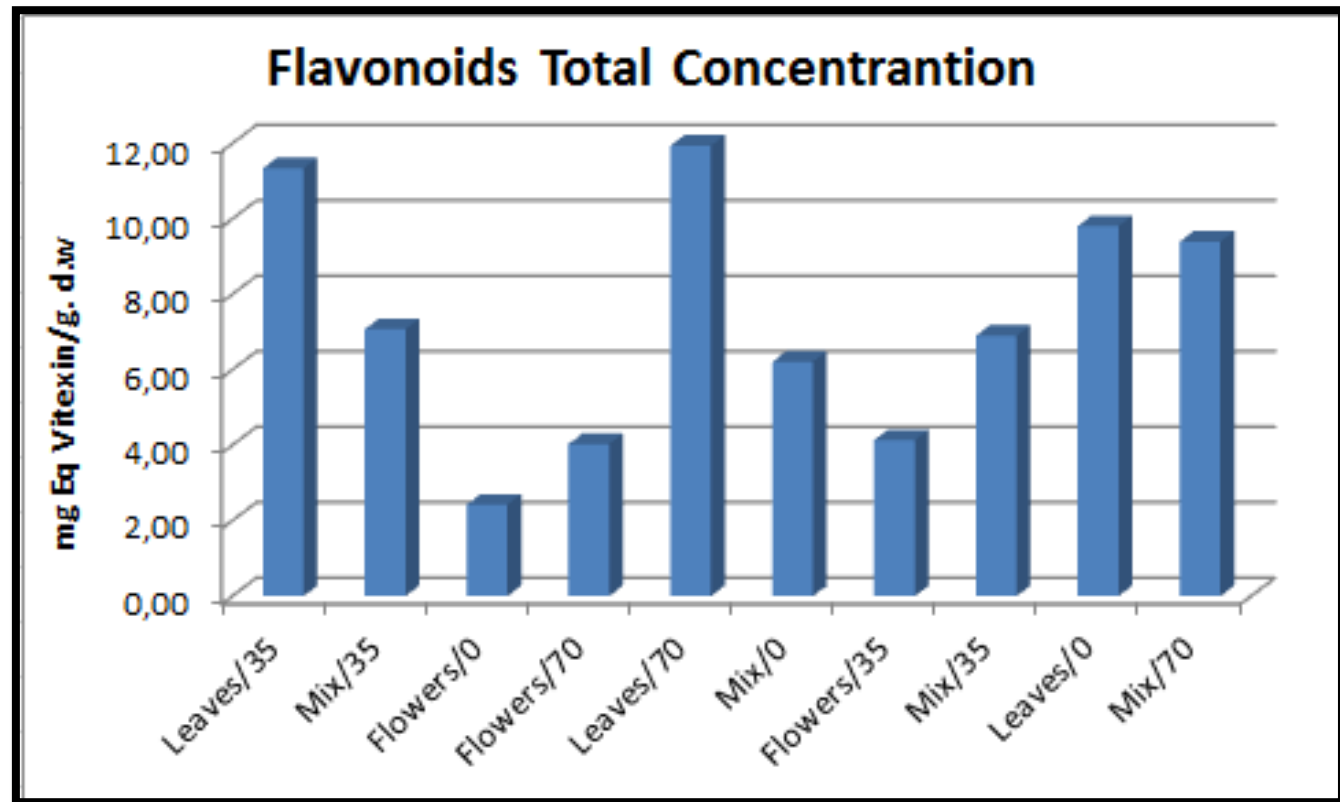




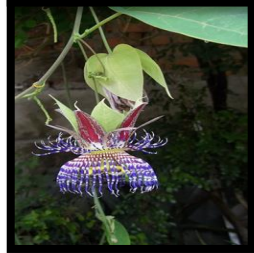
