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Antibacterial, antiobesity, and toxicity effects of cherry stem ethanolic extract

Yasmina Bourebaba [1,2*], Rabah Brahmi [2], Zahoua-Sara Berraki [2], Amina Mahdi [2], Sonia Koubache [2]

[1] Laboratory of Biomathematics, Biophysics, Biochemistry and Scientometry (L3BS), Faculty of Nature and Life Sciences, University of Bejaia, 06000 Bejaia, Algeria.

[2] Department of Biotechnology, Faculty of Nature and Life Sciences, University of Bejaia, 06000, Bejaia, Algeria.

* Corresponding author: yasmina.bourebaba@univ-bejaia.dz

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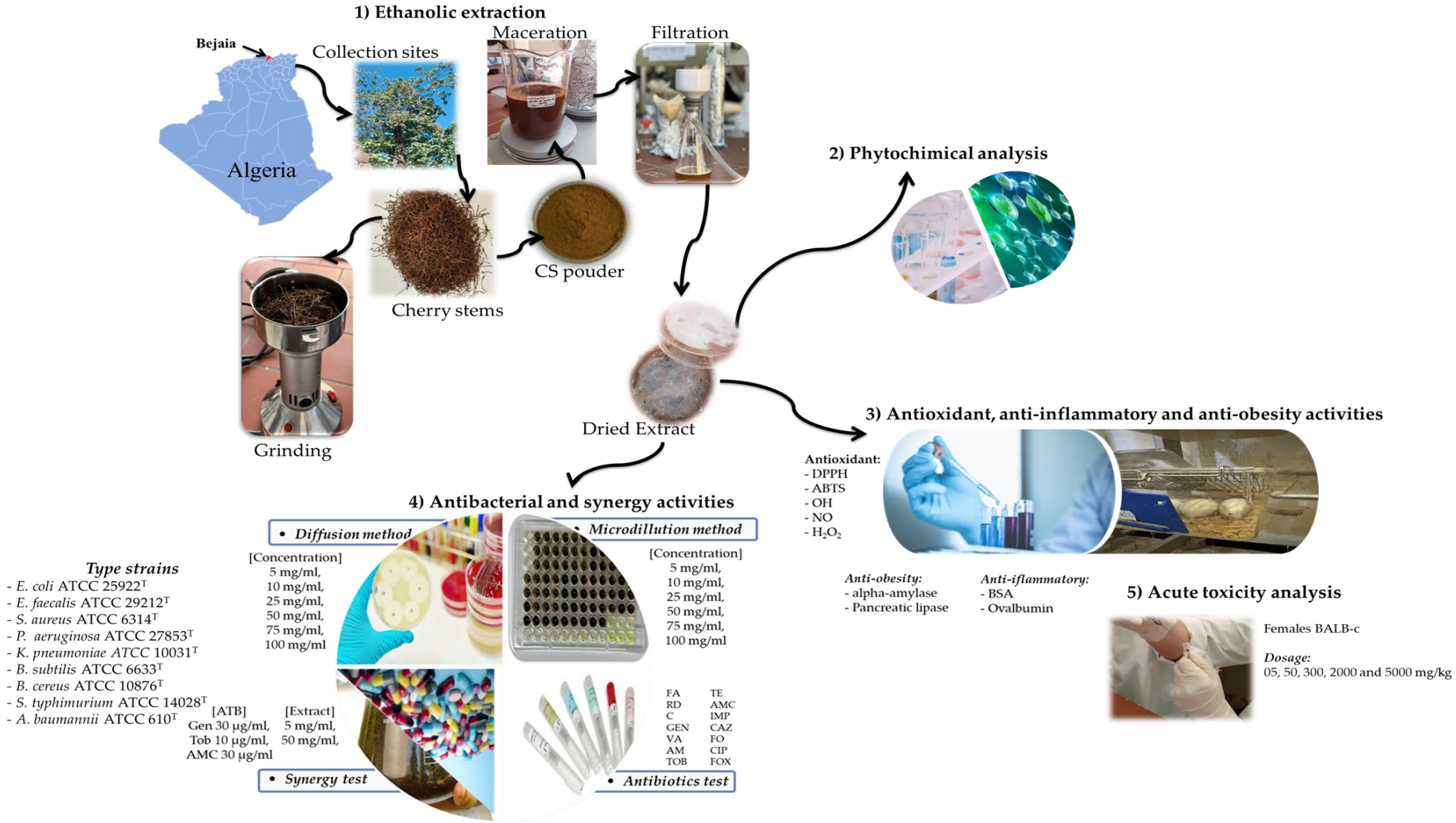
Graphical Abstract



