COLAPLAMED
9no CONGRESO LATINOAMERICANO DE PLANTAS MEDICINALES

CICS-UBI

FACULDADE CIÊNCIAS DA SAÚDE

Área Temática: *Fitoquímica y actividad biológica in vitro de compuestos bioactivos a partir de plantas medicinales* || **Poster number 96**

ANTIOXIDANT AND ANTICANCER EFFECTS OF *PRUNUS AVIUM* L. FRUITS

Ana C. Gonçalves[1,2(*)], Ana R. Nunes[1,3], José D. Flores-Félix[1,4], Gilberto Alves[1], Amílcar Falcão[1,5], Cristina García-Viguera[6], Diego A. Moreno[6], Luís R. Silva[1]

[1]CICS–UBI – Health Sciences Research Centre, University of Beira Interior, Covilhã, Portugal; [2]CIBIT – Coimbra Institute for Biomedical Imaging and Translational Research, University of Coimbra, Coimbra, Portugal; [3]CNC – Centre for Neuroscience and Cell Biology, University of Coimbra, Coimbra, Portugal; [4]Departamento de Microbiología y Genética, Universidad de Salamanca, Spain; [5]Laboratory of Pharmacology, Faculty of Pharmacy, University of Coimbra, Coimbra, Portugal; [6]CEBAS-CSIC, Food Science and Technology Department, Phytochemistry and Healthy Foods Laboratory, Murcia, Spain.*Corresponding author: anacarolinagoncalves@sapo.pt

Introduction

Natural-based plants and derivatives have received much attention due to their capacity to reduce oxidative stress levels and attenuate, or even mitigate the occurrence of many diseases[1]. Therefore, it is not surprising that their consumption and incorporation in new pharmaceutical drugs and nutraceuticals is increasing worldwide. Among fruits, sweet cherries have been a focus of many studies for being nutrient-dense fruits with low caloric content, glycemic index and high percentage of water and phenolic compounds[2]. In this context, the aim was to characterize the phenolic profile and evaluate the biological potential of phenolic-enriched fractions from *Saco* sweet cherry cultivar, i.e., (i) non-coloured phenolic fraction, (ii) coloured phenolic fraction and (iii) total phenolic extract.

Experimental Design

Hydroethanolic extracts (70:30) of *Saco* sweet cherry

↓

C18 solid-phase extraction

- Ethyl acetate → **(i) Non-coloured fraction**
  - Acidified ethanol → **(ii) Coloured fraction**
- Acidified ethanol → **(iii) Total extract**

Chromatographic analyses

Anthocyanins

Non-coloured phenolics

Biological potential

Viability assays

Human erythrocytes protection against ROO•

Human colon cancer Caco-2 cells

Results and Discussion

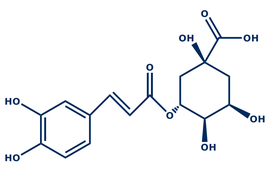
Chromatographic analysis

A total of 35 non-coloured phenolics and 4 anthocyanins were detected.

Total amounts of non-coloured phenolics:

Total phenolic extract: 11069.73 µg/g

Non-coloured fraction: 15220.88 µg/g



***cis*-3-*O*-Caffeoylquinic acid** (2) was the most predominant compound found in total extract and non-coloured fraction.

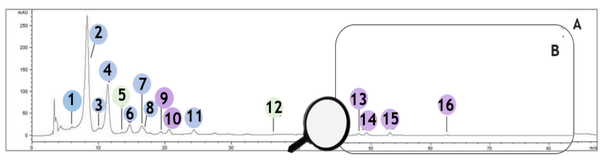
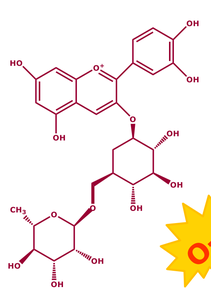


Figure 1. Non-coloured phenolic profile of *Saco* total extract obtained by HPLC-DAD (detection at 280 (A) and 350 (B) nm). (1) Feruloyl di-hexose, (2) *cis*-3-*O*-caffeoylquinic acid, (3) *trans*-3-coumaroylquinic acid, (4) *cis*-3-coumaroylquinic acid, (5) catechin, (6) caffeoyl hexose, (7) feruloylquinic acid, (8) *trans*-5-*O*-caffeoylquinic acid, (9) taxifolin-rutinoside, (10) procyanidin dimer B, (11) 4-coumaroylquinic acid, (12) catechin derivative, (13) quercetin 3-*O*-rutinoside, (14) quercetin 3-*O*-glucoside, (15) kaempferol 3-*O*-rutinoside, (16) quercetin.

Total amounts of coloured phenolics:

Total phenolic extract: 4740.73 µg/g

Coloured fraction: 19214.50 µg/g



Cyanidin 3-*O*-rutinoside (1) was the main anthocyanin found in both total extract and coloured fraction.