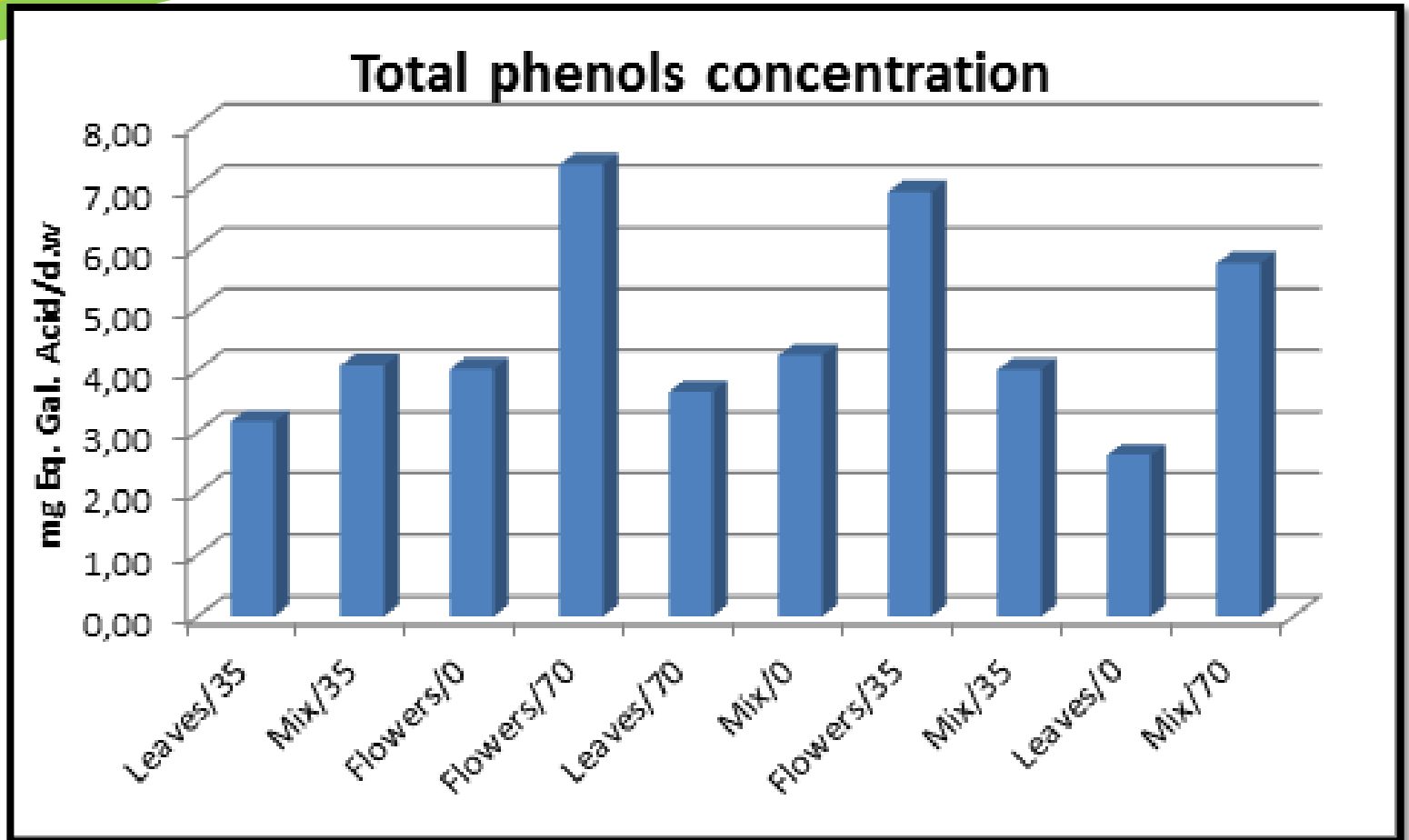
# RESULTS