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Abstract:

Due to their increasing prevalence, obesity and infectious diseases represent major public health problems, which is why effective therapeutic alternatives need to be found. There is considerable interest in the potential health benefits of cherry stems, a by-product of agri-food industry. We studied the impact of cherry stems ethanolic extract on the inflammation and oxidative stress associated with obesity, as well as its antibacterial effect. For that, a phytochemical analysis was carried out, then the biological activities related to obesity reduction and antibacterial effects were examined *in-vitro* and *in-vivo*., as well as its synergy with antibiotics. The *in vitro* studies have shown significant amounts of vitamin C and phenolic compounds (3.93 mg ASE/g and 215.52 ± 2.46 mg GAE/g extract, respectively). At a concentration of 01 mg/ml, the extract showed a significant anti-inflammatory (67.11%), antioxidant (60.17 and 64.23%) and anti-obesity (28.29 and 76.66%) properties. The acute oral toxicity of crude ethanolic cherry stem extract, even at high doses, revealed no observable toxicity. The data indicate that cherry extracts exhibit significant antimicrobial activity, with growth inhibition levels ranging from 10 to 98.50%. This is mainly attributed to their bioactive composition. When this extract is combined with antibiotics, they enhance the inhibition of bacterial proliferation, showing an encouraging synergistic effect. In addition, this plant has demonstrated bactericidal action (66.66 - 77.77%) against various strains of pathogenic bacteria. All these factors suggest that cherry stems could be a natural alternative for combating bacterial infections and obesity and their related disorders.

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Keywords: *3 to 5 keywords in alphabetical order and separated by semi colons*

Introduction

Obesity and infectious diseases prevalence, What can be the situation

Obesity is a frequent metabolic disease with a worldwide increasing prevalence.

16% worldwide

55% Algeria

7.7 millions deth worldwide

40% Algeria

Infectious diseases are one of the major public health problem with a worldwide increasing prevalence.

Introduction

What can be its therapeutics?

Medicines and surgical treatment

Exercise and dietary change

Obesity

Infectious diseases

Vaccination with attenuated viruses

Antibiotics, antifugal, and antiparasites

Phytotherapy

Cherry stems

Cherry stems

Introduction

What is cherry?

Prunus sp. or cherries is used traditional and therapeutic food preparations relating to its diversity in antioxidant compounds.

Its richness in bioactive molecules gives it a therapeutic virtues as antioxidant, anti-inflammatory drugs, antimicrobial, but also an important hypotensive and sedative capacity as well as , a diuretic potential.

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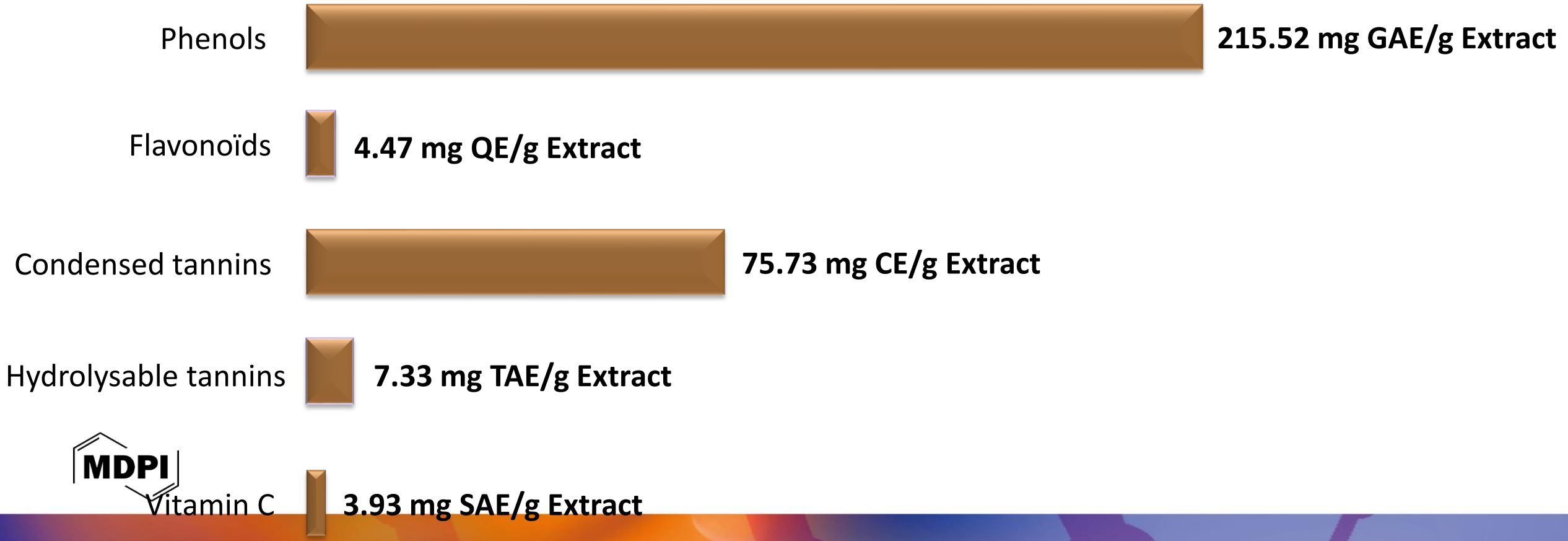
Results and discussion