O-H **Due to its hydroxyl groups, this one is related to many biological activities.**

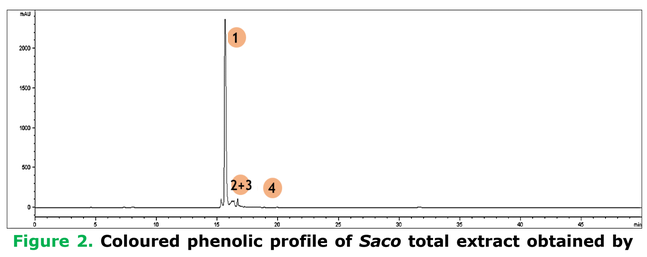
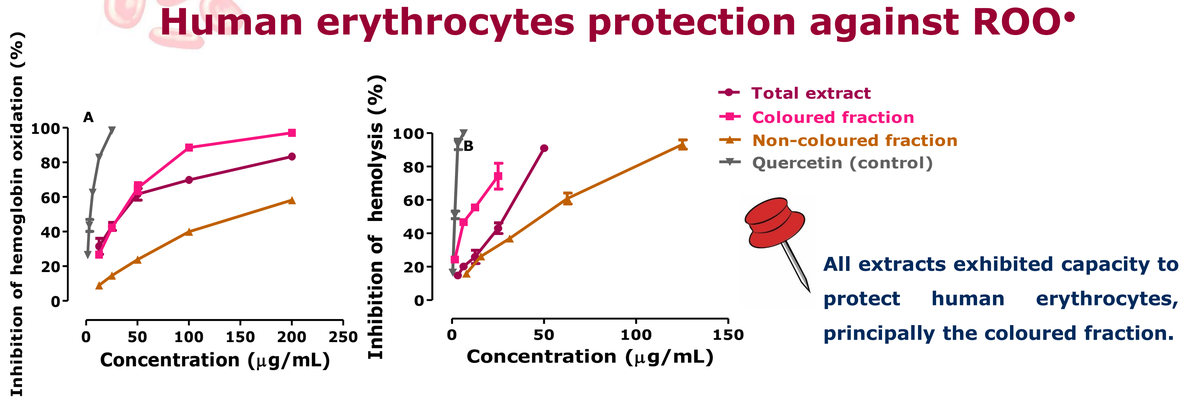


Figure 2. Coloured phenolic profile of *Saco* total extract obtained by HPLC-DAD (detection at 500 nm). (1) Cyanidin 3-*O*-rutinoside, (2) pelargonidin-3-O-rutinoside, (3) peonidin 3-*O*-rutinoside and (4) delphinidin 3-*O*-rutinoside.

Biological potential

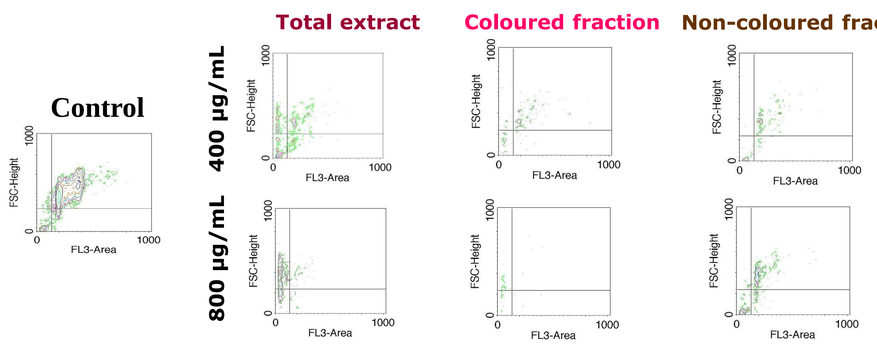
Human erythrocytes protection against ROO•



All extracts exhibited capacity to protect human erythrocytes, principally the coloured fraction.

Figure 3. *Saco*'s ability to protect human erythrocytes against ROO•-mediated toxicity generated by AAPH, inhibiting hemoglobin oxidation (A) and hemlysis (B). Values show mean ± SE from three experiments performed in triplicate.

Human colon cancer Caco-2 cells



↑ **Phenolics**

↓

Cell death

Necrosis

Figure 4. Caco-2 cellular viability assessed by flow cytometry, after exposure to *Saco* fractions for 24 hours.

Conclusions

The present data encourage not only the consumption of *Prunus avium* fruits but also their incorporation in pharmaceuticals and nutraceuticals, given that they can act as antioxidant agents and have benefits in cancer diseases.

Acknowledgments

The authors are grateful to FCT, MCTES, EFS and EU for the PhD fellowships of Ana Carolina Gonçalves (2020.04947.BD) and Ana Raquel Nunes (SFRH/BD/139137/2018). Part of this work was also supported by the Grant for Research Group of Excellence - Fundación Seneca, Murcia Regional Agency for Science and Technology, Project 19900/GERM/15 at CEBAS-CSIC.

References

1. Gonçalves, A.C.; Bento, C.; Silva, B.; Simões, M.; Silva, L.R. (2019). Nutrients, bioactive compounds and bioactivity: the health benefits of sweet cherries (*Prunus avium* L.). Current Nutrition & Food Science, 15, 208–227.
2. Gonçalves, A. C., Rodrigues, M., Santos, A. O., Alves, G., Silva, L.R. (2018). Antioxidant status, antidiabetic properties and effects on Caco-2 cells of colored and non-colored enriched extracts of sweet cherry fruits. Nutrients, 10(11) 1-20.