# Total Flavonoids in Cholupa extracts

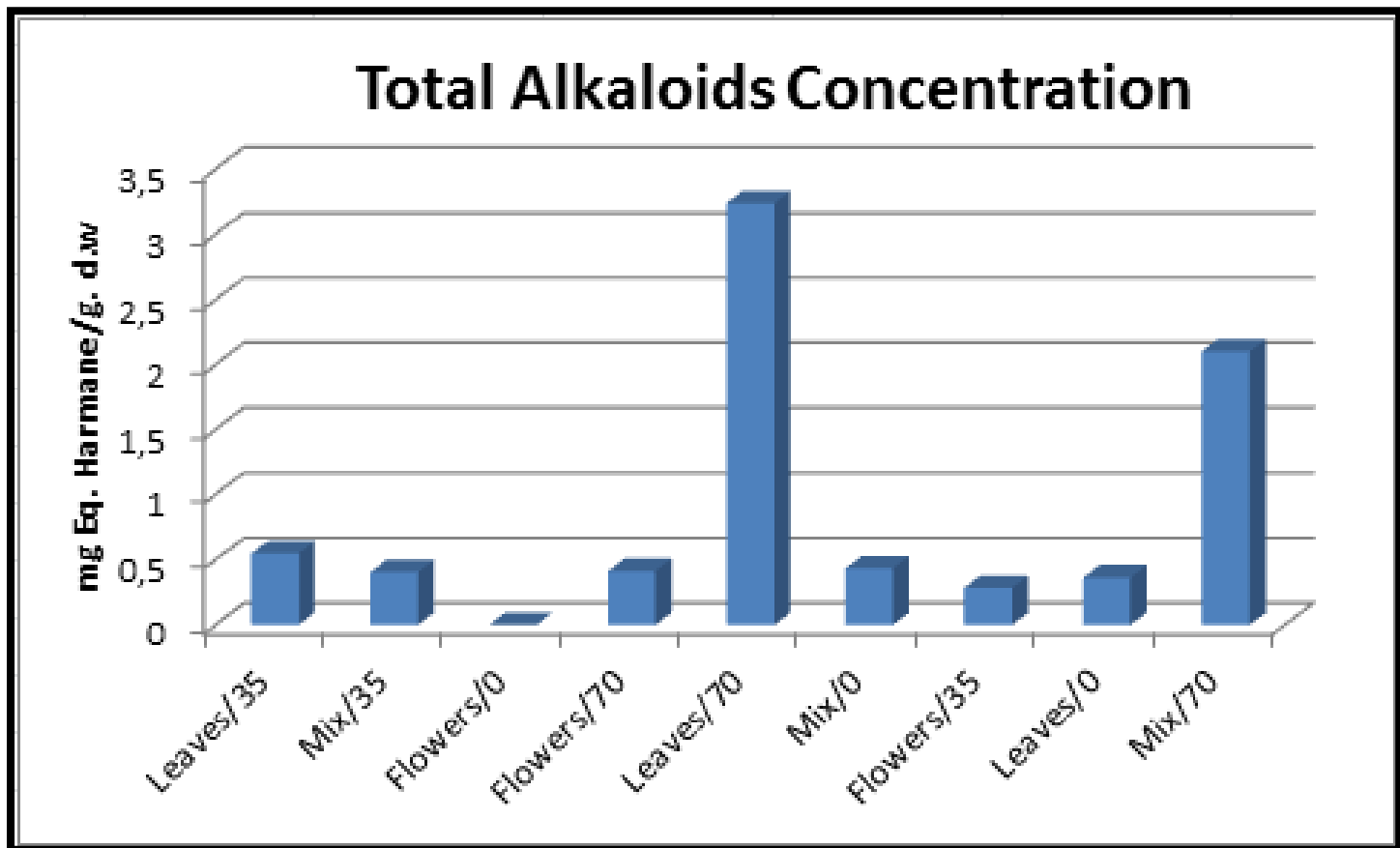


# Total phenols in Cholupa extracts



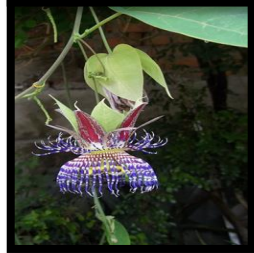