1) Phytochemical compound content of cherry stems



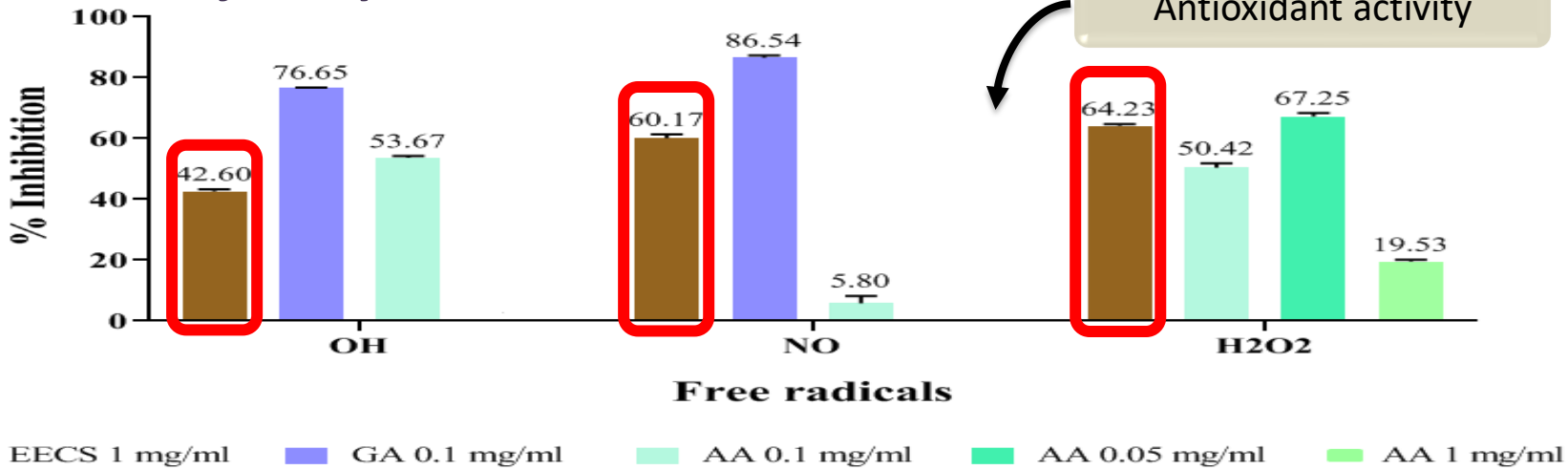
Results and discussion

2) Antioxidant and anti-inflammatory activities of cherry stems ethanolic extract

Table 1. IC_{50} values for *Prunus* sp. extract.

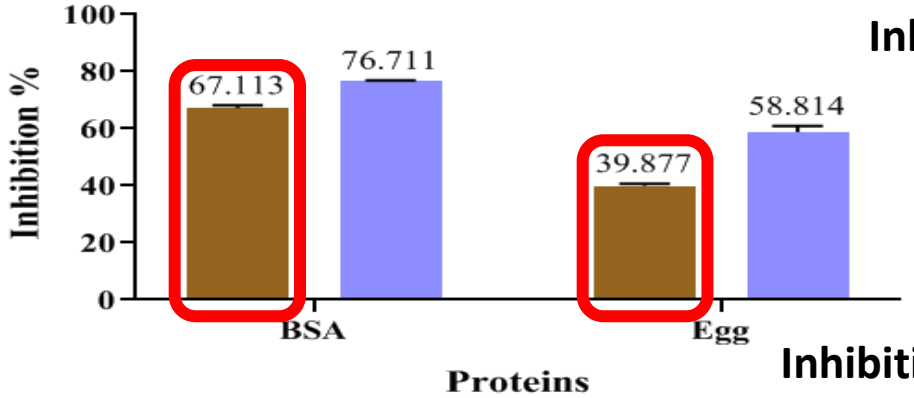
Extract/ Standard	DPPH (µg/ml)	ABTS (µg/ml)
Cherry stems	96.52	178.74
Gallic acid	1.58	/
Ascorbic acid	4.46	/
Trolox	/	3.14

Antioxidant activity



Inhibition % of free radical scavenging activities.

Anti-inflammatory activity



Inhibition % of denaturation of BSA and Ovalbumin proteins.

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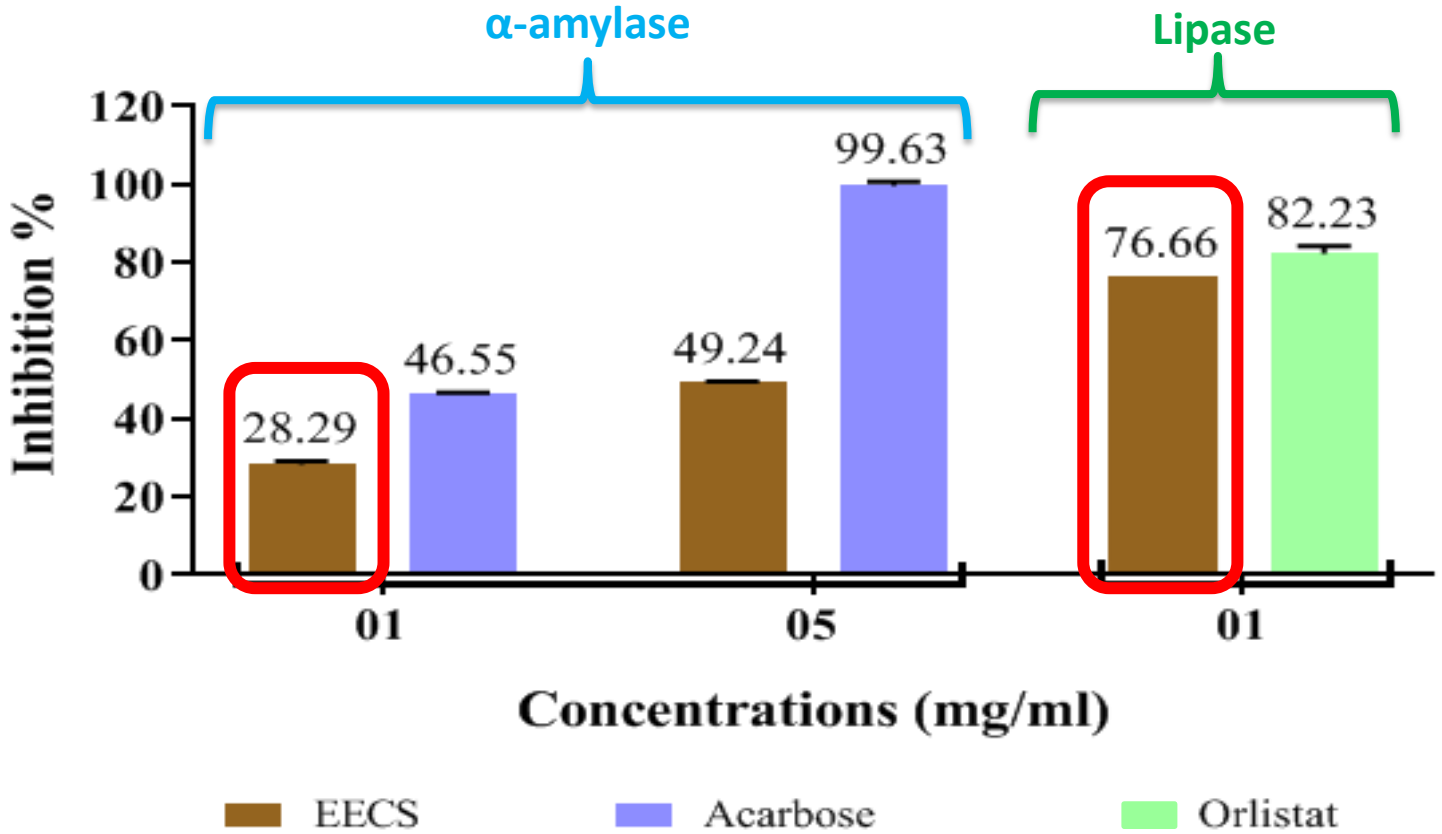
Results and discussion