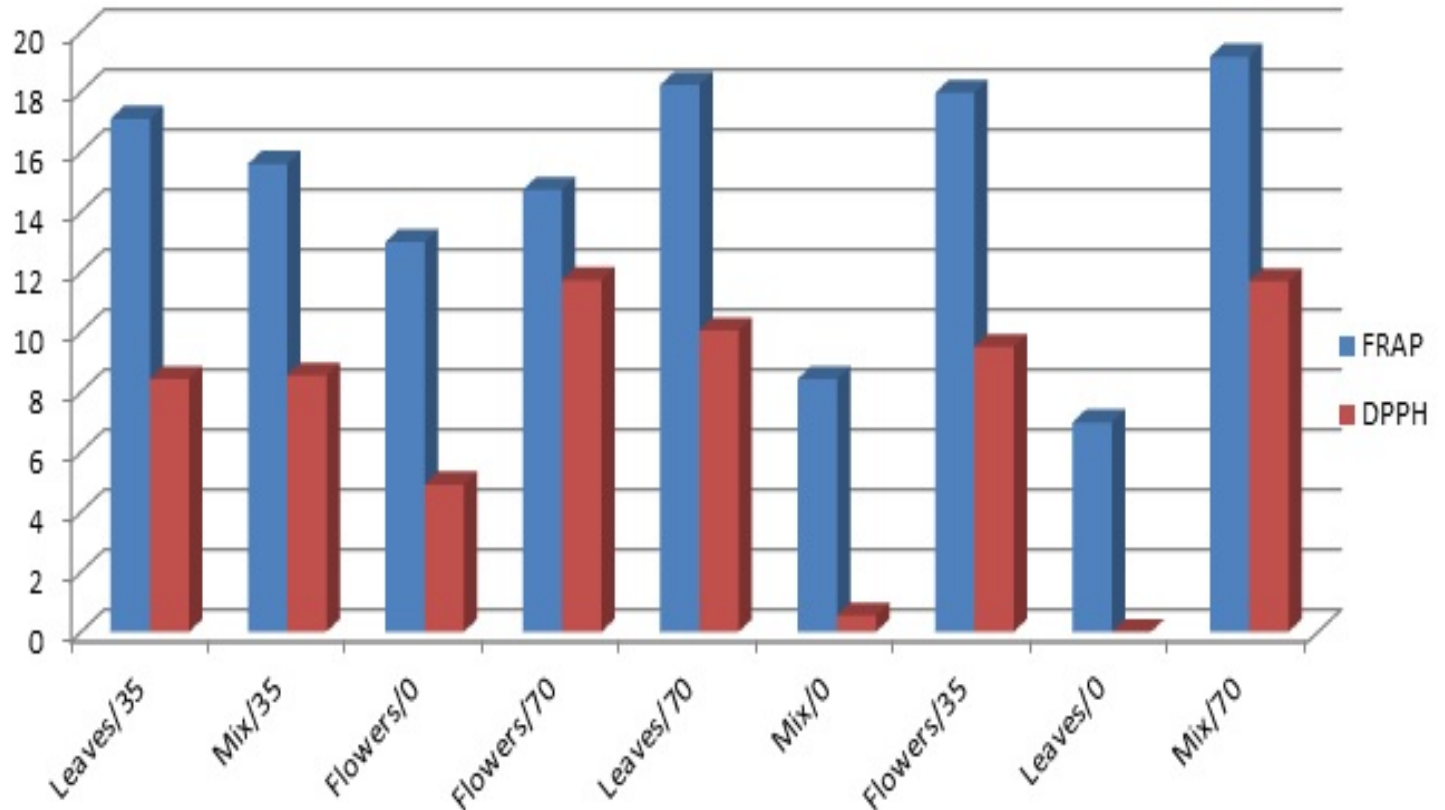


# Total Alkaloids in Cholupa extracts



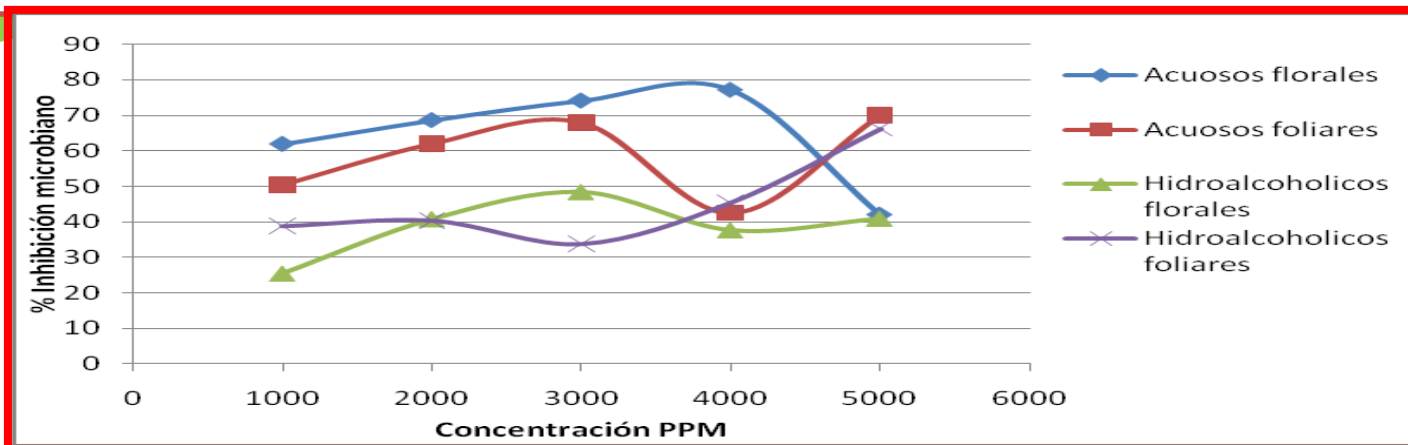
# Antioxidant Activity in Cholupa extracts