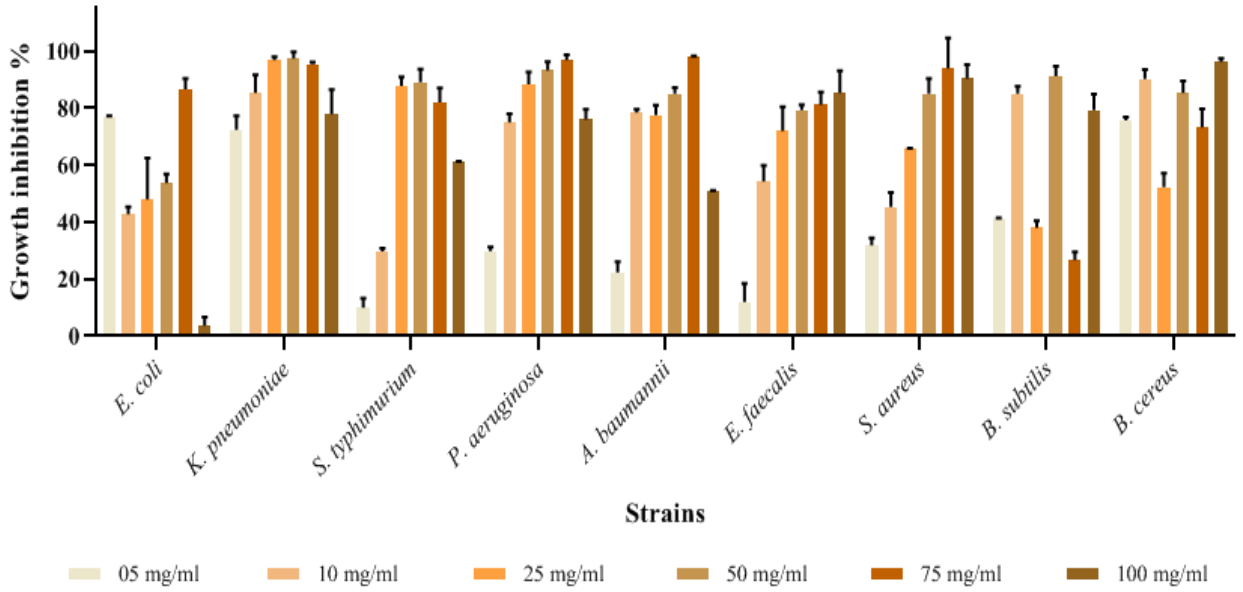
3) Anti-obesity activity of cherry stems ethanolic extract