## FRAP and DPPH ASSAY. ANTIOXIDAN ACTIVITY

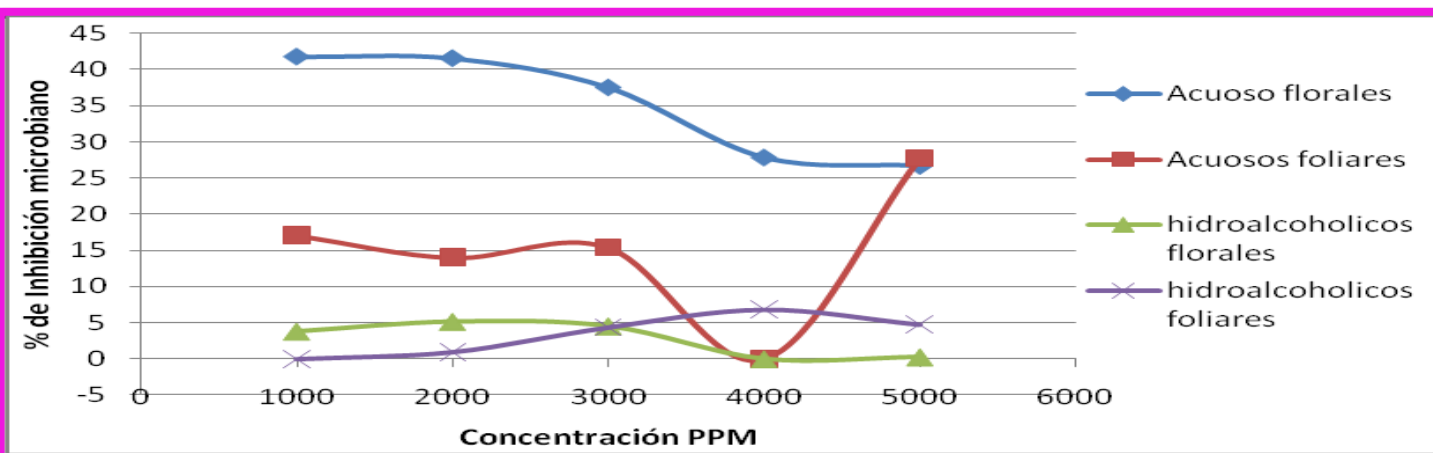


# Antimicrobial Activity in Cholupa Extract

Inhibition percentage *E. coli* in Cholupa extracts



Inhibition percentage del *S. aureus* in Cholupa extracts



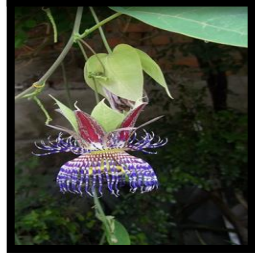




# DISCUSSION/ CONCLUSION

# Discussion/Conclusion

- High amounts of flavonoids, phenols and alkaloids, were obtained, using ethanol 70% as a solvent.
- DPPH radical scanning, demonstrated antioxidant activity both in hydroalcoholic extract flowers and hydroalcoholic extract leaves .
- FRAP assay, demonstrated antioxidant activity in herbal extracts of Cholupa (*Passiflora maliformis*).
- High inhibition of *E. coli* was observed when aqueous extracts were in contact with the moor.
- Aqueous extracts, demonstrated more antimicrobial activity than hydroalcoholic extracts of Cholupa (*Passiflora maliformis*).



# Discussion/Conclusion

- Cholupa (*Passiflora maliformis*) is a potential crop, with the possibility of being industrialised.
- Herbal extracts of Cholupa (*Passiflora maliformis*) could be considered as tea beverage
- Herbal extracts of Cholupa (*Passiflora maliformis*) could be considered as a phitomedicine.





# References

MASTEIKOVA, R., Bernatoniene, J., & Velzien, S. (2008). Antirradical Activities Of The Extract Of Passiflora Incarnata. *Acta Poloniae Pharmaceutica-drug research* , 65 (5), 577-583.

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# THANKS