Inhibition percentage activity of α-amylase and lipase

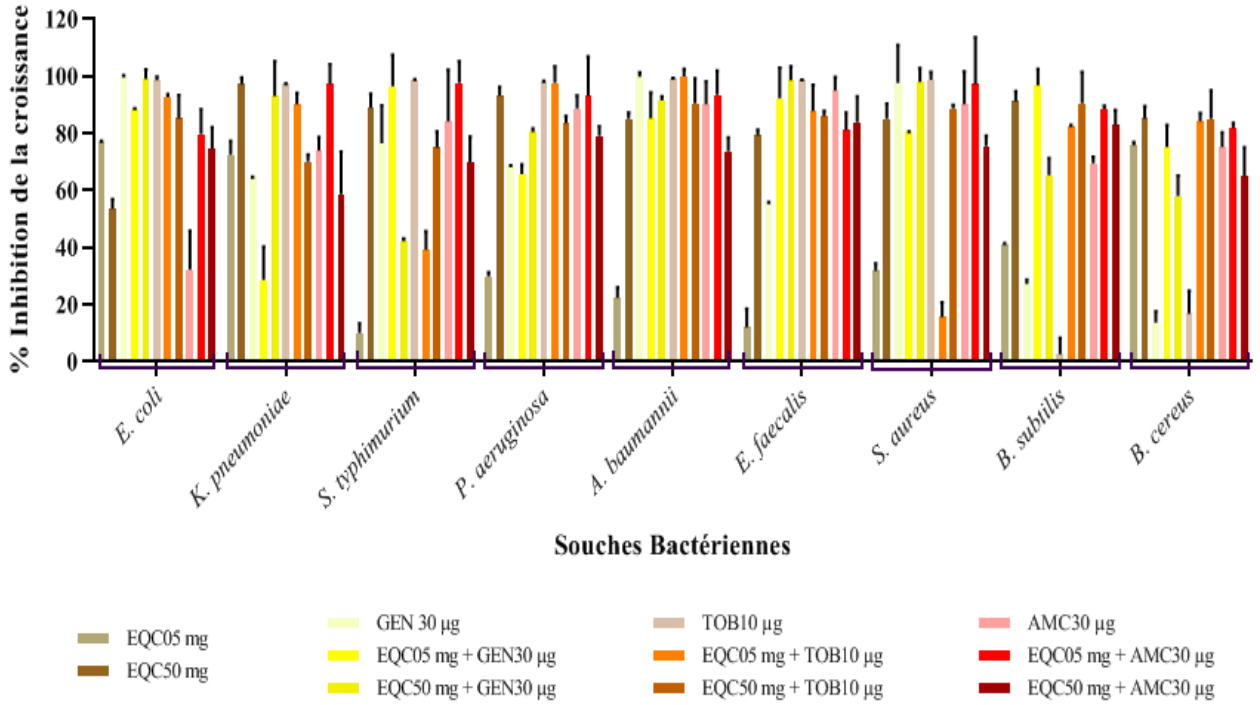
Results and discussion

4) Antibacterial effect of cherry stems ethanolic extract



Inhibition percentage of bacterial growth by ethanolic cherry extracts.

Even greater growth inhibition of certain type strains, reaching 99.80 %.



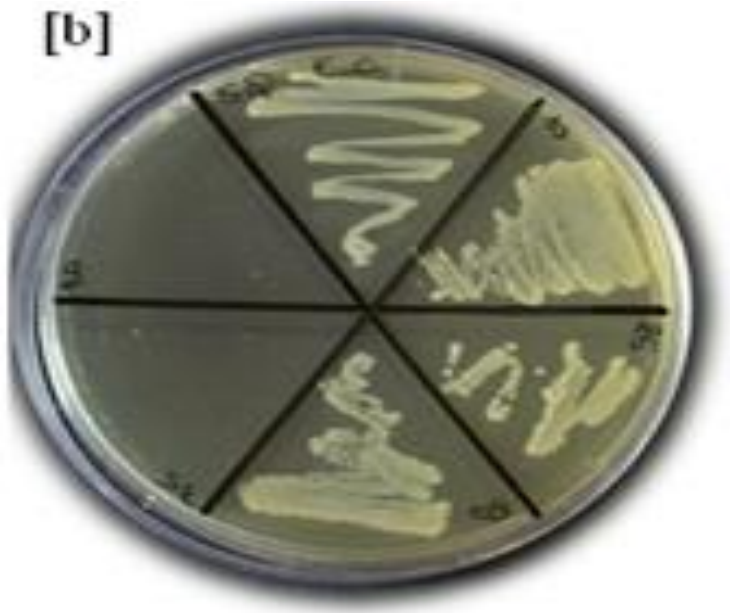
Bacterial growth inhibition percentages of cherry extracts in combination with gentamycin, tobramycin and amoxicillin-clavulanic acid.

Results and discussion

4) Antibacterial effect of cherry stems ethanolic extract

Bactericidal effect of ethanolic cherry extracts

The results reveal a significant synergistic interaction between *Prunus cerasus* L. extracts and three common antibiotics (GEN, TOB and AMC).



Bacteriocidal/bacteriostatical effets of cherry stems extracts on *E. coli*

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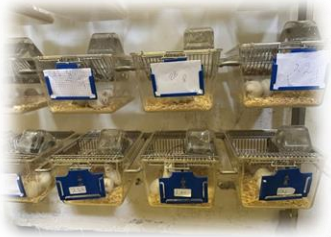
Results and discussion

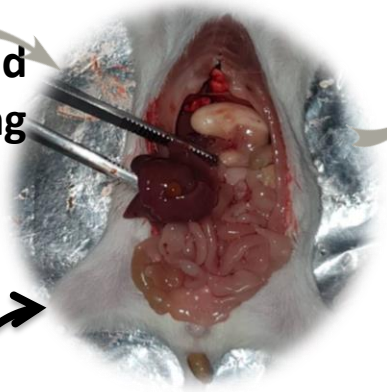
5) In vivo oral acute toxicity evaluation of cherry stems ethanolic extract

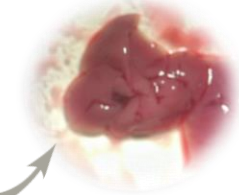


Post-feeding observation (During 14 days)

During the experimentation, no mortality or morbidity were recorded following the ingestion of the extract.

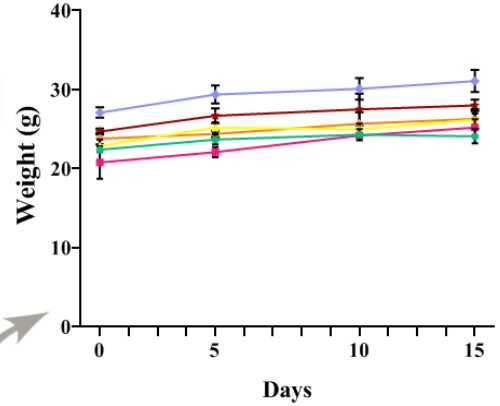
Necropsy examination and organ harvesting

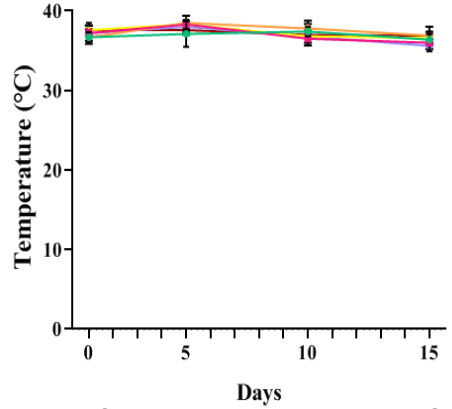


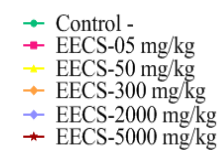


After 14 days

Increase in body weight and a stable body temperature (36-38°C) were observed in all treated mouse.



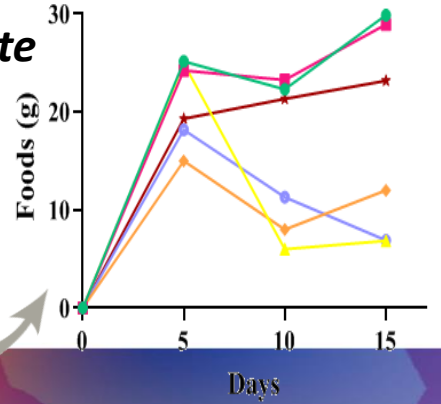


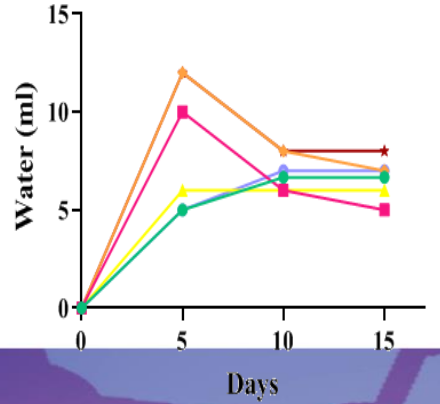


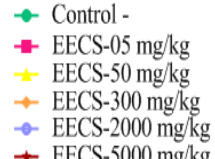
Weight and body temperature changes in animals treated with cherry stems extract during 14 days.

Amount of food and water consumed by animals in acute toxicity test.

No dietary or metabolic changes were caused by the extract tested.

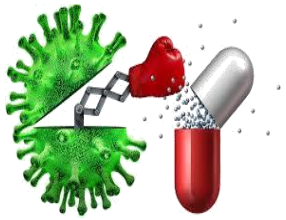






Conclusions

- Cherry stems is rich in bioactive compounds;
- Have significant antioxidant, anti-inflammatory, anti-obesity, and antibacterial properties;



- No acute toxicity in animal experimentation;
- Potential use of *Prunus cerasus* as new therapeutics;

Acknowledgments

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